eem
electronic
engineers
master

Volume
3

PASSIVE
COMPONENTS
MATERIALS
HARDWARE

PAGES
2009-3072

1971-72

UNITED
TECHNICAL
PUBLICATIONS
Division of
Cox Broadcasting Corp.

Printed in U.S.A.

1971-72 eem

electronic engineers master

Industry-wide catalog
of electronic components,
materials, equipment
and services...
in three distinct volumes

PRODUCT FINDER
Green Section

CATALOGS
White Section

MANUFACTURERS AND
SALES OFFICES DIRECTORY
Yellow Section

TRADE NAME DIRECTORY
Volume 1, Page 957

Volume 3

passive components
materials / hardware

This volume contains pages 2009-3072

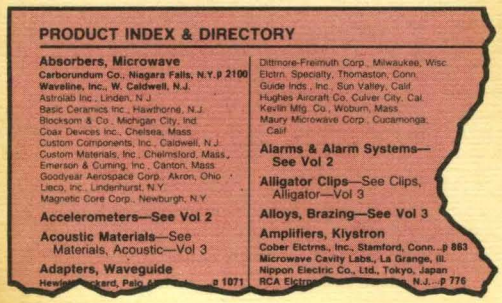
Section	Products	Starting Page
	Product Finder	2011
	Index of Manufacturers' Catalogs	2310
1400	Cabinets, Chassis, Containers, Racks, Boxes, etc.	2314
1500	Capacitors (All Types)	2330
1600	Chemicals (Acids, Adhesives, Coatings, Lubricants, etc.)	2478
1800	Coils (Inductors, Chokes), Assemblies, Forms	2481
2100	Connectors, Electrical (Receptacles, Sockets, Terminal Boards)	2510
2350	Delay Lines (All Types)	2728
2500	Fabricated Mechanical Parts (Bearings, Cores, Magnets, etc.)	2754
2600	Fans, Blowers & Cooling Equipment	2776
2800	Hardware, Non-Current Carrying (Fasteners, Washers, etc.)	2809
3100	Insulators, Insulating Materials & Parts	2810
3150	Manufacturing, Subcontracting, Custom Fabrication	2814
3200	Materials, Raw (Metals, Plastics, Glass, Rubber, Cloth, etc.)	2816
4700	Resistors, Fixed	2818
4750	Resistors, Variable (Potentiometers & Rheostats)	2902
5400	Tools (Hand & Power); Soldering Supplies	2933
5600	Transformers	2948
6000	Wire, Cable, Harnesses & Accessories	2994

Price: $20.00

How to use eem

to find manufacturers of a specific product

GREEN SECTION



PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind
Coar Devices Inc., Chelsea, Mass
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.,
Emerson & Cuming, Inc., Canton, Mass
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
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Electrn. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn...p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J....p 776

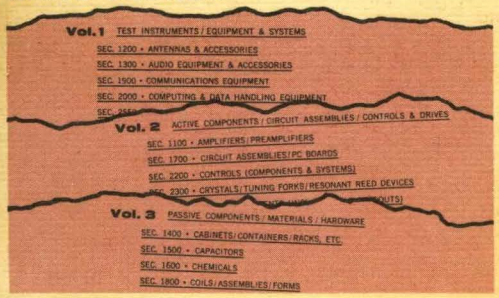
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION



Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

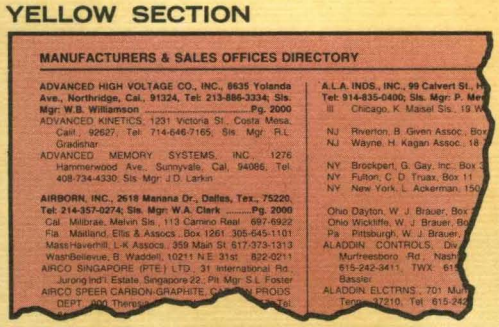
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION



MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal.: Millbrae, Melvin Sls., 113 Cameo Real 697-6922
Fla.: Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22., Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CARBON PRODS DEPT., 900 Theresia... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mey...
Ill.: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Box...
Pa.: Pittsburgh, W. J. Brauer...
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nashv... 615-242-3411, TWX: 615... Basser.
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957

TRADE NAME DIRECTORY

Autonsvigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baitoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotec - ... - Bosch Lab...
Bicalex - winding wires... Cables.
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid ...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike - ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

1971-72 eem

55 PRODUCT SECTIONS IN 3 VOLUMES

TEST INSTRUMENTS EQUIPMENT & SYSTEMS	Vol. 1
ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES	Vol. 2
PASSIVE COMPONENTS MATERIALS / HARDWARE	Vol. 3

eem — Electronic Engineers Master saves you engineering, specifying and purchasing time. Manufacturers' catalogs are grouped under easy-to-remember headings.

The 55 Product Sections categorize related electronics components, equipment, materials, instruments and systems, and fabrication services, enabling you to quickly compare and evaluate similar items.

find a specific manufacturer's catalog pages refer to the Index of Manufacturers which precedes each Catalog Section (white pages).

These are the 55 eem Product Sections grouped in 3 volumes

Volume Number	Product Section	Page Number	Products
2	1100	1278	Amplifiers, Audio, Operational, etc.
1	1200	307	Antennas & Accessories
1	1300	308	Audio Equipment & Accessories
3	1400	2314	Cabinets, Chassis, Containers, Racks, Boxes, etc.
3	1500	2330	Capacitors (All Types)
3	1600	2478	Chemicals (Acids, Adhesives, Coatings, Lubricants, etc.)
2	1700	1296	Circuit Assemblies, Circuit Boards & Breadboarding Kits
3	1800	2481	Coils (Inductors, Chokes), Assemblies, Forms
1	1900	322	Communications Equipment (Facsimile, Telephone, Television)
1	2000	328	Computing, Data Handling Equipment & Accessories
3	2100	2510	Connectors, Electrical (Receptacles, Sockets, Terminal Boards)
2	2200	1304	Controls, Control Components & Systems
2	2300	1353	Crystals & Mechanical Tuning Devices; Oscillators
3	2350	2728	Delay Lines (All Types)
2	2400	1435	Panel Components (Including Lighting & Readouts)
3	2500	2754	Fabricated Mechanical Parts (Bearings, Cores, Magnets, etc.)
1	2550	388	Environmental Test Equipment
3	2600	2776	Fans, Blowers & Cooling Equipment
2	2700	1506	Filters
3	2800	2809	Hardware, Non-Current Carrying (Fasteners, Washers, etc.)
1	2900	391	Instruments, Measuring & Test
1	3000	587	Instruments, Graphic Recording
3	3100	2810	Insulators, Insulating Materials & Parts
2	3130	1535	Integrated Circuits & Hybrid Microcircuits
3	3150	2814	Manufacturing, Subcontracting, Custom Fabrication
3	3200	2816	Materials, Raw (Metals, Plastics, Glass, Rubber, Cloth, etc.)
1	3300		Medical Electronic Equipment
1	3400	598	Microwave, Laser & Radar (Systems & Subsystems)
2	3450	1552	Microwave, Laser & Radar (Components/Accessories)
2	3500	1572	Motors, Rotating Components & Accessories
1	3600		Nuclear & Radiation Equipment
2	3700	1636	Photoelectric Equipment & Components
2	3800	1641	Optical Equipment & Accessories
1	4000	616	Power Supplies, Converters, Inverters, Batteries, etc.
1	4100	947	Production Machinery & Automation Equipment
3	4200		Engineering Aids (Books, Drafting Equipment, Whiteprinters)
1	4300	950	Recording Equipment (Non-Audio Types)
2	4500	1645	Relays
3	4600		Research, Development, Engineering Services
3	4700	2818	Resistors, Fixed
3	4750	2902	Resistors, Variable (Potentiometers & Rheostats)
2	4800	1794	Semiconductors & Devices, Rectifiers (Non-Tube Types)
2	4900	1865	Servomechanisms & Components
1	5000	951	Studio Equipment
2	5100	1877	Switches, Circuit Breakers, Fuses, Protective Devices
1	5200	953	Telemetering Equipment
2	5300	1963	Thermal Devices, Thermistors, Thermocouples, Thermostats, etc.
3	5400	2933	Tools (Hand & Power); Soldering Supplies
2	5500	1985	Transducers & Associated Equipment
3	5600	2948	Transformers
2	5700	1995	Tubes, Tube Parts, Shields, Inserts, etc.
1	5800		Ultrasonic, Sonic, Subsonic Equipment
1	5850		Vacuum Equipment & Accessories
2	5900	2006	Vibrators, Choppers, etc.
3	6000	2994	Wire, Cable, Harnesses & Accessories

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INTRODUCTION

This 1971-72 edition of **eem/Electronic Engineers Master** is the fourteenth and largest volume published to date. You will find more catalog data included than ever before, systematically presented for the first time in **three separate volumes.**

Volume 1 — Test Instruments, Equipment and Systems

Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

The 55 **eem** Product Sections have been individually assigned to their appropriate volume. A listing of the product sections within each volume appears on each cover. A complete listing of the 55 product sections appears on the first page of each volume (pages 1, 301, 989, 2009 and inside the back cover).

United Technical Publications' Time-Saving Product Information System

We have drawn upon the experience of hundreds of engineers and purchasing agents to develop a time-saving product/information system. It includes these major elements:

eem/Electronic Engineers Master

This bound catalog file for the complete product data of many huundreds of manufacturers is divided into three volumes with a total of 55 product sections. It includes the **Catalog Section** (white section); an industry-wide **Product Directory** (green section); a verified **Directory of Manufacturers** (yellow section) which can put the products and sales offices of more than 6,000 manufacturers at the user's fingertips; and a **Trade Name Directory** which starts on page 957 in the white pages of Volume 1.

Electronic Products Magazine

The electronic industry's only major magazine devoted 100% to products, product application and product selection, EPM keeps engineers and purchasing agents up to date on all phases of products.

Prices

Prices are furnished for information only — they are not offered as quotations. Participating manufacturers reserve the right to change specifications, revise prices or discontinue items without notice. While every precaution has been taken to assure accuracy in content, the publisher cannot be responsible for manufacturers' claims and representations; nor can any guarantee be made against the possibility of error or omission.

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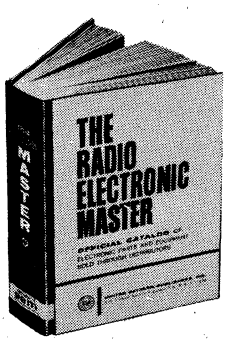

Companion volume
THE RADIO-ELECTRONIC MASTER
available from
electronic parts distributors
(See pages 984 or 3072)

PRODUCT INDEX AND DIRECTORY

This Product Index and Directory contains listings for all products in **eem**. Since **eem** consists of three volumes, if a product is shown in this volume, a complete list of its manufacturers appears below the product heading. If the product appears in one of the other two volumes, a cross reference indicates the appropriate volume.

For products which are included in this volume, manufacturers are listed alphabetically in two groups under each product heading. The first group **(shown in bold face)** includes those manufacturers whose catalog pages appear in the white pages of **eem**. Page numbers are included if information on the specific product shown in the heading is included in the manufacturers' pages. The second group includes those manufacturers who make this product but whose catalog pages do not appear in the white section.

eem
electronic engineers master
1971-72

VOLUME 3

Abrasive Belts, Cords, Wheels, etc.—See Vol 1

Abrasive Compounds, Grains, Powders, etc.—See Vol 1

Absorbers, Microwave—See Vol 2

Absorbers, Nuclear Radiation—See Vol 1

Absorbers, Shock—See Mounts, Shock & Vibration

Accelerators & Accessories, Particle—See Vol 1

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic

Acoustic Noise Generators—See Generators, Acoustic, High Intensity Noise—Vol 1

Acoustic Test Chambers—See Chambers, Acoustical Test, High Intensity Noise—Vol 1

Acrylic Sprays—See Insulating Compounds, Acrylic

Actuators, Servo, Linear—See Vol 2

Actuators, Servo, Rotary—See Vol 2

Adapters—See Connectors; Plugs; Sockets; etc.

Adapters, F-M, Recording—See Vol 1

Adapters, Panoramic—See Receivers, Panoramic—Vol 1

Adapters, Waveguide—See Vol 2

Adhesives (All Types)

Cox & Co., Inc., New York, N.Y.
GC Elctrns., Rockford, Ill.
Spectra-Strip Corp., Garden Grove, Cal. p 3054
Ablestik Adhesive Div., Gardena, Calif.
Abletech, Gardena, Calif.
Adhesive Prods. Corp., Bronx, N.Y.
Allaco Prods., Braintree, Mass.
Amicon Corp., Lexington, Mass.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Armstrong Cork Co., Lancaster, Pa.
Armstrong Prods. Co., Warsaw, Ind.
Artech Corp., Falls Church, Va.
Bacon Inds., Watertown, Mass.
Borden Chem., New York, N.Y.
Cadilac Plastics & Chems., Detroit, Mich.
Carboline Co., St. Louis, Mo.
Carter's Ink Co., Cambridge, Mass.
Chomerics, Inc., Woburn, Mass.
Clarkson Labs., Inc., Camden, N.J.
Conap, Inc., Allegany, N.Y.
Corkpak Co., Inc., New Rochelle, N.Y.
Daubert Chem. Co., Oak Brook, Ill.
Dennis Chem. Co., St. Louis, Mo.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Corning Corp., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Electrotools, Inc., Broadview, Ill.
Emerson & Cuming, Inc., Canton, Mass.
Epoxylite Corp., S. El Monte, Calif.
Fel-Pro Inc., Skokie, Ill.
Fenwal, Inc., Ashland, Mass.
Furane Plastics, Los Angeles, Cal.
GAF Corp., New York, N.Y.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
General Elec., Providence, R.I.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Hightemp Resins, Inc., Stamford, Conn.
Hysol Div., Olean, N.Y.
Isochem Resins Co., Lincoln, R.I.
Kenics Corp., Danvers, Mass.
Loctite Corp., Newington, Conn.
Mansol Ceramics Co., Inc., Belleville, N.J.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Morgan Adhesives Co., Stow, Ohio
Nitine, Inc., Clifton, N.J.
Optical Inds., Santa Ana, Cal.
Opticon Chem., Palos Verdes Peninsula, Cal.
Packaged Resins Co., Braintree, Mass.
Paisley, Edison, N.J.
Pelmor Labs., Inc., Newtown, Pa.
Philadelphia Quartz Co., Phila., Pa.
Phoenix Materials Corp., Kittanning, Pa.
Randolph Prods. Co., Carlstadt, N.J.
Resin Formulators Co., Culver City, Cal.
Royal Inds, El Segundo, Calif
Rubatex Corp, Bedford, Va.
Sauereisen Cements Co., Pittsburgh, Pa.
Schjeldahl, G.T. Co., Northfield, Minn.
Smooth-On, Inc., Gillette, N.J.
Sterling, Sewickley, Pa.
Tapecon, Inc., Rochester, N.Y.
Techform Labs., Inc., Venice, Cal.
Techni-Tool, Inc., Philadelphia, Pa.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Tra-Con, Inc., Medford, Mass.
Uniroyal, Inc., New York, N.Y.
United American Metals Div., Brooklyn, N.Y.
Universal Shellac & Supply Co., Inc., Hicksville, NY
Vigor Tool Co., New York, N.Y.
Wakefield Engrg., Inc., Wakefield, Mass.
Whittaker Corp., Los Angeles, Cal.

Aging Racks—See Racks, Aging—Vol 1

Air Cleaners & Filters (Shielded & Unshielded)

Evans, George Corp., Moline, Ill. p 2785
McLean Engrg. Labs., Princeton Jctn., N.J. ..... p 2788
Rotron, Inc., Woodstock, N.Y. p 2795,2806
Agnew-Higgins, Inc., Garden Grove, Calif.
American Air Filter, Louisville, Ky.
Atlantic Ultraviolet Corp., Long Island City, N.Y.
Balston Ind'l. Ltd., Lexington, Mass
Blocksom & Co., Michigan City, Ind.
Cambridge Filter Corp., Syracuse, N.Y.
Carbone Corp., Boonton, N.J.
Carey Elctrn. Engrg. Co., Springfield, Ohio
Cincinnati Fan & Ventilator Co., Cincinnati, Ohio
Clean Rooms Constr., Westminster, Cal.
Corning Glass Works, Fluidic Products Dept., Corning, N.Y.
Flock Process Corp., S. Norwalk, Conn.
Fox Valve Dev. Co., Inc., Hanover, N.J.
Hollis Engrg., Inc., Nashua, N.H.
Honeywell, Residential Div., Mpls., Minn.
Johnson Corp., Three Rivers, Mich.
Kahn & Co., Inc., Wethersfield, Conn.
Lear Siegler, Inc., Santa Monica, Calif.
Lisk, G.W. Co., Clifton Springs, N.Y.
Metex Corp., Edison, N.J.
Midget Louver Co., Norwalk, Conn.
North American Rockwell Corp., Cleveland, Ohio
Owens-Corning Fiberglas, Toledo, Ohio
Pall Corp., Glen Cove, N.Y.
Pall Trinity Micro Corp., Cortland, N.Y.
Pioneer Metals, Inc., Harrodsburg, Ky.
Research Prods. Corp., Madison, Wisc

Selas Corp. America, Dresher, Pa.
Sethco Mfg. Corp., Freeport, N.Y.
Taylor Instr. Process Control Div., Rochester, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Torit Corp., St. Paul, Minn.
Trion, Inc., McKees Rocks, Pa.
Westinghouse Elec. Int'l., New York, N.Y.
Wheelabrator Corp., Mishawaka, Ind.
Zero Mfg. Co., Burbank, Cal.

Air Conditioners (For Equipment)
Electro Impulse, Inc., Red Bank, N.J. p 2784
Magnedyne Inc., Carlsbad, Calif.
Accessory Controls & Equip., Windsor, Conn.
American Air Filter, Louisville, Ky.
Astro Dynamics, Inc., Burlington, Mass.
Buffalo Forge Co., Buffalo, N.Y.
Dynamic Air Engrg., Santa Ana, Calif.
Eastern Inds. Div., Hamden, Conn.
Jersey Tech. Consits., Morristown, N.J.
Kooltronic Fan Co., Princeton, N.J.
Lear Siegler, Inc., Santa Monica, Calif.
Lear Siegler, Inc., Santa Ana, Calif.
Nuclear Sys., Garland, Tex.
Standard Cabinet Co., Inc., Totowa, N.J.
Task Corp., Anaheim, Calif.
Westinghouse Elec. Int'l., New York, N.Y.

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Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Silver Co. Div., Flushing, N.Y.
American Smelting & Refining Co., New York, N.Y.
Anaconda American Brass Co., Waterbury, Conn.
ARC Prods. Div., Chicago, Ill.
Cabot Corp., Kokomo, Ind.
Cerac, Inc., Butler, Wisc.
Handy & Harman, New York, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Mueller Brass Co., Port Huron, Mich.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Unibraze Corp, White Plains, N.Y.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Western Gold & Platinum Co., Belmont, Cal.
Westinghouse Elec., Sykesville, Md.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Wilkinson Co., Westlake Village, Cal.

Alloys, Metal - Ceramic
Engelhard Minerals & Chem., Murray Hill, N.J.
Glass Tech., Newport Bch., Cal.
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Metal Climax, Inc., New York, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cerac, Inc., Butler, Wisc.
Cerro Corp., New York, N.Y.
Crucible Steel Corp., Pittsburgh, Pa.
Division Lead Co., Summit, Ill.
Dixon Sintaloy, Inc., Stamford, Conn.
Driver, Wilbur B. Co., Newark, N.J.
Duramic Prods., Inc., Palisades Park, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Glidden-Durkee Div., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
King Laboratories, Inc., Syracuse, N.Y.
Leico Inds., Inc., New York, N.Y.
Magnetics, Inc., Butler, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
National Beryllia Corp., Haskell, N.J.
Nat'l. Lead Co., New York, N.Y.
Plasmadyne, Santa Ana, Calif.
Pyco, Inc., Penndel, Pa.
Republic Foil, Inc., Danbury, Conn.
Research Chem., Phoenix, Ariz.
Reynolds Metals Co., Richmond, Va.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Union Carbide, San Diego, Cal.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
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Arvee Engrg. Co., Torrance, Calif.
Engelhard Minerals & Chem., Murray Hill, N.J.
Melcor Elctrns. Corp., Farmingdale, N.Y.
Aerospace Resch. Inc., Boston, Mass.
Andersen W. M. A. & Assocs., Tariffville, Conn.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Elctrn. Modules Corp., Timonium, Md.
Harshaw Chem. Co., Cleveland, Ohio
Hughes Aircraft Co, Fullerton, Cal.
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Anaconda American Brass Co., Waterbury, Conn.
Chase Metal Service Div., Cleveland, Ohio
Division Lead Co., Summit, Ill.
Gardiner Solder Co., Chicago, Ill.
Handy & Harman, New York, N.Y.
Indium Corp. America, Utica, N.Y.
M & T Chemicals Inc., Rahway, N.J.
Revere Copper & Brass, Inc., New York, N.Y.
Sel-Rex Corp., Nutley, N.J.
Sifco Metachemical, Cleveland, Ohio

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Smith, Herman H., Inc., Bklyn., N.Y.
Atlas Sound Div., Parsippany, N.J.
Buckeye Stamping Co., Columbus, Ohio
Mid-West Metal Prods., Kansas City, Kans.
Sturdilite Sci. Furniture Sys., Plainwell, Mich
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Bendix, Utica, N.Y.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Cambridge Thermionic, Cambridge, Mass
Carco Elctrns., Menlo Park, Calif.
Dixon Sintaloy, Inc., Stamford, Conn.
Engineered Plastics, Inc., Gibsonville, N.C.
Fafnir Bearing Co., New Britain, Conn.
Franklin Fibre-Lamitex, Wilmington, Del.
General Bearing Co., W. Nyack, N.Y.
General Elec., Detroit, Mich.
Gould, Inc., Cleveland, Ohio
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
Gwilliam Co., Brooklyn, N.Y.
Ind'l Tectonics, Compton, Cal.
Ind'l. Tectonics, Ann Arbor, Mich.
Insulating Shapes, Inc., Bronx, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Janney Cylinder Co, Philadelphia, Pa.
Johns-Manville Sls. Corp., New York, N.Y.
Kahlenberg Bros. Co., Two Rivers, Wisc.
Keene Corp., Muskegon, Mich.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Marlin-Rockwell, Jamestown, N.Y.
Mechanical Technology, Inc., Latham, N.Y.
MPB Corp., Keene, N.H.
Networks Elctrn. Corp., Chatsworth, Calif.
Nylomatic Corp., Morrisville, Pa.
Ohio Carbon Co., Cleveland, Ohio
PIC Design Corp., Ridgefield,, Conn.
Poco Graphite, Inc., Decatur, Tex.
Polymer Corp., Reading, Pa.
Raway Bearing Corp., New York, N.Y.
Richardson Co., Des Plaines, Ill.
Roller Bearing Co. America, W. Trenton, N.J.
Royal Inds, El Segundo, Calif
Ryerson, J.T. & Son, Inc., Chicago, Ill.
SECS, Inc., Long Island City, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Southwest Prods. Co., Monrovia, Calif.
St. Marys Carbon Co., St. Marys, Pa.
Sterling Instr., New Hyde Pk., NY
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Stop Components, Inc., Freeport, N.Y.
Torrington Co., Torrington, Conn.

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Dialight Corp., Brooklyn, N.Y.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hammel, Riglander & Co., New York, N.Y.
Keller, Hugo P., Inc., New York, N.Y.
Larsen Importing Co., New York, N.Y.
Moran, T.R. Co., El Segundo, Cal.
Moser Jewel Co., Perth Amboy, N.J.
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Barden Corp., Danbury, Conn.
Beemer Engrg. Co., Ft. Washington, Pa.
Fafnir Bearing Co., New Britain, Conn.
Franklin Fibre-Lamitex, Wilmington, Del.
General Bearing Co., W. Nyack, N.Y.
Janel, Inc., Stirling, N.J.
Marlin-Rockwell, Jamestown, N.Y.
Modern Ind'l. Plastics, Dayton, Ohio
MPB Corp., Keene, N.H.
Norelcom Inds., Inc., Farmingdale, N.Y.
PIC Design Corp., Ridgefield,, Conn.
Polymer Corp., Reading, Pa.
Pure Carbon Co., Inc., St. Marys, Pa.
Raway Bearing Corp., New York, N.Y.
Royal Inds, El Segundo, Calif
SECS, Inc., Long Island City, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Southwest Prods. Co., Monrovia, Calif.
Stock Drive Prods., New Hyde Pk., N.Y.
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Crane Packing Co., Morton Grove, Ill.
Dixon Corp., Bristol, R.I.
Engineered Plastics, Inc., Gibsonville, N.C.
Fafnir Bearing Co., New Britain, Conn.
Fluorocarbon Co., Anaheim, Cal.
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
Helwig Carbon Prods., Inc., Milwaukee, Wisc.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Laminated Sheet Prods., Millbury, Mass.
Lear Siegler, Inc., Santa Monica, Calif.
Mechanical Technology, Inc., Latham, N.Y.
Modern Ind'l. Plastics, Dayton, Ohio
MPB Corp., Keene, N.H.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nylomatic Corp., Morrisville, Pa.
Ohio Carbon Co., Cleveland, Ohio
PIC Design Corp., Ridgefield,, Conn.
Polymer Corp., Reading, Pa.
Pure Carbon Co., Inc., St. Marys, Pa.
Raway Bearing Corp., New York, N.Y.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Shamban, W.S. & Co., Los Angeles, Calif.
Southwest Prods. Co., Monrovia, Calif.
St. Marys Carbon Co., St. Marys, Pa.
Stock Drive Prods., New Hyde Pk., N.Y.
Stop Components, Inc., Freeport, N.Y.
Tekna Prods. Co., Rochester, N.Y.
Union Carbide, Carbon Prods. Div., New York, N.Y.
Varied Ind'l. Prods., Inc., Paterson, N.J.

Bellows

Belfab, Daytona Beach, Fla.
Burke & James, Inc., Chicago, Ill.
Gagne Assocs., Inc., Binghamton, N.Y.
Granville-Phillips Co., Boulder, Colo.
High Voltage Engrg. Corp., Burlington, Mass.
Metal Bellows Corp., Sharon, Mass.
Minor Rubber Co., Inc., Bloomfield, N.J.
Royal Inds, El Segundo, Calif
Sealol, Inc., Providence, R.I.
Servometer Corp., Clifton, N.J.
Shamban, W.S. & Co., Los Angeles, Calif.
Technologics Inc, Ormond Beach, Fla.
Trish Energetics, Harvard, Mass.
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Bay Prods., Phila., Pa.
BFC-Bernard Franklin Co., Phila., Pa.
Blickman, S., Inc., Weehawken, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Controlled Environment Equip. Corp., Newton Upper Falls, Mass.
Craig Sys. Corp., Lawrence, Mass.
DoAll Co., Des Plaines, Ill.
Edcraft Inds., Inc., Linden, N.J.
Equipto, Aurora, Ill.
Fisher Sci. Co., Pittsburgh, Pa.
Hallowell, Hatfield, Pa.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Lab-Line Instrs., Inc., Melrose Park, Ill.
Lyon Metal Prod., Inc., Aurora, Ill.
Matrix Engineering Corp., Gardena, Calif.
Matthews Resch., Inc., Alexandria, Va.
Mid-West Metal Prods., Kansas City, Kans.
Pressteel Co., El Monte, Calif.
Republic Steel Corp, Cleveland, Ohio
States Co., Hartford, Conn.
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Acme Mfg. & Gasket Co., Philadelphia, Pa.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Brush Beryllium Co., Cleveland, Ohio
Dell Optics Co., Inc., N. Bergen, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
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Int'l. Elctrn. Resch., Burbank, Cal.
Kawecki Berylco Inds., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
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Ark-Les Switch Corp., Watertown, Mass.
Armel Elctrns., Inc., N. Bergen, N.J.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
Boonton Molding Co., Inc., Boonton, N.J.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Cinch Mfg. Co., Elk Grove Village, Ill.
Cole-Hersee Co., S. Boston, Mass.
Comco Plastics, Inc., Richmond Hill, N.Y.
Culver Stearns Mfg. Co., Worcester, Mass.
Curtis Dev. & Mfg., Milwaukee, Wisc.
Deutsch Co., Banning, Calif.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Specialty Co., Philadelphia, Pa.
Eby Sls. Co., Jamaica, N.Y.
Electric Terminal Corp., Warwick, R.I.
Electrical Insulation Co., Inc., Copiague, N.Y.
Electrical Refractories Co., E. Palestine, Ohio
Electrovert, Inc., Mt. Vernon, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Epoxy Plastic Molders, Irvington, N J
Ercona Corp., Bellmore, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
Ferro Corp., E. Liverpool, Ohio
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Laminated Fabricators, San Bruno, Calif.

Littelfuse, Inc., Des Plaines, Ill.
Litton Inds., Van Nuys, Calif.
Long, T.J., Inc., Carle Pl., N.Y.
Magnum Elec. Corp., Erie, Mich.
Maryland Lava Co., Bel Air, Md.
Matrix Science, Torrance, Cal.
McElroy Elctrns. Corp., Shirley, Mass.
Mechanical Engraving Co., Inc., Bronx, N.Y.
MEKontrol Inc., Northboro, Mass.
Methode Elctrns., Inc., Chicago, Ill.
Midwest Molding & Mfg. Co., Gurnee, Ill.
Molex Prods. Co., Downers Grove, Ill.
Morey Corp, Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Permonite Mfg. Co., Chicago, Ill.
Rex Rheostat & Co., Roosevelt, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Square D Co., Park Ridge, Ill.
Staffall, Inc., Providence, R.I.
Teledyne Penn-Union Elec., Edinboro, Pa.
Thomas & Betts Co., Elizabeth, N.J.
3M Co., St. Paul, Minn.
Twin Lock Inc., Los Angeles, Cal.
Underwriters Safety Device Co., Chicago, Ill.
Viz Mfg. Co., Philadelphia, Pa.
Waldom Elctrns., Inc., Chicago, Ill.

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Accessory Controls & Equip., Windsor, Conn.
Agnew-Higgins, Inc., Garden Grove, Calif.
Alpha Comps. Corp., Venice, Calif.
Amco Engrg. Co., Chicago, Ill.
American Air Filter, Louisville, Ky.
Astro Dynamics, Inc., Burlington, Mass.
Barber-Colman Co., Electro-Mechanical Prods. Div., Rockford, Ill.
Bud Radio, Inc., Willoughby, Ohio
Buffalo Forge Co., Buffalo, N.Y.
Cincinnati Fan & Ventilator Co., Cincinnati, Ohio
Clean Rooms Constr., Westminster, Cal.
Clements Mfg. Co., Chicago, Ill.
Clifton Div., Clifton Hgts., Pa.
Corkpak Co., Inc., New Rochelle, N.Y.
De-Sta-Co Div., Detroit, Mich.
De Vilbiss Co., The, Toledo, Ohio
Dynacool Mfg. Co., Inc., Saugerties, N.Y.
Dynamic Air Engrg., Santa Ana, Calif.
Eastern Inds. Div., Hamden, Conn.
Enclosure Corp., Pennsauken, N.J.
Fasco Inds., Inc., Rochester, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Homelite, Port Chester, N.Y.
Humphrey, Inc., San Diego, Calif.
ILG Industries, Inc., Chicago, Ill.
IMC Magnetics Corp., Westbury, N.Y.
IMC Magnetics Corp., Rochester, N.H.
Joy Mfg. Co., Fan Mktg. Dept., New Philadelphia, Ohio
Kooltronic Fan Co., Princeton, N.J.
Mamco Corp., Racine, Wisc.
Mechanical Technology, Inc., Latham, N.Y.
Molon Motors & Coil, Rolling Meadows, Ill.
Morrison Prods., Inc., Cleveland, Ohio
Par-Metal Prods. Div., Brooklyn, N.Y.
Pesco Prods., Bedford, Ohio
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Sanders Assocs., Inc., Manchester, N.H.
Siemens Corp., Comps. Div., Iselin, N.J.
Singer Co., Somerville, N.J.
Skurka Engrg. Co., Los Angeles, Calif.
Standard Elec. Mfg. Co., W. Berlin, N.J.
Task Corp., Anaheim, Calif.
Telectro Sys. Corp., Corona, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Torin Corp., Torrington, Conn.
Uppco, Inc., Chicago, Ill.
Vent-Rak, Inc., Indianapolis, Ind.
Westinghouse Elec. Int'l., New York, N.Y.
Zero Mfg. Co., Burbank, Cal.

Blueprint Machines

Dietzgen, Eugene Co., Chicago, Ill.
HJS Engrg. Co., Park Ridge, Ill.
Rotolite, Teledyne Co., Stirling, N.J.

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Cinch-Graphik, City of Industry, Cal.
Data-Control Systems, Danbury, Conn.
Digital Equip. Corp., Maynard, Mass.
Digitron Corp., Norristown, Pa.
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Elctrn. Engrg. Co. Cal., Santa Ana, Cal.
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LVC Ind's., Inc., Corona, N.Y.
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Rosemount Plug-In, Nashville, Tenn.
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Tempo/UTI Div., Chatsworth, Cal.
Trompeter Elctrns., Chatsworth, Cal.
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Accurate Elctrns. Corp., Elyria, Ohio
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Cambridge Thermionic, Cambridge, Mass
Chem Aero, Inc., Wilmington, Cal.
Defense Elctrns., Inc., Rockville, Md.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dorsett Elctrns., Tulsa, Okla.
Dynamic Sys. Elctrns. Corp., Tempe, Ariz.
Electrol Co., Inc., York, Pa.
Elgin Elctrns., Waterford, Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elctrn. Labs., Boston, Mass.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
IFE Div, E Providence, R.I.
Iso-Switch Corp., Costa Mesa, Cal.
Joliet Control Corp., Joliet, Ill.
Keystone Elctrns. Corp., New York, N.Y.
La Pointe Inds., Inc., Rockville, Conn.
Loral Elctrn. Sys., Bronx, N.Y.
Malco Mfg. Co., Chicago, Ill.
Methode Elctrns., Inc., Chicago, Ill.
Micro Instr., Hawthorne, Cal.
Mid-West Metal Prods., Kansas City, Kans.
Molex Prods. Co., Downers Grove, Ill.
Monitor Sys., Inc., Ft. Washington, Pa.
Oklahoma Aerotronics, Hartshorne, Okla.
Philips Elctrns. Inds., Ltd., Toronto 17, Can.
Radio Resch. Co., Rockaway, N.J.
Signal Analysis Inds. Corp., Hauppauge, N.Y.
Solid Controls, Inc., Minneapolis, Minn.
Triad Distributor Div., Huntington, Ind.
Twin Lock Inc., Los Angeles, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Wyle Labs., El Segundo, Calif.
Xerox Data Sys., El Segundo, Cal
Y.T. & T. Corp., Roslyn Hgts., N.Y.

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Virginia Panel Corp., Waynesboro, Va.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Aerolite Electronics Corp., Union City, N.J.
Aeronautical Elec. Co., Inc., Chicago, Ill.
Allegri-Tech, Inc., Nutley, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anritsu Electric Co., Ltd., Tokyo, Japan
Apahouser Corp. of N.E., Boston, Mass.
Argent Inds., Inc., Dayton, Ohio
Ark-Les Switch Corp., Watertown, Mass.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
Beman Mfg., Inc., New Cumberland, Pa.
Brandywine Fibre Prods. Co., Wilmington, Del.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Carter Precision Elec. Co., Skokie, Ill.
Chem Aero, Inc., Wilmington, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Cole Instr., Costa Mesa, Cal.
Collectron Corp., New York, N.Y.
Comco Plastics, Inc., Richmond Hill, N.Y.
Curtis Dev. & Mfg., Milwaukee, Wisc.
D-Cemco, Inc., Burbank, Calif.
De Soto Elec. Prods., De Soto, Mo.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Doran Mfg. Co., Cincinnati, Ohio
Eagle-Picher Inds., Inc., Joplin, Mo.
Eby Sls. Co., Jamaica, N.Y.
Electrical Insulation Co., Inc., Copiague, N.Y.
Electrical Plastics Corp., Lyndhurst, N.J.
Electrol Co., Inc., York, Pa.
Elgin Elctrns., Waterford, Pa.
Eljay Corp., Columbia, Md.
Engineered Plastics, Inc., Gibsonville, N.C.
Epoxy Plastic Molders, Irvington, N J
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
Gyrotronics, Inc., Asbury Park, N.J.
Hobson Bros., Inc., Chicago, Ill.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Litton Inds., Van Nuys, Calif.
Long, T.J., Inc., Carle Pl., N.Y.
Magnum Elec. Corp., Erie, Mich.
Malco Mfg. Co., Chicago, Ill.
Maryland Lava Co., Bel Air, Md.
Maxson Elctrns. Div., Great River, N.Y.
McElroy Elctrns. Corp., Shirley, Mass.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Miller Dial, El Monte, Calif.
Molex Prods. Co., Downers Grove, Ill.
Morey Corp, Downers Grove, Ill.
Neptune Elctrns. Co., New York, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Paraplegics Mfg., Bensenville, Ill.
Permonite Mfg. Co., Chicago, Ill.
Philco-Ford Corp., Washington, D.C.
Philips Elctrns. Inds., Ltd., Toronto 17, Can.
Plastic Assocs., Inc., Inwood, N.Y.
Red Seal Elec. Co., Cleveland, Ohio
Robinson-Nugent, New Albany, Ind.
Rostone Corp., Lafayette, Ind.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Staffall, Inc., Providence, R.I.
States Co., Hartford, Conn.
Teledyne Penn-Union Elec., Edinboro, Pa.
Teledyne Positive Connector, Ansonia, Conn.
3M Co., St. Paul, Minn.
Tri-Dex Co., Visalia, Calif.
Twin Lock Inc., Los Angeles, Cal.
Underwriters Safety Device Co., Chicago, Ill.
Viz Mfg. Co., Philadelphia, Pa.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Boats & Crucibles

Engelhard Minerals & Chem., Murray Hill, N.J.
General Elec., Richmond Hgts., Ohio
Aircraft & Missile Conslts., Manhattan Beach, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Bendix, Rochester, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Computer Diode, Fair Lawn, N.J.
Duramic Prods., Inc., Palisades Park, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
GTE Sylvania Inc., Danvers, Mass.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Mackay, A.D., Inc., New York, N.Y.
Maryland Lava Co., Bel Air, Md.
Matthey Bishop Inc., Malvern, Pa.
Norton Co., Worcester, Mass.
Norton Co., Newton, Mass.
Ohio Carbon Co., Cleveland, Ohio
Philips Elmet Corp., Lewiston, Me.
Poco Graphite, Inc., Decatur, Tex.
Pure Carbon Co., Inc., St. Marys, Pa.
Quartz & Silice, Paris 8e, France
Quartzite Processing, Inc., Malden, Mass.
Richland Glass Co., Inc., Richland, N.J.
Rosenthal China Corp., New York, N.Y.
Sloan Technology Corp., Santa Barbara, Calif.
Stackpole Carbon Co., Carbon Div., St. Marys, Pa.
Textool Prods., Inc., Irving, Tex.
Thermal Amer. Fused Quartz, Montville, N.J.
Ultra Carbon Corp., Bay City, Mich.

Varian Assocs., Vacuum Div., Palo Alto, Cal.
Veritron West, Inc., Chatsworth, Calif.
Zirconium Corp. of Amer., Solon, Ohio

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American Lava Corp., Chattanooga, Tenn.
Automatic Coil, New Hyde Pk., N.Y.
Berg Elctrns., Inc., New Cumberland, Pa.
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Thermotech Plastics, Co., Hopkins, Minn. ..... **p 2766-2773**
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Wilcox Prods. Co., Hopkins, Minn. p 2766-2773
Zaring Inds., Inc., Carmel, Ind.
Albany Int'l. Corp., Albany, NY
Alloys Unlimited, Inc., Encino, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Asheville-Schoonmaker Mica, Newport News, Va.
Basic Ceramics Inc., Hawthorne, N.J.
Boonton Molding Co., Inc., Boonton, N.J.
Bradohm, Inc., Salamanca, N.Y.
Buckeye Bobbin Div., Westlake, Ohio
Celestial Comps., Inc., Covina, Cal.
Ceram Corp., La Mesa, Calif.
Consolidated Resistance Sls., Yonkers, N.Y.
Cosmo Plastics Co., Cleveland, Ohio
Diamonite Prods. Mfg. Co., Shreve, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Du-Co Ceramics Co., Saxonburg, Pa.
Electrical Plastics Corp., Lyndhurst, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Endicott Coil Co., Binghamton, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Form-It Prods., Inc., Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Gorman Machine Corp., Costa Mesa, Cal.
Gries Reproducer Co., New Rochelle, N.Y.
Helix Spring Corp., Long Island City, N.Y.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Jerome Elec. Corp., Orange, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Kirchberger, M & Co., Inc., Englewood, N.J.
Magnetics, Inc., Butler, Pa.
Maryland Lava Co., Bel Air, Md.
National Moldite, Newark, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
NY-Glass Plastics, Paramount, Calif.
Nylomatic Corp., Morrisville, Pa.
Penn Fibre & Specialty, Phila., Pa.
Possis Mach., Minneapolis, Minn.
Precision Paper Tube Co., Wheeling, Ill.
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pyroferric - N. Y., Inc., Bronx, N.Y.
REM-Tronics, Silver Creek, N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
Resdel Corp., Rio Grande, N.J.
Resinite Corp. Div., Wheeling , Ill
Rosenthal China Corp., New York, N.Y.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Smith, Judson A. Co., Boyertown, Pa.
Space Prods., Inc., Long Beach, Calif.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spec Plastics, No. Hollywood, Cal.
Staffall, Inc., Providence, R.I.
Stevens Prods., Inc., E. Orange, N.J.
Superior Steatite & Ceramic Corp., Englewood, N.J.
Tekna Prods. Co., Rochester, N.Y.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Wilco Corp., Indianapolis, Ind.

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Bolometers, Microwave—See Vol 1

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Bonding Jumpers—See Jumpers, Bonding

Books—See Technical Books

Booms, Stands, Holders & Accessories, Microphone—See Vol 1

Boots, Switch Handle—See Vol 2

Boxes, Circuit Board—See Boxes, Component (Subassembly Handling)

Boxes, Component/Subassembly Handling (Production)

Vector Elctrn. Co., Inc., Sylmar, Cal.
Clover Inds. Div., Tonawanda, N.Y.
Corrugated Paper Prods., Inc., Roosevelt, N.Y.
Daniels, C.R., Inc., Daniels, Md.
Electro Assemblies, Inc., Chicago, Ill.
Epoxy Plastic Molders, Irvington, N J
Equipment Co. of America, Hialeah, Fla.
Goldsman, Inc., Philadelphia, Pa.
Insulating Fabricators, E. Rutherford, N.J.
Kole Enterprises, Inc., Miami, Fla.
Lewis G. B. Co, Watertown, Wisc
Lyon Metal Prod., Inc., Aurora, Ill.
Maryland Lava Co., Bel Air, Md.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
NVF Co., Yorklyn, Del.
Panel Controls Corp., Detroit, Mich.
Republic Steel Corp, Cleveland, Ohio
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Stock Drive Prods., New Hyde Pk., N.Y.
Vlchek Plastics Co., Middlefield, Ohio
Warwick Prods. Co., Independence, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

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Boxes, Dry—See Vol 1

Boxes, Echo—See Vol 1

Boxes, Glove—See Vol 1

Boxes, Junction & Wall Plate

Trimm, Inc., Libertyville, Ill.
Wiremold Co., W. Hartford, Conn. p 2726,2727
Abalon Precision Mfg. Corp., Bronx, N.Y.
Adalet Mfg., Cleveland, Ohio
Althor Prods., Brooklyn, N.Y.
A.O.I.P., 75/Paris 12eme, France
Bogen Div., Paramus, N.J.
Bradley Inds., Franklin Park, Ill.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Bud Radio, Inc., Willoughby, Ohio
C.B.C. Inds., Inc., Ft. Washington, Pa.
Cole-Parmer Instr. Co., Chicago, Ill.
Dura Plastics N.Y., Inc., Westport, Conn.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
Electro Oceanics, Inc., Compton, Calif.
Environmental Container Sys., Union City, Calif.
Equipment & Svc. Co., Dallas, Tex.
General Elec., Providence, R.I.
General Metals, Greensboro, N. C.
Goldsman, Inc., Philadelphia, Pa.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hoffman Engrg. Co., Anoka, Minn.
Javex Elctrns., Cherry Valley, Calif.
Kahlenberg Bros. Co., Two Rivers, Wisc.
Keystone Columbia, Inc., Warren, Mich.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Kolton Elec. Mfg. Co., Newark, N.J.
Metal Works, Inc., Hermann, Mo.
Midwest Electric Products, Mankato, Minn.
Molex Prods. Co., Downers Grove, Ill.
Neptune Elctrns. Co., New York, N.Y.
Philmore Mfg. Co., Richmond Hill, N.Y.
Pyle-National Co., Chgo., Ill.
Pyle-National Div., Harvey Hubbell, Chicago, Ill.
Rowe L. L. Co., Boston, Mass.
Spring City Elec. Mfg. Co., Spring City, Pa.
Stahlin Bros., Inc., Belding, Mich.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Thomas & Betts Co., Elizabeth, N.J.
Union Insulating Co., Parkersburg, W. Va.
Viz Mfg. Co., Philadelphia, Pa.
Waber Elctrns., Inc., Philadelphia, Pa.
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

Boxes, Metal & Plastic—See Cabinets; Cans; Cases; Containers

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Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Aircraft & Elctrn. Spec., Plainfield, Ind.
American Elec. Cable Co., Holyoke, Mass.
Belden Corp., Chicago, Ill.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Co-Operative Inds., Inc., Chester, N.J.
Coleman Cable & Wire Co., River Grove, Ill.
Eagle-Picher Inds., Inc., Joplin, Mo.
Estes Engrg. Co., Gardena, Calif.
Gore, W.L. & Assocs., Inc., Newark, Del.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
International Wire Prods., Wyckoff, N.J.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Metex Corp., Edison, N.J.
Montgomery Co, Windsor Locks, Conn
Natvar Corp., Rahway, N.J.
New England Elec. Wire, Lisbon, N.H.
New-Tronics Corp., Brookpark, Ohio
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
Prestolite Wire & Cable, Port Huron, Mich.
Syncor Prods. Co., Inc., Malden, Mass.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Thermax Wire Corp., Flushing, N.Y.

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Bridges, Synchro & Resolver—See Vol 1

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Bridges, Thermistor—See Vol 1

Bridges, Wenner—See Vol 1

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Brushes & Brush Assemblies—See Vol 2

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Bulbs—See Lamps—Vol 2

Bumpers

Smith, Herman H., Inc., Bklyn., N.Y. p 2716
Abesto Corp., Bloomfield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anchor Plastics Co Inc., Long Island City, N. Y.
Atlantic India Rubber Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Budwig Mfg. Co., Ramona, Calif.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hecht Rubber Corp., Jacksonville, Fla.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
Plastiglide Mfg. Corp., Santa Monica, Cal.
3M Co., St. Paul, Minn.
Uniroyal, Inc., New York, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.

Burnishers, Contact

Edsyn, Inc., Van Nuys, Cal.
GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.. p 2941
Adre Co., Milwaukee, Wisc.
Jenkins', M.W. Sons, Inc., Cedar Grove, N.J.
Ohio Carbon Co., Cleveland, Ohio
Techni-Tool, Inc., Philadelphia, Pa.

Bus Bars & Systems

Amp Inc., Elizabethtown, Pa.
Berg Elctrns., Inc., New Cumberland, Pa.
Douglas Electronics, Inc., San Leandro, Cal.
Elco, Willow Grove, Pa.
General Elec. Co., Schenectady, N.Y.
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Tempo/UTI Div., Chatsworth, Cal.
Advanced Circuitry Div., Springfield, Mo.
Aluminum Co. America, Pittsburgh, Pa.
Anaconda American Brass Co., Waterbury, Conn.
Apahouser Corp. of N.E., Boston, Mass.
Bussco Engrg., El Segundo, Cal.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Chem Aero, Inc., Wilmington, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Connectrol Corp., New York, N Y
Cutler-Hammer, Milwaukee, Wisc.
Eldre Comps., Inc., Rochester, N.Y.
Extrudonics Co., New Brunswick, N.J.
Flexible Circuits, Inc., Warrington, Pa.
Lear Siegler, Inc., Santa Monica, Calif.
Lear Siegler, Anaheim, Cal.
Malco Mfg. Co., Chicago, Ill.
Matrix Science, Torrance, Cal.
Methode Elctrns., Inc., Chicago, Ill.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Revere Copper & Brass, Inc., New York, N.Y.
Reynolds Metals Co., Richmond, Va.
Rogers Corp., Rogers, Conn.
Seastrom Mfg. Co. Inc., Glendale, Cal.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Twin Lock Inc., Los Angeles, Cal.
Westinghouse Elec. Int'l., New York, N.Y.
Zero Mfg. Co., Burbank, Cal.

Bushings, Glass, Plastic, Metal, etc.

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
GC Elctrns., Rockford, Ill.
Graphite Metallizing Corp., Yonkers, N.Y. ..... p 1596
Jones Hiram Elctrns., No. Hollywood, Cal.
Sealectro Corp., Mamaroneck, N.Y. p 2709
Severna Operation, East Orange, N.J.
Smith, Herman H., Inc., Bklyn., N.Y. p 2716
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Acme Model Engrg. Co., Ridgefield, N.J.
Adalet Mfg., Cleveland, Ohio
Adjustable Bushing Corp., N Hollywood, Calif.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Atlantic India Rubber Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Cabot Corp., Kokomo, Ind.
Cambridge Thermionic, Cambridge, Mass
Carbone Corp., Boonton, N.J.
Central Plastics Dists., Chicago, Ill.
Century Fastener Corp., Brooklyn, N.Y.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Delbert Blinn. Co., Pomona, Calif.
Deutsch Fastener Corp., Los Angeles, Cal.
Dixon Corp., Bristol, R.I.
Dura Plastics N.Y., Inc., Westport, Conn.
Duramic Prods., Inc., Palisades Park, N.J.
Dynaloy, Inc., Hanover, N.J.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Electro Assemblies, Inc., Chicago, Ill.
Engineered Plastics, Inc., Gibsonville, N.C.
Fastex Div., Des Plaines, Ill.
Fischer Special Mfg. Co., Cincinnati, Ohio
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
Gemp Terminals, Inc., Yonkers, N.Y.
General Elec., Detroit, Mich.
Gillen, John Co., Cicero, Ill.
Gould, Inc., Cleveland, Ohio
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Gries Reproducer Co., New Rochelle, N.Y.
Groov-Pin Corp., Ridgefield, N.J.
GTE Sylvania Inc., Warren, Pa.
Helitronics Corp., Newark, N.J.
Heyman Mfg. Co., Kenilworth, N.J.
Holmberg, Inc., Melville, N.Y.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Janney Cylinder Co, Philadelphia, Pa.
Jones, A.D. Optical Works, Burlington, Mass.
K & S Engrg. Co., Chicago, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Kopp Glass, Inc., Pittsburgh, Pa.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Laminated Fabricators, San Bruno, Calif.
Maryland Lava Co., Bel Air, Md.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Midwest Molding & Mfg. Co., Gurnee, Ill.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
MPB Corp., Keene, N.H.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nutmeg Screw Mach. Prods., Waterbury, Conn.
Nylogrip Prods. Co., Waltham, Mass.
Nylomatic Corp., Morrisville, Pa.
Penn Fibre & Specialty, Phila., Pa.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Polymer Corp., Reading, Pa.
Porcelain Prods. Co., Carey, Ohio
Precision Paper Tube Co., Wheeling, Ill.
Pure Carbon Co., Inc., St. Marys, Pa.
Pylon Co., Inc., Attleboro, Mass.
Red Seal Elec. Co., Cleveland, Ohio
Resdel Corp., Rio Grande, N.J.
R. I. Metpro, Inc., Warwick, R.I.
Richardson Co., Des Plaines, Ill.
Richland Glass Co., Inc., Richland, N.J.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
SECS, Inc., Long Island City, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Shur-Lok Corp., Santa Ana, Calif.
Southwest Prods. Co., Monrovia, Calif.
Sparta Mfg. Co., Dover, Ohio
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spring City Elec. Mfg. Co., Spring City, Pa.
St. Marys Carbon Co., St. Marys, Pa.
Sterling Instr., New Hyde Pk., NY
Stock Drive Prods., New Hyde Pk., N.Y.
Stop Components, Inc., Freeport, N.Y.
Syncor Prods. Co., Inc., Malden, Mass.
Tekna Prods. Co., Rochester, N.Y.
Tri-Point Inds., Inc., Commack, N.Y.
Union Carbide, Carbon Prods. Div., New York, N.Y.
Union Insulating Co., Parkersburg, W. Va.
Uniroyal, Inc., New York, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Weckesser Co., Inc., Chicago, Ill.
Western Sky Ind., Hayward, Calif.

Bushings, Hermetically Sealed

American Lava Corp., Chattanooga, Tenn.
Victoreen Instr., Cleveland, Ohio
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Consolidated Ceramics & Metalizing, Flemington, N.J.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Fansteel Inc., N Chicago, Ill.
Glass Beads Co., Latrobe, Pa.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Isotronics, Inc., New Bedford, Mass.
Johns-Manville Sls. Corp., New York, N.Y.
Kidco, Inc., Medford, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Latronics Corp., Latrobe, Pa.
Lundey Assocs., Inc., Waltham, Mass.
Rosenthal China Corp., New York, N.Y.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Veritron West, Inc., Chatsworth, Calif.

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Rosemount Plug-In, Nashville, Tenn.
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Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Accessory Controls & Equip., Windsor, Conn.
Acro Prods. Corp., Chicago, Ill.
Aerotronic Assocs., Inc., Contoocook, N.H.
Akro-Mils, Inc., Akron, Ohio
Algo, S. Hackensack, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Amco Engrg. Co., Chicago, Ill.
Anchor Specialty Mfg., Teterboro, N.J.
Apahouser Corp. of N.E., Boston, Mass.
Automatic Signal Div., E. Norwalk, Conn.
Baker Co., Inc., Biddeford, Me.
Ballonoff Home Prods. Co., Cleveland, Ohio
Barnes Engrg. Co., Santa Ana, Calif.
Baumker Mfg. Co., Toledo, Ohio
Bay Prods., Phila., Pa.
Beechwood Mfg., Indpls., Ind.
BFC-Bernard Franklin Co., Phila., Pa.
Blickman, S., Inc., Weehawken, N.J.
Bossert Mfg. Corp., Utica, N.Y.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Buffalo Forge Co., Buffalo, N.Y.
Chassis-Trak, Inc., Indianapolis, Ind.
Dahlstrom Mfg. Corp., Jamestown, N.Y.
Danco Metal Products, Inc., Westlake, Ohio
Data Technology Corp., Palo Alto, Cal.
DoAll Co., Des Plaines, Ill.
Dolin Metal Prods., Inc., Brooklyn, N.Y.
Donnelly Mfg. Co., Waltham, Mass.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Equipto, Aurora, Ill.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Falstrom Co., Passaic, N.J.
Fansteel Inc., N Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
Foxboro Co., Foxboro, Mass.
GAF Corp., New York, N.Y.
General Devices, Inc., Princeton, N.J.
General Elec., Providence, R.I.
General Metals, Greensboro, N. C.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Granite State Machine Co., Inc., Manchester, N.H.
Grant Pulley & Hardware Co., W. Nyack, N.Y.
Gyrotronics, Inc., Asbury Park, N.J.
Hallowell, Hatfield, Pa.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
High Voltage Engrg. Corp., Burlington, Mass.
Hoffman Engrg. Co., Anoka, Minn.
Holbrook-Merrill Co., Sunnyvale, Cal.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Ingersoll Prods., Chicago, Ill.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Janitrol Aero Div., Columbus, Ohio
Keystone Columbia, Inc., Warren, Mich.
Kinetron Corp., Asbury Park, N.J.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Lear Siegler, Inc., Santa Monica, Calif.
Lindsay Structure, Evansville, Ind.
Lynch, R.H. Mfg. Co., S. San Gabriel, Calif.
Lyon Metal Prod., Inc., Aurora, Ill.
Met-L-Wood Corp., Chicago, Ill.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Midget Louver Co., Norwalk, Conn.
Mobil Elctrns., Inc., Anderson, Ind.
Muckle Mfg. Co., Owatonna, Minn.
Neumade Prods. Corp., Scarsdale, N.Y.
Newcomb Audio Prods. Co., Sylmar, Calif.
Par-Metal Prods. Div., Brooklyn, N.Y.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Proto Tool Co, Los Angeles, Calif.
Republic Steel Corp, Cleveland, Ohio
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Snap-On Tools Corp., Kenosha, Wisc.
Spring City Elec. Mfg. Co., Spring City, Pa.
Stacor Corp., Newark, N.J.
Standard Cabinet Co., Inc., Totowa, N.J.
Stanford Applied Engrg., Santa Clara, Cal.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Stop Components, Inc., Freeport, N.Y.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.

Sturdilite Sci. Furniture Sys., Plainwell, Mich
Superior Switchboard & Devices Div., Canton, Ohio
Systems Enclosures, Northbrook, Ill.
Taylor Instr. Process Control Div., Rochester, N.Y.
Technical Mat'l., Mamaroneck, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Titchener, E.H. & Co., Binghamton, N.Y.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Waber Elctrns., Inc., Philadelphia, Pa.
Warwick Prods. Co., Independence, Ohio
Watson Mfg. Co., Inc., Jamestown, N.Y.
Wilmer Mfg. Co., Beltsville, Md.
Wolfson, P.J. Co., New Rochelle, N.Y.
Zero Mfg. Co., Burbank, Cal.

Cabinets, Metal Shielded

Cabtron Corp., Chicago, Ill.
Digital Equip. Corp., Maynard, Mass.
Electronic Enclosures, El Segundo, Cal.
Honeywell, Inc., Wabash, Ind.
Perfection Mica Co., Bensenville, Ill.
Scanbe Mfg. Corp., El Monte, Cal.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Ainslie Corp., S. Braintree, Mass.
Amco Engrg. Co., Chicago, Ill.
Applied Design Co., Inc., Tonawanda, N.Y.
Barnes Engrg. Co., Santa Ana, Calif.
Bossert Mfg. Corp., Utica, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Craig Sys. Corp., Lawrence, Mass.
Danco Metal Products, Inc., Westlake, Ohio
Donnelly Mfg. Co., Waltham, Mass.
Eberline Instr. Corp., Santa Fe, N.M.
Enclosure Corp., Pennsauken, N.J.
Eugene Engrg. Co., Inc., Rockland, Mass.
Falstrom Co., Passaic, N.J.
Fansteel Inc., N Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
Hoffman Engrg. Co., Anoka, Minn.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
LectroMagnetics, Los Angeles, Cal.
Lindsay Structure, Evansville, Ind.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Plan Hold Corp., Carson, Cal.
Riester & Thesmacher Co., Cleveland, Ohio
Skydyne, Inc., Port Jervis, N.Y.
Superior Switchboard & Devices Div., Canton, Ohio
Systems Enclosures, Northbrook, Ill.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Viz Mfg. Co., Philadelphia, Pa.
Watson Mfg. Co., Inc., Jamestown, N.Y.
Zero Mfg. Co., Burbank, Cal.

Cabinets, Plastic

Smith, Herman H., Inc., Bklyn., N.Y.
Akro-Mils, Inc., Akron, Ohio
Albany Int'l. Corp., Albany, NY
Althor Prods., Brooklyn, N.Y.
Applied Design Co., Inc., Tonawanda, N.Y.
Boonton Molding Co., Inc., Boonton, N.J.
Central Plastics Dists., Chicago, Ill.
Comco Plastics, Inc., Richmond Hill, N.Y.
Dura Plastics N.Y., Inc., Westport, Conn.
Edcraft Inds., Inc., Linden, N.J.
Edo Western Corp., Salt Lake City, Utah
Electro Assemblies, Inc., Chicago, Ill.
Eljay Corp., Columbia, Md.
Fansteel Inc., N Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Keystone Elctrns. Corp., New York, N.Y.
Koch, H. & Sons, Corte Madera, Cal.
NY-Glass Plastics, Paramount, Calif.
Romar Plastics, Inc., St. Charles, Ill.
Rostone Corp., Lafayette, Ind.
Skydyne, Inc., Port Jervis, N.Y.
Stahlin Bros., Inc., Belding, Mich.
Warwick Prods. Co., Independence, Ohio

Cabinets, Sliding Drawer

Honeywell, Inc., Wabash, Ind.
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Scanbe Mfg. Corp., El Monte, Cal.
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Acro Prods. Corp., Chicago, Ill.
Akro-Mils, Inc., Akron, Ohio
Amco Engrg. Co., Chicago, Ill.
Ballonoff Home Prods. Co., Cleveland, Ohio
Bay Prods., Phila., Pa.
BFC-Bernard Franklin Co., Phila., Pa.
Blickman, S., Inc., Weehawken, N.J.
Bossert Mfg. Corp., Utica, N.Y.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Bud Radio, Inc., Willoughby, Ohio
Enclosure Corp., Pennsauken, N.J.
Eugene Engrg. Co., Inc., Rockland, Mass.
General Devices, Inc., Princeton, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Janel, Inc., Stirling, N.J.
Lear Siegler, Inc., Santa Monica, Calif.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Neumade Prods. Corp., Scarsdale, N.Y.
Par-Metal Prods. Div., Brooklyn, N.Y.
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Snap-On Tools Corp., Kenosha, Wisc.
Sturdilite Sci. Furniture Sys., Plainwell, Mich
Taylor Millwork & Stair Co., Inc., Gardena, Cal.
Warwick Prods. Co., Independence, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

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Cabinets, Wood (Excluding Kits)

A C Electronics Co., Santa Monica, Cal.
Anchor Specialty Mfg., Teterboro, N.J.
Bogen Div., Paramus, N.J.
Components Specialties, Inc., Freeport, N.Y.
Furniture Craftsmen, Grand Rapids, Mich.
General Devices, Inc., Princeton, N.J.
Goldsman, Inc., Philadelphia, Pa.
Heath Co., Benton Harbor, Mich.
Major Elctrns. Corp., Brooklyn, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Taylor Millwork & Stair Co., Inc., Gardena, Cal.
Wald Sound, Sun Valley, Calif.
Warwick Prods. Co., Independence, Ohio

Cable, Audio

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Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Action Systems Co., Meriden, Conn.
American Elec. Cable Co., Holyoke, Mass.
Applied Electro Mechanics, Alexandria, Va.
Belden Corp., Chicago, Ill.
Beman Mfg., Inc., New Cumberland, Pa.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
EV/Game, Inc., Freeport, N.Y.
Eby Sls. Co., Jamaica, N.Y.
Essex Int'l., Inc., Decatur, Ill.
Flexible Circuits, Inc., Warrington, Pa.
General Elec., Bridgeport, Conn
General Radio Co., Concord, Mass.
Gore, W.L. & Assocs., Inc., Newark, Del.
Gotham Audio Corp., New York, N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Jersey Specialty Co., Inc., Wayne, N.J.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Mohawk Wire & Cable, Leominster, Mass.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Superex Elctrns. Corp., Yonkers, N.Y.
Superior Continental Corp., Hickory, N.C.
Switchcraft, Inc., Chicago, Ill.
3M Co., St. Paul, Minn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
VIKOA Cable Div., Freehold, N.J.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Cable, Battery Booster

Cities Svc. Co., Chester, N.Y.
Columbia Eletrn. Cables, New Bedford, Mass.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Mueller Elec. Co., Cleveland, Ohio p 2649
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Coleman Cable & Wire Co., River Grove, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Shigoto Inds., Ltd., New York, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Tri-State Elctrns. Corp., Camden, N.J.
Whitaker Cable Corp., N. Kansas City, Mo.

Cable, Coaxial

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J. p 2996
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill. .....p 3012,3013
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Glass Tech., Newport Bch., Cal. p 2632
Markel, L. Frank & Sons, Norristown, Pa. ..... p 3035
Nat'l. Wire & Cable, Los Angeles, Cal.
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y. p 3049,3050
Standard Wire & Cable, Los Angeles, Cal. ..... p 3057
Tensolite, Tarrytown, N.Y. ..... p 3059
Trompeter Elctrns., Chatsworth, Cal. p 2719
Uniform Tubes, Collegeville, Pa. p 3068
Victor Wire & Cable, L.A., Cal. .... p 3069
Virginia Panel Corp., Waynesboro, Va.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Andrew Corp., Orland Pk., Ill.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Caton Inds., Inc., Clark, N.J.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Control Prods. Corp., Chicago, Ill.
Decibel Prods., Inc., Dallas, Tex.
Dielectric Materials Co., Chicago, Ill.
Dynatronic Cable Engrg., Sub. National Wire & Cable, Los Angeles, Cal.
Eagle-Picher Inds., Inc., Joplin, Mo.
Electro Oceanics, Inc., Compton, Calif.
Elctrn. Resources Div., Los Angeles, Cal.
Essex Int'l., Inc., Decatur, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Everett/Charles, Inc., Pomona, Cal.
Finney Co., Bedford, Ohio
General Elec., Bridgeport, Conn
General Radio Co., Concord, Mass.
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania, Inc., Moorestown, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Jerrold Elctrns. Corp., Philadelphia, Pa.
Jerrold/Watkins Div., Toronto, 395, Ont., Can.
Jersey Specialty Co., Inc., Wayne, N.J.
Judd Wire Div., Burlington, Mass.
Kistler Instr. Co., Redmond, Wash.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Maspro Co., Inc., Nagoya-Shigai, Japan
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Paraplegics Mfg., Bensenville, Ill.
Phelps Dodge Comm., North Haven, Conn.
Physical Sciences, Arcadia,, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Precision Tube, No. Wales, Pa.
Prodelin, Inc., Hightstown, N.J.
Raychem Corp., Menlo Park, Calif.
RCA Corp., Camden, N.J.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rome Cable, Rome, N.Y.
Sensor Dynamics, Inc., Addison, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comm. Eq. Div., Iselin, N.J.
Superior Continental Corp., Hickory, N.C.
Superior Insulated Wire Corp., Stony Point, N.Y.
Thermax Wire Corp., Flushing, N.Y.
Thermotronic Devices, Inc., Conshohocken, Pa.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.

VIKOA Cable Div., Freehold, N.J.
Wald Sound, Sun Valley, Calif.
Whistler Elctrns., Inc., Northridge, Cal.
Zippertubing Co., Los Angeles, Calif.

Cable, Control—See Cable, Multiconductor

Cable, Dial—See Cords & Cable, Dial Drive—Vol 2

Cable, Fault Locators—See Locators, Cable & Line Fault —Vol 1

Cable, Flat, Collated (Flat or Round Conductors)

Alpha Wire Corp., Elizabeth, N.J.
Augat Inc., Attleboro, Mass.
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Columbia Eletrn. Cables, New Bedford, Mass.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3018**
Hughes Aircraft Co., Connecting Devices, Newport Beach, Cal. .. **p 2633**
Micro Elctrns. Corp., Palmdale, Cal **p 2647**
Saxton Prods., Congers, N.Y.
Spectra-Strip Corp., Garden Grove, Cal. **p 3054,3056**
Standard Wire & Cable, Los Angeles, Cal.
Tapeswitch Corp. Amer., Farmingdale, N.Y.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
American Elec. Cable Co., Holyoke, Mass.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Automatic Die Cutting Mach. Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Burndy Corp., Norwalk, Conn.
Carol Cable Co. W., Compton, Cal.
Columbia Wire Prods. Co., Chicago, Ill.
Connectron Corp., Van Nuys, Cal
Electric Parts Corp., Georgetown, Ky.
Electro Oceanics, Inc., Compton, Calif.
Flexible Circuits, Inc., Warrington, Pa.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Providence, R.I.
GTE Sylvania, Inc., Moorestown, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
International Wire Prods., Wyckoff, N.J.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Judd Wire Div., Burlington, Mass.
Lance Inds., Sylmar, Calif.
Lane Inds., North Hollywood, Calif.
Magnet Wire, Inc., New York, N.Y.
Methode Elctrns., Inc., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
Montgomery Co, Windsor Locks, Conn
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Raychem Corp., Menlo Park, Calif.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rowe Engravers, Clifton, N.J.
Sanders Assocs., Flexprint, Manchester, N.H.
Tapecon, Inc., Rochester, N.Y.
Thermax Wire Corp., Flushing, N.Y.
3M Co. Electro Prods. Div., St. Paul, Minn.
Varied Ind'l. Prods., Inc., Paterson, N.J.
Zippertubing Co., Los Angeles, Calif.

Cable, Flat, Etched

Alpha Wire Corp., Elizabeth, N.J.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Hughes Aircraft Co., Connecting Devices, Newport Beach, Cal. .. **p 2633**
ITT Cannon Electric, Santa Ana, Cal.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Rye Inds., Inc., Mamaroneck, N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Berk Tek, Inc., Reading, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Buckbee-Mears Co., St. Paul, Minn.
Cable Elec. Prods., Inc., Providence, R.I.
Connectron Corp., Van Nuys, Cal
Electro Oceanics, Inc., Compton, Calif.
Flexible Circuits, Inc., Warrington, Pa.
General Circuits, Inc., Rochester, N.Y.
General Elec., Providence, R.I.
Gore, W.L. & Assocs., Inc., Newark, Del.
Hughes Aircraft Co, Culver City, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Lane Inds., North Hollywood, Calif.
Methode Elctrns., Inc., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Permaluster, Inc., Burbank, Calif.
Rogers Corp., Rogers, Conn.
Sanders Assocs., Flexprint, Manchester, N.H.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Superior Insulated Wire Corp., Stony Point, N.Y.
3M Co., St. Paul, Minn.
Zippertubing Co., Los Angeles, Calif.

Cable, Flexible—See Cable, Flat

Cable, Heater

Cities Svc. Co., Chester, N.Y.
Columbia Eletrn. Cables, New Bedford, Mass. ..... **p 3000**
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Cox & Co., Inc., New York, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Saxton Prods., Congers, N.Y.
Tensolite, Tarrytown, N.Y. ..... **p 3059**
Varflex Corp., Rome, N.Y.
Ackerman Gould Co., Inc., Oceanside, N.Y.
American Standard, Franklin Pk., Ill.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Birnbach Co., Inc., Freeport, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Cerro Corp., New York, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Continental Wire & Cable, York, Pa.
Control Prods. Corp., Chicago, Ill.
Driver, Wilbur B. Co., Newark, N.J.
Electric Parts Corp., Georgetown, Ky.
Electro-Flex Heat, Inc., Bloomfield, Conn.
Essex Int'l, Inc., Sycamore, Ill.
General Elec., Bridgeport, Conn
General Elec., Providence, R.I.
GTE Sylvania, Inc., Moorestown, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
Physical Sciences, Arcadia,, Cal.
Rogers Corp., Rogers, Conn.
Sensor Dynamics, Inc., Addison, Ill.
Thermax Wire Corp., Flushing, N.Y.

Cable, High Voltage

Cimco Wire & Cable, Allendale, N.J. **p 2996**
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill. ..... **p 3012,3013**
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... **p 3032,3033**
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3018,3024**
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Markel, L. Frank & Sons, Norristown, Pa. ..... **p 3035**
Nat'l. Wire & Cable, Los Angeles, Cal. **p 3038-3041**
Rowe Inds., Div., Toledo, Ohio
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y. ..... **p 3059**
Universal Voltronics Corp., Mt. Kisco, N.Y.
Victor Wire & Cable, L.A., Cal. .... **p 3069**
Whitmor Wire & Cable, No. Hollywood, Cal. ..... **p 3070**
Aluminum Co. America, Pittsburgh, Pa.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Caton Inds., Inc., Clark, N.J.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Dielectric Sciences, Burlington, Mass
Essex Int'l., Inc., Marion, Ind.
Estes Engrg. Co., Gardena, Calif.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Judd Wire Div., Burlington, Mass.
Okonite Co., Ramsey, N.J.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Reynolds Metals Co., Richmond, Va.
Rome Cable, Rome, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Transitron Elctrn. Corp., Wakefield, Mass.

Cable, Irradiated

Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Spectra-Strip Corp., Garden Grove, Cal. **p 3056**
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Judd Wire Div., Burlington, Mass.
Raychem Corp., Menlo Park, Calif.
Transitron Elctrn. Corp., Wakefield, Mass.

Cable, Low-Capacitance

Alpha Wire Corp., Elizabeth, N.J.
Cimco Wire & Cable, Allendale, N.J. **p 2996**
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Columbia Eletrn. Cables, New Bedford, Mass. ..... **p 3004**
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Gulton Inds., Inc., Metuchen, N.J.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Nat'l. Wire & Cable, Los Angeles, Cal. **p 3040,3044**
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal. ..... **p 3057**
Tensolite, Tarrytown, N.Y.
Uniform Tubes, Collegeville, Pa. **p 3068**
Victor Wire & Cable, L.A., Cal. .... **p 3069**
Whitmor Wire & Cable, No. Hollywood, Cal.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Andrew Corp., Orland Pk., Ill.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Dynatronic Cable Engrg., Sub. National Wire & Cable, Los Angeles, Cal.
Essex Int'l., Inc., Decatur, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Flexible Circuits, Inc., Warrington, Pa.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
Gotham Audio Corp., New York, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Kistler Instr. Co., Redmond, Wash.
Lenz Elec. Mfg. Co., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
New-Tronics Corp., Brookpark, Ohio
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Phelps Dodge Comm., North Haven, Conn.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Raychem Corp., Menlo Park, Calif.
Superior Continental Corp., Hickory, N.C.
Thermax Wire Corp., Flushing, N.Y.
3M Co. Electro Prods. Div., St. Paul, Minn.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.

Cable, Microphone

Alpha Wire Corp., Elizabeth, N.J. **p 2995**
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill. ..... **p 3009**
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal. ..... **p 3057**
Tensolite, Tarrytown, N.Y.
Whitmor Wire & Cable, No. Hollywood, Cal.
Action Systems Co., Meriden, Conn.
American Elec. Cable Co., Holyoke, Mass.
Automatic Clerical Sys., Pasadena, Calif.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bogen Div., Paramus, N.J.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Columbia Wire Prods. Co., Chicago, Ill.
Dielectric Materials Co., Chicago, Ill.
EV/Game, Inc., Freeport, N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Flexible Circuits, Inc., Warrington, Pa.
General Elec., Bridgeport, Conn
Gotham Audio Corp., New York, N.Y.
Int'l. Wire & Cable, Chicago, Ill.
Jersey Specialty Co., Inc., Wayne, N.J.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Mohawk Wire & Cable, Leominster, Mass.
New England Elec. Wire, Lisbon, N.H.
Pace Wire & Cable Corp., Oceanside, N.Y.

Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rome Cable, Rome, N.Y.
Secode Elctrns., Dallas, Texas
Shigoto Inds., Ltd., New York, N.Y.
Superior Continental Corp., Hickory, N.C.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
VIKOA Cable Div., Freehold, N.J.

Cable, Multiconductor

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J.
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass. ..... p 3000-3004
Consolidated Wire & Assoc. Corps., Chicago, Ill. ..... p 3006-3011
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. p 3018,3021,3022,3024,3028,3030,3031
Gulton Inds., Inc., Metuchen, N.J.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... p 3034
Markel, L. Frank & Sons, Norristown, Pa. ..... p 3035
Nat'l. Wire & Cable, Los Angeles, Cal. p 3037-3044
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y. p 3048,3049,3053
Spectra-Strip Corp., Garden Grove, Cal. p 3056
Standard Wire & Cable, Los Angeles, Cal. ..... p 3057
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal. .... p 3069
Whitmor Wire & Cable, No. Hollywood, Cal. ..... p 3070
Action Systems Co., Meriden, Conn.
Aluminum Co. America, Pittsburgh, Pa.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Andrew Corp., Orland Pk., Ill.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Belden Corp., Chicago, Ill.
Beman Mfg., Inc., New Cumberland, Pa.
Bergen Wire Rope Co., Lodi, N.J.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bogen Div., Paramus, N.J.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
Carol Cable Co. W., Compton, Cal.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Dynatronic Cable Engineering Corp., Los Angeles, Cal.
Dynatronic Cable Engrg., Sub. National Wire & Cable, Los Angeles, Cal.
Electro Oceanics, Inc., Compton, Calif.
Essex Int'l, Inc., Sycamore, Ill.
Essex Int'l., Inc., Marion, Ind.
Flexible Circuits, Inc., Warrington, Pa.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Bridgeport, Conn
General Elec., Providence, R.I.
General Reliance Div., Dover, N.J.
Gore, W.L. & Assocs., Inc., Newark, Del.
Gotham Audio Corp., New York, N.Y.
GTE Sylvania, Inc., Moorestown, N.J.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lane Inds., North Hollywood, Calif.
Lenz Elec. Mfg. Co., Chicago, Ill.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
M-T Elctrns. Co., San Leandro, Calif.
Magnet Wire, Inc., New York, N.Y.
Mark Prods., Inc., Houston, Tex.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Mohawk Wire & Cable, Leominster, Mass.
Moore, Samuel & Co., Mantua, Ohio
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Phoenix Wire, Inc., S. Hero, Vt.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Pyco, Inc., Penndel, Pa.
Raychem Corp., Menlo Park, Calif.
Revere Elctrn. Div., Wallingford, Conn.
Reynolds Metals Co., Richmond, Va.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rogers Corp., Rogers, Conn.
Rome Cable, Rome, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comm. Eq. Div., Iselin, N.J.
Stromberg Carlson Corp., Rochester, N.Y.
Superior Continental Corp., Hickory, N.C.
Tapecon, Inc., Rochester, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Thermax Wire Corp., Flushing, N.Y.
Thermo Elec. Co., Inc., Saddle Brook, N.J.
3M Co., St. Paul, Minn.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
Triple-A Specialty Co., Chicago, Ill.
VIKOA Cable Div., Freehold, N.J.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Zippertubing Co., Los Angeles, Calif.

Cable, Power

Alpha Wire Corp., Elizabeth, N.J.
Cimco Wire & Cable, Allendale, N.J.
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3022,3030
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... p 3034
Nat'l. Wire & Cable, Los Angeles, Cal. p 3038
Saxton Prods., Congers, N.Y..... p 3053
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y. ..... p 3059
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal. ..... p 3070
Anaconda Wire and Cable Co., New York, N.Y.
Anchor Specialty Mfg., Teterboro, N.J.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Caton Inds., Inc., Clark, N.J.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Copperweld Steel Co., Glassport, Pa.
Dielectric Materials Co., Chicago, Ill.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Essex Int'l., Inc., Marion, Ind.
Flexible Circuits, Inc., Warrington, Pa.
General Elec., Bridgeport, Conn
General Elec., Providence, R.I.
General Radio Co., Concord, Mass.
General Reliance Div., Dover, N.J.
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania, Inc., Moorestown, N.J.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Moore, Samuel & Co., Mantua, Ohio
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Reynolds Metals Co., Richmond, Va.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rome Cable, Rome, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
Unibraze Corp, White Plains, N.Y.
United States Steel Corp., Pittsburgh, Pa.
Waber Elctrns., Inc., Philadelphia, Pa.
Wiegand, Edwin L. Co., Pittsburgh, Pa.

Cable, Retractile—See Cords, Retractile

Cable, Ribbon—See Cable, Flat

Cable, Rotator, Antenna

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
GC Elctrns., Rockford, Ill.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Andrew Corp., Orland Pk., Ill.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Jersey Specialty Co., Inc., Wayne, N.J.
Judd Wire Div., Burlington, Mass.
Lance Inds., Sylmar, Calif.
Lenz Elec. Mfg. Co., Chicago, Ill.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rohn Mfg. Co., Peoria, Ill.
Superior Insulated Wire Corp., Stony Point, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.

Cable, Shielded

Alpha Wire Corp., Elizabeth, N.J.
Cimco Wire & Cable, Allendale, N.J. p 2996
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass. ..... p 2998-3000,3003,3004
Consolidated Wire & Assoc. Corps., Chicago, Ill. ..... p 3007-3009,3012,3013
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3018,3019,3021,3028,3030,3031
Gulton Inds., Inc., Metuchen, N.J.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... p 3034
Markel, L. Frank & Sons, Norristown, Pa. ..... p 3035
Nat'l. Wire & Cable, Los Angeles, Cal. p 3037-3043
Perfection Mica Co., Bensenville, Ill. p 2003
Saxton Prods., Congers, N.Y. p 3048-3050,3053
Standard Wire & Cable, Los Angeles, Cal. ..... p 3057
Tensolite, Tarrytown, N.Y.
Trompeter Elctrns., Chatsworth, Cal. p 2719
Uniform Tubes, Collegeville, Pa. p 3068
Victor Wire & Cable, L.A., Cal. .... p 3069
Whitmor Wire & Cable, No. Hollywood, Cal. ..... p 3070
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Andrew Corp., Orland Pk., Ill.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bogen Div., Paramus, N.J.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Caton Inds., Inc., Clark, N.J.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Co-Operative Inds., Inc., Chester, N.J.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Dynatronic Cable Engineering Corp., Los Angeles, Cal.
Dynatronic Cable Engrg., Sub. National Wire & Cable, Los Angeles, Cal.
Electro Oceanics, Inc., Compton, Calif.
Essex Int'l, Inc., Sycamore, Ill.
Estes Engrg. Co., Gardena, Calif.
Flexible Circuits, Inc., Warrington, Pa.
Franel Corp., So. River, N.J.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Bridgeport, Conn
General Radio Co., Concord, Mass.
Gore, W.L. & Assocs., Inc., Newark, Del.
Gotham Audio Corp., New York, N.Y.
GTE Sylvania, Inc., Moorestown, N.J.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Icore, Inc., Santa Clara, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Mark Prods., Inc., Houston, Tex.
Methode Elctrns., Inc., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
Moore, Samuel & Co., Mantua, Ohio
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.

Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Precision Tube, No. Wales, Pa.
Prestolite Wire & Cable, Port Huron, Mich.
Raychem Corp., Menlo Park, Calif.
Revere Elctrn. Div., Wallingford, Conn.
Reynolds Metals Co., Richmond, Va.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rome Cable, Rome, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Superior Continental Corp., Hickory, N.C.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Thermax Wire Corp., Flushing, N.Y.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
VIKOA Cable Div., Freehold, N.J.
Wald Sound, Sun Valley, Calif.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Zippertubing Co., Los Angeles, Calif.

Cable, Solid Dielectric

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y. p 2997
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill. p 3007,3011
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa. p 3035
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal. p 3057
Tensolite, Tarrytown, N.Y.
Trompeter Elctrns., Chatsworth, Cal.
Uniform Tubes, Collegeville, Pa. p 3068
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Chemplast, Inc., Wayne, N.J.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Control Prods. Corp., Chicago, Ill.
Dielectric Materials Co., Chicago, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Finney Co., Bedford, Ohio
General Elec., Bridgeport, Conn
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Fullerton, Cal.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Precision Tube, No. Wales, Pa.
Raychem Corp., Menlo Park, Calif.
Reynolds Metals Co., Richmond, Va.
Rome Cable, Rome, N.Y.
Superior Continental Corp., Hickory, N.C.
Thermax Wire Corp., Flushing, N.Y.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.
Wiegand, Edwin L. Co., Pittsburgh, Pa.

Cable, TFE Insulated

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J. p 2996
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. p 3032
Dearborn Wire & Cable Co., Rosemont, Ill. p 3019,3021
Manhattan Elec. Cable Corp., Brooklyn, N.Y. p 3034
Markel, L. Frank & Sons, Norristown, Pa. p 3035
Nat'l. Wire & Cable, Los Angeles, Cal. p 3042
Saxton Prods., Congers, N.Y. p 3050
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y. p 3059
Uniform Tubes, Collegeville, Pa. p 3068
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Belden Corp., Chicago, Ill.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cerro Wire & Cable Co., New Haven, Conn.
Chemplast, Inc., Wayne, N.J.
Coleman Cable & Wire Co., River Grove, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Kistler Instr. Co., Redmond, Wash.
Lewis Engrg. Co., Naugatuck, Conn.
Microdot Inc., S. Pasadena, Calif.
Phoenix Wire, Inc., S. Hero, Vt.
Revere Elctrn. Div., Wallingford, Conn.
Thermax Wire Corp., Flushing, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.
Zippertubing Co., Los Angeles, Calif.

Cable, TV Camera

Cities Svc. Co., Chester, N.Y. p 2997
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Dearborn Wire & Cable Co., Rosemont, Ill.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal. p 3069
Whitmor Wire & Cable, No. Hollywood, Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cohu Elctrns., Inc., San Diego, Calif.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Denson Elctrns. Corp., Rockville, Conn.
GBC Closed Circuit TV Corp., New York, N.Y.
General Elec., Bridgeport, Conn
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lear Siegler, Anaheim, Cal.
Lenz Elec. Mfg. Co., Chicago, Ill.
Mark Prods., Inc., Houston, Tex.
Mohawk Wire & Cable, Leominster, Mass.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Plastoid Corp., Long Island City, N.Y.
RCA Corp., Camden, N.J.
Superior Continental Corp., Hickory, N.C.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
VIKOA Cable Div., Freehold, N.J.

Cable, Telephone

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y. p 2997
Columbia Eletrn. Cables, New Bedford, Mass. p 3001
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. p 3033
Dearborn Wire & Cable Co., Rosemont, Ill.
Manhattan Elec. Cable Corp., Brooklyn, N.Y. p 3034
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal. p 3057
Victor Wire & Cable, L.A., Cal. p 3069
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Consolidated Prods., Gardena, Calif.
Dielectric Materials Co., Chicago, Ill.
Essex Int'l., Inc., Decatur, Ill.
Flexible Circuits, Inc., Warrington, Pa.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Lenz Elec. Mfg. Co., Chicago, Ill.
Miller Elec. Co., Woonsocket, R.I.
Mohawk Wire & Cable, Leominster, Mass.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Phelps Dodge Comm., North Haven, Conn.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Rome Cable, Rome, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Stromberg Carlson Corp., Rochester, N.Y.
Superior Continental Corp., Hickory, N.C.
Transitron Elctrn. Corp., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.

Cable, Transmission Line

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cities Svc. Co., Chester, N.Y. p 2997
Columbia Eletrn. Cables, New Bedford, Mass. p 3001
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill. p 3022,3028
Markel, L. Frank & Sons, Norristown, Pa. p 3035
Nat'l. Wire & Cable, Los Angeles, Cal. p 3044
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal. p 3057
Tensolite, Tarrytown, N.Y. p 3059
Trompeter Elctrns., Chatsworth, Cal.
Uniform Tubes, Collegeville, Pa. p 3068
Victor Wire & Cable, L.A., Cal.
Aluminum Co. America, Pittsburgh, Pa.
Anaconda Wire and Cable Co., New York, N.Y.
Andrew Corp., Orland Pk., Ill.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Belden Corp., Chicago, Ill.
Berk Tek, Inc., Reading, Pa.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Copperweld Steel Co., Glassport, Pa.
Decibel Prods., Inc., Dallas, Tex.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynatronic Cable Engineering Corp., Los Angeles, Cal.
Essex Int'l., Inc., Decatur, Ill.
Essex Int'l., Inc., Marion, Ind.
Flexible Circuits, Inc., Warrington, Pa.
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Maspro Co., Inc., Nagoya-Shigai, Japan
Mohawk Wire & Cable, Leominster, Mass.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Phelps Dodge Comm., North Haven, Conn.
Reynolds Metals Co., Richmond, Va.
RF Systems, Inc., Cohasset, Mass.
Superior Continental Corp., Hickory, N.C.
Superior Insulated Wire Corp., Stony Point, N.Y.
Surface Conduction, Inc., New York, N.Y.
TACO Div., Sherburne, N.Y.
Thermax Wire Corp., Flushing, N.Y.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.
Zippertubing Co., Los Angeles, Calif.

Cable, Triaxial

Cities Svc. Co., Chester, N.Y.
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill. p 3013
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa.
Nat'l. Wire & Cable, Los Angeles, Cal. p 3037
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Trompeter Elctrns., Chatsworth, Cal. p 2719
Victor Wire & Cable, L.A., Cal.
Whitmor Wire & Cable, No. Hollywood, Cal.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.
Caton Inds., Inc., Clark, N.J.
Coleman Cable & Wire Co., River Grove, Ill.
Dynatronic Cable Engineering Corp., Los Angeles, Cal.
Elctrn. Resources Div., Los Angeles, Cal.
Essex Int'l., Inc., Decatur, Ill.
Essex Int'l, Inc., Sycamore, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Judd Wire Div., Burlington, Mass.
Lewis Engrg. Co., Naugatuck, Conn.
Microdot Inc., S. Pasadena, Calif.
Mohawk Wire & Cable, Leominster, Mass.
Plastoid Corp., Long Island City, N.Y.
Rome Cable, Rome, N.Y.
Sensor Dynamics, Inc., Addison, Ill.
Superior Continental Corp., Hickory, N.C.
Thermax Wire Corp., Flushing, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
Zippertubing Co., Los Angeles, Calif.

Cable Assemblies & Harnesses

ADC Prods., Minneapolis, Minn.
Amp Inc., Elizabethtown, Pa. p 2518
Amphenol Cadre Div., Endicott, N.Y. p 2814
Amphenol Connector Div., Broadview, Ill.
Amphenol Ind'l. Div., Chicago, Ill.
Amphenol Sales Div., Broadview, Ill. p 2558,2559,2814
Amphenol Space & Missile Sys., Chatsworth, Cal. p 2558,2559
Augat Inc., Attleboro, Mass.
Bendix, Franklin, Ind.
Berg Elctrns., Inc., New Cumberland, Pa. p 2594
Chicago Dynamic Inds., Chicago, Ill.
Connector Corp., Chicago, Ill. p 2613

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Data-Control Systems, Danbury, Conn.
Dearborn Wire & Cable Co., Rosemont, Ill.
Electro Sci. Inds., Portland, Ore.
Elctrn. Molding Corp., Woonsocket, R.I.
Electrospace Corp., Westbury
Gulton Inds., Inc., Metuchen, N.J.
Hughes Aircraft Co., Connecting Devices, Newport Beach, Cal.
ITT Cannon Electric, Santa Ana, Cal.
Janco Corp., Burbank, Cal.
Micro Elctrns. Corp., Palmdale, Cal p 2647
Nat'l. Wire & Cable, Los Angeles, Cal. p 3045
Panduit Corp., Tinley Pk., Ill.
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2672,2673,2688,2699,2700
Rowe Inds., Div., Toledo, Ohio.... p 2707
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y.
Sealectro Corp., Mamaroneck, N.Y.
Severna Operation, East Orange, N.J. p 2814
Smith, Herman H., Inc., Bklyn., N.Y.
Spectra-Strip Corp., Garden Grove, Cal. p 3055
Standard Wire & Cable, Los Angeles, Cal.
Trompeter Elctrns., Chatsworth, Cal.
Uniform Tubes, Collegeville, Pa. p 3068
Vemaline Prods. Co., Wyckoff, N.J.
Victor Wire & Cable, L.A., Cal.... p 3069
Weinschel Engrg. Co., Gaithersburg, Md.
Wiremold Co., W. Hartford, Conn.
Zaring Inds., Inc., Carmel, Ind.
Accurate Elctrns. Corp., Elyria, Ohio
Adronics, Inc., Cedar Grove, N.J.
Aerolite Electronics Corp., Union City, N.J.
Aircraft & Elctrn. Spec., Plainfield, Ind.
Allegri-Tech, Inc., Nutley, N.J.
Alloys Unlimited, Inc., Encino, Calif.
American Elec. Cable Co., Holyoke, Mass.
American Standard, Franklin Pk., Ill.
Americon Corp., Waltham, Mass.
Anchor Specialty Mfg., Teterboro, N.J.
Andrew Corp., Orland Pk., Ill.
Ansley Elctrns. Corp., Doylestown, Pa.
Ansley Elctrns. Corp., Los Angeles, Cal.
Applied Electro Mechanics, Alexandria, Va.
A.R.F. Products, Inc., Raton, N.M.
Argent Inds., Inc., Dayton, Ohio
Artisan Elctrns. Corp., Parsippany, N.J.
Austin Elctrns., Roselle, N.J.
Automation Dynamics, Northvale, N.J.
Ava Elctrns., Upper Darby, Pa.
Avco Corp., Cincinnati, Ohio
Avionics, Inc., South Bend, Ind.
Barker Prods. Co., Saugus, Mass.
Beckman Instrs., Porterville, Cal.
Belden Corp., Chicago, Ill.
Beman Mfg., Inc., New Cumberland, Pa.
Bendix Corp., Sidney, N.Y.
Bergen Wire Rope Co., Lodi, N.J.
Berk Tek, Inc., Reading, Pa.
Bliss Elctrn. Corp., Sussex, N.J.
Boston Insulated Wire & Cable Co., Dorchester, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Burndy Corp., Norwalk, Conn.
Cable Elec. Prods., Inc., Providence, R.I.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
Cam-Lok Div., Cincinnati, Ohio
Caton Inds., Inc., Clark, N.J.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Climatronics Corp., Hauppauge, N.Y.
Co-Operative Inds., Inc., Chester, N.J.
Cole Instr., Costa Mesa, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Collins Radio Co., Dallas, Tex.
Columbia Wire Prods. Co., Chicago, Ill.
Connectron Corp., Van Nuys, Cal
Consolidated Prods., Gardena, Calif.
Control Prods. Corp., Chicago, Ill.
Cord Specialties Co., Franklin Park, Ill.
Culver Stearns Mfg. Co., Worcester, Mass.
D-Cemco, Inc., Burbank, Calif.
Darling, R.E. Co., Inc., Tucson, Ariz.
De Soto Elec. Prods., De Soto, Mo.
Dielectric Sciences, Burlington, Mass
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynatronic Cable Engineering Corp., Los Angeles, Cal.
Eagle-Picher Inds., Inc., Joplin, Mo.
Eastern Co., North Branch, N.J.
Eastern Specialty Co., Philadelphia, Pa.
Eby Sls. Co., Jamaica, N.Y.
Electric Parts Corp., Georgetown, Ky.
Electro Oceanics, Inc., Compton, Calif.
Electrol Co., Inc., York, Pa.
Elctrn. Resources Div., Los Angeles, Cal.
Electrovert, Inc., Mt. Vernon, N.Y.
Elgin Elctrns., Waterford, Pa.
Engrg. Design & Dev., Pacoima, Cal.
Essex Int'l, Inc., Sycamore, Ill.
Estes Engrg. Co., Gardena, Calif.
Everett/Charles, Inc., Pomona, Cal.
Excel Specialty Corp., Chicago, Ill.
Flexible Circuits, Inc., Warrington, Pa.
Franel Corp., So. River, N.J.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Lab. Assocs., Norwich, N.Y.
General Reliance Div., Dover, N.J.
Gillette Elctrn. Prods. Co., Beverly, N.J.
Glenair, Inc., Glendale, Calif.
Gore, W.L. & Assocs., Inc., Newark, Del.
Granite State Machine Co., Inc., Manchester, N.H.
Gray Resch. & Dev. Co., E. Hartford, Conn.
Guardian California, Culver City, Cal.
Halmar Elctrns., Inc., Columbus, Ohio
Harco Labs., Inc., Branford, Conn.
Haydu Prods., Inc., Opa Locka, Fla.
Hiltronics, Stony Pt., N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Industrial Elctrn. Hardware, New York, N.Y.
Int'l. Wire & Cable, Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Jettron Prods., Hanover, N.J.
Joliet Control Corp., Joliet, Ill.
Judd Wire Div., Burlington, Mass.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Kentrox Inds., Inc., Portland, Ore.
Kings Elctrns., Tuckahoe, N.Y.
Koontz-Wagner Elec., South Bend, Ind.
Lance Inds., Sylmar, Calif.
Lane Inds., North Hollywood, Calif.
Lear Siegler, Inc., Santa Monica, Calif.
Lectrodyne Sys. Corp., Philadelphia, Pa.
Lewis Engrg. Co., Naugatuck, Conn.
Linemaster Switch Corp., Woodstock, Conn.
Lingenfelter Applied Tech., Gaithersburg, Md.
Link Div., Binghamton, N.Y.
Lockheed Aircraft Svce., Special Devices Div., Ontario, Calif.
Lynn Elctrns. Corp., Philadelphia, Pa.
M-T Elctrns. Co., San Leandro, Calif.
Mac Panel Co., High Pt., N.C.
Malco Mfg. Co., Chicago, Ill.
Manger Elec. Co., Inc., Stamford, Conn.
Mark Prods., Inc., Houston, Tex.
Matrix Science, Torrance, Cal.
Maxson Elctrns. Div., Great River, N.Y.
Mercury Elctrns. Corp., York, Pa.
Microdot Inc., S. Pasadena, Calif.
Mid-West Metal Prods., Kansas City, Kans.
Milletron, Inc., Pittsburgh, Pa.
Minisink Rubber Co., Inc., Unionville, N.Y.
Modelectric Prods. Corp., Asbury Park, N.J.
Molex Prods. Co., Downers Grove, Ill.
Morey Corp, Downers Grove, Ill.
Mutron Corp., Brockton, Mass.
Narco Avionics, Ft. Washington, Pa.
Neptune Elctrns. Co., New York, N.Y.
Network Inds., Inc., Bayonne, N.J.
Newman, M.M. Corp., Marblehead, Mass.
Noel Mfg. Co. Inc., Bronx, N.Y.
O'Brien, D. G., Inc., Framingham, Mass.
Omega Labs., Inc., Rowley, Mass.
Paraplegics Mfg., Bensenville, Ill.
Permonite Mfg. Co., Chicago, Ill.
Phelps Dodge Comm., North Haven, Conn.
Phoenix Wire, Inc., S. Hero, Vt.
Physical Sciences, Arcadia,, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
PMC Designing, Cincinnati,, Ohio
Power Instrs., Skokie, Ill.
Projects Unlimited, Inc., Dayton, Ohio
Pyco, Inc., Penndel, Pa.
Pyle-National Co., Chgo., Ill.
REM-Tronics, Silver Creek, N.Y.
Rectico, Inc., Cedar Grove, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Revere Elctrn. Div., Wallingford, Conn.
Rogers Corp., Rogers, Conn.
Rowe L. L. Co., Boston, Mass.
Santa Fe Mfg. Co., Bronx, N.Y.
Scala Radio Corp., San Leandro, Cal.
Sensor Dynamics, Inc., Addison, Ill.
Seven Assocs., Sunnyvale, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Sparton Southwest, Inc., Albuquerque, N.M.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Superior Continental Corp., Hickory, N.C.
Switchcraft, Inc., Chicago, Ill.
Teledyne Mecca, Houston, Tex.
Teledyne Positive Connector, Ansonia, Conn.
3M Co. Electro Prods. Div., St. Paul, Minn.
3M Co., St. Paul, Minn.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-Dex Co., Visalia, Calif.
Tri-State Elctrns. Corp., Camden, N.J.
Tru-Connector Corp., Peabody, Mass.
Varied Ind'l. Prods., Inc., Paterson, N.J.
Victor Microwave, Inc., Wakefield, Mass.
VIKOA Cable Div., Freehold, N.J.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Vitro Laboratories, Silver Spring, Md.
Viz Mfg. Co., Philadelphia, Pa.
Waber Elctrns., Inc., Philadelphia, Pa.
Waters Instrs., Inc., Rochester, Minn
Whitaker Cable Corp., N. Kansas City, Mo.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Xerox Data Sys., El Segundo, Cal
Zippertubing Co., Los Angeles, Calif.

Cable Clamps & Clips—See Clamps & Clips, Cable

Cable-End Sealing Kits—See Kits, Cable-End Sealing

Cable Pressurization Equipment—See Vol 1

Cable Retractors
Accuride Div., Santa Fe Springs, Calif.
Aero-Motive Mfg. Co., Kalamazoo, Mich.
Flexible Circuits, Inc., Warrington, Pa.
Grant Pulley & Hardware Co., W. Nyack, N.Y.
Hunter Spring, Hatfield, Pa.
Ind'l. Elec. Reels, Omaha, Neb.
Morey Corp, Downers Grove, Ill.
Vent-Rak, Inc., Indianapolis, Ind.
Zero Mfg. Co., Burbank, Cal.
Zippertubing Co., Los Angeles, Calif.

Cable Testers—See Testers, Cable—Vol 1

Cages, Circuit Board—See Racks, Circuit

Calculators, Electrical & Electronic-Also See Computers, Desk Top—See Vol 1

Calibration Services—See Services, Calibration & Instrument Repair

Calibrators, Accelerometer—See Vol 1

Calibrators, Attenuation—See Vol 1

Calibrators, Crystal—See Vol 1

Calibrators, Current—See Vol 1

Calibrators, Frequency—See Vol 1

Calibrators, LVDT—See Vol 1

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Calibrators, Radar Range—See Vol 1

Calibrators, Sweep—See Generators, Sweep—Vol 1

Calibrators, Synchro—See Vol 1

Calibrators, Telemetering—See Telemetering Testers—Vol 1

Calibrators, Time-Base—See Vol 1

Calibrators, Voltage—See Vol 1

Calibrators, VSWR—See Vol 1

Calling Sytems—See Intercommunication Systems —Vol 1

Calorimeters, Heat Transfer—See Vol 1

Calorimeters, Laser—See Vol 1

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Cameras, Image Converter—See Vol 2

Cameras, Image Dissection—See Vol 2

Cameras, Infrared—See Vol 2

Cameras, Microcircuit Processing—See Vol 2

Cameras, Oscilloscope—See Vol 2

Cameras, Rotating Mirror & Drum—See Vol 2

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Cameras, TV (Color) & Accessories—See Vol 1

Cameras, TV, Infrared—See Vol 1

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Cams
Kahle Engrg. Co., Union City, N.J.
Abesto Corp., Bloomfield, N.J.
Dixon Sintaloy, Inc., Stamford, Conn.
Franklin Fibre-Lamitex, Wilmington, Del.
Kwikset Powdered Metal Prods., Anaheim, Cal.
McNally Bros. Mach. & Gear, Mipls., Minn.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Nylomatic Corp., Morrisville, Pa.
PIC Design Corp., Ridgefield,, Conn.
SECS, Inc., Long Island City, N.Y.
Sterling Instr., New Hyde Pk., NY

Stop Components, Inc., Freeport, N.Y.

Cans & Flat Packs, Integrated Circuit—See Packages, Integrated Circuit—Vol 2

Cans, Capacitor

Alloys Unlimited, Inc., Encino, Calif.
Epoxy Plastic Molders, Irvington, N J
Fansteel Inc., N Chicago, Ill.
Heeger, Inc., Los Angeles, Calif.
Improved Laminated Metal Co., Providence, R.I.
Kentucky Elctrns., Owensboro, Ky.
Kinetron Corp., Asbury Park, N.J.
Mirro Aluminum Co., Manitowoc, Wisc.
Paul, F.H. & Stein Bros., New York, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Sexton Can Co., Inc., Everett, Mass.
Silicone Seals, Chicago, Ill.

Cans, Crystal

Haydon, A. W. Co., Waterbury, Conn.
Magnecraft Elec., Chicago, Ill.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Algo, S. Hackensack, N.J.
Consolidated Resistance Sls., Yonkers, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
GTE Sylvania Inc., Warren, Pa.
Mirro Aluminum Co., Manitowoc, Wisc.
Pan American Trade Dev., New York, N.Y.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Staver Co., Inc., Bay Shore, N.Y.
Veritron West, Inc., Chatsworth, Calif.

Cans, Relay

Magnecraft Elec., Chicago, Ill.
Schrack Elec. Sls., New York, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Algo, S. Hackensack, N.J.
Caton Inds., Inc., Clark, N.J.
Consolidated Resistance Sls., Yonkers, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
Gemp Terminals, Inc., Yonkers, N.Y.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
GTE Sylvania Inc., Warren, Pa.
Heeger, Inc., Los Angeles, Calif.
Johnson & Hoffman Mfg. Co., Carle Place, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Mirro Aluminum Co., Manitowoc, Wisc.
Mobil Elctrns., Inc., Anderson, Ind.
Norelcom Inds., Inc., Farmingdale, N.Y.
R. I. Metpro, Inc., Warwick, R.I.
Russell Inds., Inc., Lynbrook, N.Y.
Silicone Seals, Chicago, Ill.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Staver Co., Inc., Bay Shore, N.Y.
Stevens Prods., Inc., E. Orange, N.J.
Struthers-Dunn, Inc., Pitman, N.J.
Veritron West, Inc., Chatsworth, Calif.

Cans, Semiconductor

Unisem, Philadelphia, Pa. ..... p 1551
Abalon Precision Mfg. Corp., Bronx, N.Y.
Alloys Unlimited, Inc., Encino, Calif.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
GTE Sylvania Inc., Warren, Pa.
Heeger, Inc., Los Angeles, Calif.
Johnson & Hoffman Mfg. Co., Carle Place, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Mirro Aluminum Co., Manitowoc, Wisc.
R. I. Metpro, Inc., Warwick, R.I.
Staver Co., Inc., Bay Shore, N.Y.
United American Metals Div., Brooklyn, N.Y.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Veritron West, Inc., Chatsworth, Calif.

Cans, Transformer

Arnold Engrg. Co., Marengo, Ill.
Automatic Coil, New Hyde Pk., N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Algo, S. Hackensack, N.J.
Consolidated Resistance Sls., Yonkers, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
Gemp Terminals, Inc., Yonkers, N.Y.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Heeger, Inc., Los Angeles, Calif.
Johnson & Hoffman Mfg. Co., Carle Place, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Kling Metal Spinning & Stamping, New York, N.Y.
Mirro Aluminum Co., Manitowoc, Wisc.
Mobil Elctrns., Inc., Anderson, Ind.
MSL Steel Co., Chicago, Ill.
Russell Inds., Inc., Lynbrook, N.Y.
Sexton Can Co., Inc., Everett, Mass.
Silicone Seals, Chicago, Ill.
Spec Plastics, No. Hollywood, Cal.
Staver Co., Inc., Bay Shore, N.Y.
Stevens Prods., Inc., E. Orange, N.J.
Superior Switchboard & Devices Div., Canton, Ohio
Wadsworth Elec. Mfg. Co., Inc., Covington, Ky.

Capacitance Comparators—See Bridges, Capacitance—Vol 1

Capacitor Leakage Indicators—See Testers, Capacitor—Vol 1

Capacitors, Air Cooled

Centralab, Elctrns., Milwaukee, Wisc.
Del Elctrns. Corp., Mt. Vernon, N.Y.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Capacitor Specialists, Inc., Escondido, Cal.
Maxwell Labs., Inc., San Diego, Calif.

Capacitors, Chip (For Microcircuits)

Allen-Bradley Co., Milwaukee, Wisc. p 2331
American Lava Corp., Chattanooga, Tenn.
American Tech. Ceramics, Huntington Sta., N.Y. .....p 2332,2333
AVX Aerovox Corp., New Bedford, Mass.
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. ..... p 2349
Cal-R, Inc., Capacitor Div., Santa Monica, Cal. ..... p 2349
Cal-R, Inc., Thermonetics Div., Santa Monica, Cal. ..... p 2349
Centralab, Elctrns., Milwaukee, Wisc.
Corning Glass Works, Elctrn. Prods. Div., Corning, N.Y.....p 2374,2375
Erie Technological Prods. (EEM), Erie, Pa.
Gulton Inds., Inc., Metuchen, N.J.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. ..... p 2420
Monolithic Dielectrics, Burbank, Cal. p 2432,2433
Murata Corp. of America, Elmsford, N.Y.
Murata Mfg. Co. Ltd., Kyoto, Japan
Nippon Electric/NEC America, N.Y., N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Republic Elctrns. Corp., Paterson, N.J. p 2436
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Southern Elctrns., Burbank, Cal. p 1548,2446-2451
Sprague Elec. Co., No. Adams, Mass.
Union Carbide Corp., Greenville, S.C. p 2427
USCC/Centralab, Elctrns. Div., Burbank, Cal. ..... p 2477
American Comps., Inc., Conshohocken, Pa.
Components, Inc., Biddeford, Me.
Computer Components Int'l, Palm Beach Gardens, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dionics, Inc., Westbury, N.Y.
Eastron Corp., Haverhill, Mass.
Electro Mat'ls., San Diego, Cal.
Elctrn. Concepts, Inc., Eatontown, N.J.
EMC Technology Inc, Philadelphia, Pa.
Maida Dev. Co., Hampton, Va.
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
NCI, Inc., W. Palm Beach, Fla.
Plessey Elctrns. Corp., Farmingdale, N.Y.
"The Potter Co.", Inglewood, Calif
Semtech Ceramic Corp., Newbury Pk., Cal.
Skottie Elctrns., Inc., Archbald, Pa.
Sloan Technology Corp., Santa Barbara, Calif.
TDK Elctrns. Corp., Long Island City, N.Y.
TRW Capacitor Div., Ogallala, Neb.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Vitramon, Inc., Bridgeport, Conn.

Capacitors, Fixed, Air

Del Elctrns. Corp., Mt. Vernon, N.Y.
Jackson Bros., (London) Ltd., New York, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cardwell Condenser, Lindenhurst, N.Y.
Condenser Prods. Corp., Brooksville, Fla.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Radio Co., Concord, Mass.
La Pointe Inds., Inc., Rockville, Conn.
Leeds & Northrup Corp., No. Wales, Pa.
Rohde & Schwarz Sls., Passaic, N.J.
Shigoto Inds., Ltd., New York, N.Y.

Capacitors, Fixed, Bathtub

AVX Aerovox Corp., New Bedford, Mass. ..... p 2330
Balco Capacitors, Orange, N.J.
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PFC Mfg. Div., Great Neck, N.Y.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal.
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Sprague Elec. Co., No. Adams, Mass. p 2474
Standard Condenser Corp., Chicago, Ill.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Neptune Elctrns. Co., New York, N.Y.
"The Potter Co.", Inglewood, Calif
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Ceramic

Allen-Bradley Co., Milwaukee, Wisc. p 1511,2331
American Tech. Ceramics, Huntington Sta., N.Y. .....p 2332,2333
AVX Aerovox Corp., New Bedford, Mass.
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. .....p 2350,2351
Cal-R, Inc., Capacitor Div., Santa Monica, Cal. ..... p 2350
Cal-R, Inc., Thermonetics Div., Santa Monica, Cal. .....p 2350,2351
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GC Elctrns., Rockford, Ill.
Gulton Inds., Inc., Metuchen, N.J. p 2410-2413
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Murata Corp. of America, Elmsford, N.Y.
Murata Mfg. Co. Ltd., Kyoto, Japan
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
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Sprague Elec. Co., No. Adams, Mass.
Stackpole Carbon Co., Elctrn. Comps. - Resistors, Kane, Pa.
Union Carbide Corp., Greenville, S.C. p 2426
USCC/Centralab, Elctrns. Div., Burbank, Cal. ..... p 2477
Airco Speer Elctrns, Bradford, Pa.
American Comps., Inc., Conshohocken, Pa.
Cambridge Thermionic, Cambridge, Mass
Components Specialties, Inc., Freeport, N.Y.
Constanta Co. of Can., Montreal, Can.
Cornell-Dubilier Elctrns., Newark, N.J.
Electro Mat'ls., San Diego, Cal.
Leclanche S A, CH 1401-Yverdon, Switzerland
Maida Dev. Co., Hampton, Va.
Marshall Inds., Monrovia, Cal.
Plessey Elctrns. Corp., Farmingdale, N.Y.
"The Potter Co.", Inglewood, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Skottie Elctrns., Inc., Archbald, Pa.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
3M Co., St. Paul, Minn.
Transitron Elctrn. Corp., Wakefield, Mass.
United Mineral & Chem. Corp., New York, N.Y.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Vitramon, Inc., Bridgeport, Conn.

Capacitors, Fixed, Ceramic Disc

Allen-Bradley Co., Milwaukee, Wisc. p 1511,2331
AVX Aerovox Corp., New Bedford, Mass.
Bel Fuse, Inc., Jersey City, N.J.
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Erie Technological Prods. (EEM), Erie, Pa.
GC Elctrns., Rockford, Ill.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Murata Corp. of America, Elmsford, N.Y.
Murata Mfg. Co. Ltd., Kyoto, Japan
Radio Materials Co., Chicago, Ill. p 2435
San Fernando Elec. Mfg., San Fernando, Cal.
Southern Elctrns., Burbank, Cal.
Sprague Elec. Co., No. Adams, Mass. p 2474
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Components Specialties, Inc., Freeport, N.Y.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Maida Dev. Co., Hampton, Va.

Mallory Capacitor, Indpls., Ind.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Nucleonic Prods., Canoga Pk, Cal.
Sampson Elctrns. Prods. Div., Chicago, Ill.
Semtech Ceramic Corp., Newbury Pk., Cal.
Shigoto Inds., Ltd., New York, N.Y.
Skottie Elctrns., Inc., Archbald, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
3M Co., St. Paul, Minn.
Transitron Elctrn. Corp., Wakefield, Mass.
United Mineral & Chem. Corp., New York, N.Y.

Capacitors, Fixed, Decade

American Tech. Ceramics, Huntington Sta., N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J.
Boonton Elctrns., Parsippany, N.J.
Component Resch., Santa Monica, Cal. p 2353
Electro Cube, San Gabriel, Cal
Electro Sci. Inds., Portland, Ore.
Elctrn. Assocs., W. Long Branch, N.J.
Freed Transformer Co., Bklyn., N.Y. p 482
General Resistance, Mt. Vernon, N.Y.
Interelectronics Corp., Congers, N.Y.
PFC Mfg. Div., Great Neck, N.Y... p 2339
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal.
Southern Elctrns., Burbank, Cal.
Sprague Elec. Co., No. Adams, Mass.
A.O.I.P., 75/Paris 12eme, France
Condenser Prods. Corp., Brooksville, Fla.
Film Capacitors, Inc., Passaic, N.J.
General Radio Co., Concord, Mass.
Leclanche S A, CH 1401-Yverdon, Switzerland
Lionmount & Co., Ltd., New Southgate, London, England
Midg-Line Instr. Co., Miami, Fla.
Neptune Elctrns. Co., New York, N.Y.
Rohde & Schwarz Sls., Passaic, N.J.
TRW Capacitor Div., Ogallala, Neb.

Capacitors, Fixed, Electrolytic (All Types)

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2334,2337
Centralab, Elctrns., Milwaukee, Wisc.
General Elec. Co., Schenectady, N.Y. p 2384,2385
General Instr. Corp., Tazewell, Va. p 2387
Int'l. Elctrns., Melville, N.Y. ..... p 2418
Nippon Electric/NEC America, N.Y., N.Y.
Presin Co., Inc., Shelton, Conn.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.p 2440
Sprague Elec. Co., No. Adams, Mass. p 2474
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Barco, Inc., Milwaukee, Wisc.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Callins Inds., Greenfield, Tenn.
Components, Inc., Biddeford, Me.
Components Specialties, Inc., Freeport, N.Y.
Cornell-Dubilier Elctrns., Newark, N.J.
General Instr. Corp., Hicksville, N.Y.
Gentronics, Inc., Clinton, Conn.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
ITT Semiconductors, W. Palm Beach, Fla.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Mallory Capacitor, Indpls., Ind.
Model Rectifier, Edison, N.J.
Mullard, Inc., Farmingdale, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Syncro Capacitor, Hicksville, Ohio
Transitron Elctrn. Corp., Wakefield, Mass.
United Elctrn. Mfg. Corp., Union City, N.J.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec. Int'l., New York, N.Y.

Capacitors, Fixed, Feedthru

Allen-Bradley Co., Milwaukee, Wisc. p 1511,2331
American Tech. Ceramics, Huntington Sta., N.Y. .....p 2332,2333
AVX Aerovox Corp., New Bedford, Mass.
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal
Erie Frequency Control, Carlisle, Pa. p 1383
Erie Technological Prods. (EEM), Erie, Pa. ..... p 1383
F-Dyne Elctrns., Bridgeport, Conn. p 2383
Gudeman Div., Chicago, Ill.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Monolithic Dielectrics, Burbank, Cal. p 2433
RF Interonics, Bay Shore, N.Y..... p 1528
S & E I Mfg., Northridge, Cal..... p 2439
San Fernando Elec. Mfg., San Fernando, Cal.
Seacor, Inc., Norwood, N.J.
Southern Elctrns., Burbank, Cal. p 2450
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill.
USCC/Centralab, Elctrns. Div., Burbank, Cal.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Cambridge Thermionic, Cambridge, Mass
Capacitor Specialists, Inc., Escondido, Cal.
Capcon, Inc., New York, N.Y.
Chicago Condenser Corp., Chicago, Ill.
Cornell-Dubilier Elctrns., Newark, N.J.
Custom Elctrns., Oneonta, N.Y.
Dearborn Elctrns., Inc., Orlando, Fla.
Dolinko & Wilkens, Inc., Union City, N.J.
Elmag Corp., Newark, N.J.
Estes Engrg. Co., Gardena, Calif.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Maida Dev. Co., Hampton, Va.
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
"The Potter Co.", Inglewood, Calif
RtroN Corp., Skokie, Ill.
Solar Elctrns. Co., Hollywood, Calif.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
Tansitor Elctrns., Inc., Bennington, Vt.
TDK Elctrns. Corp., Long Island City, N.Y.
3M Co., St. Paul, Minn.
Transitron Elctrn. Corp., Wakefield, Mass.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Film

Amp Inc., Elizabethtown, Pa. ..... p 2338
Amp Inc., Harrisburg, Pa.
Amperex Elctrn. Corp., Hauppauge, N.Y. p 2335
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J.
Centralab, Elctrns., Milwaukee, Wisc.
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn. p 2382,2383
General Elec. Co., Schenectady, N.Y. p 2384,2385
General Instr. Corp., Tazewell, Va.
Gudeman Div., Chicago, Ill...p 2391,2404
Hipotronics, Inc., Brewster, N.Y.
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2430
Nippon Electric/NEC America, N.Y., N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
PFC Mfg. Div., Great Neck, N.Y.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.p 2440
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal.
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill. p 2475
Union Carbide Corp., Greenville, S.C. p 2425
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Capacitor Specialists, Inc., Escondido, Cal.
Capcon, Inc., New York, N.Y.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Instr. Corp., Hicksville, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Matthey Bishop Inc., Malvern, Pa.
Maxwell Labs., Inc., San Diego, Calif.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Mullard, Inc., Farmingdale, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Paktron Div., Alexandria, Va.
"The Potter Co.", Inglewood, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Sloan Technology Corp., Santa Barbara, Calif.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
TRW Capacitor Div., Ogallala, Neb.

Capacitors, Fixed, Gas Filled

Cardwell Condenser, Lindenhurst, N.Y.
Epic, Inc., New York, N.Y.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Marshall Inds., Monrovia, Cal.
Rohde & Schwarz Sls., Passaic, N.J.

Capacitors, Fixed, Glass

American Tech. Ceramics, Huntington Sta., N.Y.
Corning Glass Works, Elctrn. Prods. Div., Corning, N.Y.....p 2374,2375
Gudeman Div., Chicago, Ill.
Hipotronics, Inc., Brewster, N.Y.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
San Fernando Elec. Mfg., San Fernando, Cal.
Cambridge Thermionic, Cambridge, Mass
Cardwell Condenser, Lindenhurst, N.Y.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Electro-Science Labs., Philadelphia, Pa.
Owens-Illinois, C&TP Div., Elctrn. Mat'ls., Toledo, Ohio
Syncor Prods. Co., Inc., Malden, Mass.
Vitramon, Inc., Bridgeport, Conn.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Fixed, High Capacitance-Low Voltage

American Lava Corp., Chattanooga, Tenn.
American Tech. Ceramics, Huntington Sta., N.Y. .....p 2332,2333
Amperex Elctrn. Corp., Hauppauge, N.Y. p 2334,2337
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J.
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. .....p 2350,2351
Cal-R, Inc., Capacitor Div., Santa Monica, Cal. ..... p 2350
Cal-R, Inc., Thermonetics Div., Santa Monica, Cal. .....p 2350,2351
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Component Resch., Santa Monica, Cal. p 2353
Corning Glass Works, Elctrn. Prods. Div., Corning, N.Y.....p 2374,2375
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal p 2378,2379
Electro Motive Mfg., Willimantic, Conn. p 2380
Erie Technological Prods. (EEM), Erie, Pa.
F-Dyne Elctrns., Bridgeport, Conn. p 2382
General Elec. Co., Schenectady, N.Y. p 2384,2385
General Instr. Corp., Tazewell, Va. p 2387
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Interelectronics Corp., Congers, N.Y.
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Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
PFC Mfg. Div., Great Neck, N.Y... p 2339
Radio Materials Co., Chicago, Ill. p 2435
Republic Elctrns. Corp., Paterson, N.J. p 2436
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.p 2440
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal. p 2453-2466,2468,2470
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill. p 2475
Union Carbide Corp., Greenville, S.C. p 2424,2426
USCC/Centralab, Elctrns. Div., Burbank, Cal. ..... p 2477
Callins Inds., Greenfield, Tenn.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Components Specialties, Inc., Freeport, N.Y.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
General Instr. Corp., Hicksville, N.Y.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
ITT Semiconductors, W. Palm Beach, Fla.
Leclanche S A, CH 1401-Yverdon, Switzerland
Maida Dev. Co., Hampton, Va.
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
NCI, Inc., W. Palm Beach, Fla.
Paktron Div., Alexandria, Va.
"The Potter Co.", Inglewood, Calif
Siemens Corp., Comps. Div., Iselin, N.J.
Skottie Elctrns., Inc., Archbald, Pa.
Syncro Capacitor, Hicksville, Ohio
Tansitor Elctrns., Inc., Bennington, Vt.
3M Co., St. Paul, Minn.
TRW Capacitor Div., Ogallala, Neb.
Underwood Elec. & Mfg., Maywood, Ill.
United Elctrn. Mfg. Corp., Union City, N.J.
United Mineral & Chem. Corp., New York, N.Y.
Vitramon, Inc., Bridgeport, Conn.
Wesco Elec. Co., Inc., Greenfield, Mass.
Westinghouse Elec. Int'l., New York, N.Y.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, High Temperature

American Tech. Ceramics, Huntington Sta., N.Y. ..... p 2332,2333
Amp Inc., Elizabethtown, Pa. ..... p 2338
Amp Inc., Harrisburg, Pa.
Amperex Elctrn. Corp., Hauppauge, N.Y. p 2335,2337
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J. p 2346,2347
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. ..... p 2350,2351
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Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal p 2378,2379
Electro Motive Mfg., Willimantic, Conn. p 2380
Erie Technological Prods. (EEM), Erie, Pa.
General Elec. Co., Schenectady, N.Y. p 2384,2385
Gudeman Div., Chicago, Ill. p 2388-2400,2402,2405
Gulton Inds., Inc., Metuchen, N.J. p 2410-2413
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y. ..... p 2418
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. ..... p 2420
Monolithic Dielectrics, Burbank, Cal.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
PFC Mfg. Div., Great Neck, N.Y... p 2339
Republic Elctrns. Corp., Paterson, N.J. p 2436
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal. p 2438,2439
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Sangamo Elec. Co., Pickens, S.C. p 2440
Soshin Elec. Co., Tokyo, Japan .. p 2442
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Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill. p 2475
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Union Carbide Corp., Greenville, S.C. p 2424-2426
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Callins Inds., Greenfield, Tenn.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Custom Elctrns., Oneonta, N.Y.
Dearborn Elctrns., Inc., Orlando, Fla.
Electro Mat'ls., San Diego, Cal.
Elmag Corp., Newark, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Lab. Assocs., Norwich, N.Y.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Leviant Int'l., New York, N.Y.
Maida Dev. Co., Hampton, Va.
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
"The Potter Co.", Inglewood, Calif
Skottie Elctrns., Inc., Archbald, Pa.
Spectrum Control, Inc., Fairview, Pa.
Syncor Prods. Co., Inc., Malden, Mass.
Tansitor Elctrns., Inc., Bennington, Vt.
TRW Capacitor Div., Ogallala, Neb.
Vitramon, Inc., Bridgeport, Conn.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, High Voltage

American Tech. Ceramics, Huntington Sta., N.Y.
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Amp Inc., Harrisburg, Pa.
Amperex Elctrn. Corp., Hauppauge, N.Y. p 2335
AVX Aerovox Corp., New Bedford, Mass. ..... p 2330
Balco Capacitors, Orange, N.J. p 2346,2347
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal p 2378,2379
Electro Motive Mfg., Willimantic, Conn. p 2380
Erie Technological Prods. (EEM), Erie, Pa.
F-Dyne Elctrns., Bridgeport, Conn. p 2382
General Elec. Co., Schenectady, N.Y. p 2384,2385
Gudeman Div., Chicago, Ill. p 2389,2390,2392-2396,2402-2404,2407
Gulton Inds., Inc., Metuchen, N.J.
Hipotronics, Inc., Brewster, N.Y. p 2415
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y. ..... p 2418
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal. p 2416
ITT Jennings, Dunellen,, N.J. ..... p 2416
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. ..... p 2420
Monolithic Dielectrics, Burbank, Cal. p 2433
Nytronics, Inc., Capacitor Div., Darlington, S.C.
PFC Mfg. Div., Great Neck, N.Y... p 2339
Radio Materials Co., Chicago, Ill. p 2435
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal. ..... p 2439
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C. p 2440
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal. p 2451
Sprague Elec. Co., No. Adams, Mass. p 2474
Standard Condenser Corp., Chicago, Ill. p 2475
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... p 2476
USCC/Centralab, Elctrns. Div., Burbank, Cal.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Callins Inds., Greenfield, Tenn.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Custom Elctrns., Oneonta, N.Y.
Dearborn Elctrns., Inc., Orlando, Fla.
Dolinko & Wilkens, Inc., Union City, N.J.
Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epic, Inc., New York, N.Y.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Lab. Assocs., Norwich, N.Y.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leeds & Northrup Corp., No. Wales, Pa.
Leviant Int'l., New York, N.Y.
Maida Dev. Co., Hampton, Va.
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Plessey Elctrns. Corp., Farmingdale, N.Y.
"The Potter Co.", Inglewood, Calif
Rohde & Schwarz Sls., Passaic, N.J.
Skottie Elctrns., Inc., Archbald, Pa.
Spectrum Control, Inc., Fairview, Pa.
Sun Capacitors, Chicago, Ill.
Syncor Prods. Co., Inc., Malden, Mass.
Tansitor Elctrns., Inc., Bennington, Vt.
TDK Elctrns. Corp., Long Island City, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Vitramon, Inc., Bridgeport, Conn.
Wesco Elec. Co., Inc., Greenfield, Mass.
Wilmad Glass Co., Inc., Buena, N.J.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Laboratory Standard

American Tech. Ceramics, Huntington Sta., N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J.
Boonton Elctrns., Parsippany, N.J.
Component Resch., Santa Monica, Cal. p 2353
Electro Cube, San Gabriel, Cal
Electro Sci. Inds., Portland, Ore.
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn.
PFC Mfg. Div., Great Neck, N.Y.
S & E I Mfg., Northridge, Cal.
Southern Elctrns., Burbank, Cal.
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill.
Cardwell Condenser, Lindenhurst, N.Y.
Condenser Prods. Corp., Brooksville, Fla.
Dearborn Elctrns., Inc., Orlando, Fla.
Film Capacitors, Inc., Passaic, N.J.
General Radio Co., Concord, Mass.
Leclanche S A, CH 1401-Yverdon, Switzerland
Mallory Capacitor, Indpls., Ind.
Rohde & Schwarz Sls., Passaic, N.J.
Skottie Elctrns., Inc., Archbald, Pa.
TRW Capacitor Div., Ogallala, Neb.
Vitramon, Inc., Bridgeport, Conn.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Mica

American Tech. Ceramics, Huntington Sta., N.Y.
Amp Inc., Harrisburg, Pa.
AVX Aerovox Corp., New Bedford, Mass. ..... p 2330
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Motive Mfg., Willimantic, Conn. p 2380
Erie Technological Prods. (EEM), Erie, Pa.
General Instr. Corp., Tazewell, Va. p 2386
PFC Mfg. Div., Great Neck, N.Y... p 2339
Sangamo Elec. Co., Pickens, S.C. p 2440
Soshin Elec. Co., Tokyo, Japan .. p 2442
Sprague Elec. Co., No. Adams, Mass. p 2474
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... p 2476
Capacitor Specialists, Inc., Escondido, Cal.
Cornell-Dubilier Elctrns., Newark, N.J.
Custom Elctrns., Oneonta, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Hicksville, N.Y.
General Lab. Assocs., Norwich, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Model Rectifier, Edison, N.J.
Morey Corp, Downers Grove, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Transitron Elctrn. Corp., Wakefield, Mass.
Underwood Elec. & Mfg., Maywood, Ill.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Motor Run

AVX Aerovox Corp., New Bedford, Mass.
Electro Cube, San Gabriel, Cal
Gudeman Div., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal.
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Sprague Elec. Co., No. Adams, Mass.
USCC/Centralab, Elctrns. Div., Burbank, Cal.
Capacitor Specialists, Inc., Escondido, Cal.
Cornell-Dubilier Elctrns., Newark, N.J.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Mallory Capacitor, Indpls., Ind.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Motor-Starting

AVX Aerovox Corp., New Bedford, Mass.
Electro Cube, San Gabriel, Cal
General Elec. Co., Schenectady, N.Y.
Gudeman Div., Chicago, Ill. ..... p 2409
Int'l. Elctrns., Melville, N.Y.
Presin Co., Inc., Shelton, Conn.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal.
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Sprague Elec. Co., No. Adams, Mass.
USCC/Centralab, Elctrns. Div., Burbank, Cal.
Industrial Condenser Corp., Chicago, Ill.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Mallory Capacitor, Indpls., Ind.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Syncro Capacitor, Hicksville, Ohio
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Mylar

Amperex Elctrn. Corp., Hauppauge, N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J. p 2346,2347
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y. p 2377
Electro Cube, San Gabriel, Cal.... p 2379
Electro Motive Mfg., Willimantic, Conn. p 2380
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn. p 2382
General Elec. Co., Schenectady, N.Y.
General Instr. Corp., Tazewell, Va. p 2387
Gudeman Div., Chicago, Ill. p 2392-2395
Gulton Inds., Inc., Metuchen, N.J.
Hipotronics, Inc., Brewster, N.Y.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2430
Nippon Electric/NEC America, N.Y., N.Y.
PFC Mfg. Div., Great Neck, N.Y.
Presin Co., Inc., Shelton, Conn.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal. p 2438,2439
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Southern Elctrns., Burbank, Cal. p 2469
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill.
Tobe Deutschmann Labs., Inc., Canton, Mass.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Callins Inds., Greenfield, Tenn.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.

Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Engineered Comps. Co., Gardena, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
LectroMagnetics, Los Angeles, Cal.
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Nucleonic Prods., Canoga Pk, Cal.
Paktron Div., Alexandria, Va.
Philmore Mfg. Co., Richmond Hill, N.Y.
"The Potter Co.", Inglewood, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Sun Capacitors, Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Mylar, Metallized

Amperex Elctrn. Corp., Hauppauge, N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J. p 2346,2347
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal.... p 2379
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn. p 2382
General Elec. Co., Schenectady, N.Y.
Gudeman Div., Chicago, Ill. p 2401-2403
Gulton Inds., Inc., Metuchen, N.J.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2431
Nippon Electric/NEC America, N.Y., N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
PFC Mfg. Div., Great Neck, N.Y... p 2339
Presin Co., Inc., Shelton, Conn.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal. p 2438,2439
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Southern Elctrns., Burbank, Cal. p 2470
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill.
Callins Inds., Greenfield, Tenn.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Engineered Comps. Co., Gardena, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
LectroMagnetics, Los Angeles, Cal.
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Nucleonic Prods., Canoga Pk, Cal.
Paktron Div., Alexandria, Va.
"The Potter Co.", Inglewood, Calif
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Oil

Amp Inc., Elizabethtown, Pa. ..... p 2338
AVX Aerovox Corp., New Bedford, Mass. ..... p 2330
Del Elctrns. Corp., Mt. Vernon, N.Y.
General Elec. Co., Schenectady, N.Y. p 2385
Gudeman Div., Chicago, Ill.
Hipotronics, Inc., Brewster, N.Y. p 2415
PFC Mfg. Div., Great Neck, N.Y.
RF Interonics, Bay Shore, N.Y.
San Fernando Elec. Mfg., San Fernando, Cal.
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill.
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... p 2476
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Radio Co., Concord, Mass.
Industrial Condenser Corp., Chicago, Ill.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Mallory Capacitor, Indpls., Ind.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Neptune Elctrns. Co., New York, N.Y.
"The Potter Co.", Inglewood, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
Sun Capacitors, Chicago, Ill.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Paper

AVX Aerovox Corp., New Bedford, Mass. ..... p 2330
Del Elctrns. Corp., Mt. Vernon, N.Y. p 2377
Electro Motive Mfg., Willimantic, Conn. p 2380
General Elec. Co., Schenectady, N.Y. p 2385
Gudeman Div., Chicago, Ill. p 2404,2406-2408
Gulton Inds., Inc., Metuchen, N.J.
Hipotronics, Inc., Brewster, N.Y.
Int'l. Elctrns., Melville, N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
RF Interonics, Bay Shore, N.Y.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C. p 2440
Seacor, Inc., Norwood, N.J.
Sprague Elec. Co., No. Adams, Mass. p 2474
Standard Condenser Corp., Chicago, Ill.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Capacitor Specialists, Inc., Escondido, Cal.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elmag Corp., Newark, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Neptune Elctrns. Co., New York, N.Y.
"The Potter Co.", Inglewood, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Sun Capacitors, Chicago, Ill.
TRW Capacitor Div., Ogallala, Neb.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Paper, Metallized

AVX Aerovox Corp., New Bedford, Mass.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal.... p 2379
General Elec. Co., Schenectady, N.Y. p 2385
Gudeman Div., Chicago, Ill. ..... p 2405
Gulton Inds., Inc., Metuchen, N.J.
Int'l. Elctrns., Melville, N.Y.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C.
Sprague Elec. Co., No. Adams, Mass. p 2474
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Chicago Condenser Corp., Chicago, Ill.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Maxwell Labs., Inc., San Diego, Calif.
Nucleonic Prods., Canoga Pk, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Stromberg Carlson Corp., Rochester, N.Y.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Photoflash

American Tech. Ceramics, Huntington Sta., N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Del Elctrns. Corp., Mt. Vernon, N.Y.
General Elec. Co., Schenectady, N.Y. p 2385
General Instr. Corp., Tazewell, Va. p 2387
Sprague Elec. Co., No. Adams, Mass.
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... p 2476
Capacitor Specialists, Inc., Escondido, Cal.
Cornell-Dubilier Elctrns., Newark, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Film Capacitors, Inc., Passaic, N.J.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Paktron Div., Alexandria, Va.
Siemens Corp., Comps. Div., Iselin, N.J.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.

Capacitors, Fixed, Polycarbonate

Amperex Elctrn. Corp., Hauppauge, N.Y.
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J.
Component Resch., Santa Monica, Cal. p 2352,2353
Del Elctrns. Corp., Mt. Vernon, N.Y. p 2377
Electro Cube, San Gabriel, Cal
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn. p 2382,2383
General Elec. Co., Schenectady, N.Y. p 2385
Gudeman Div., Chicago, Ill. p 2388-2390
Gulton Inds., Inc., Metuchen, N.J.
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2431
S & E I Mfg., Northridge, Cal.
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Sangamo Elec. Co., Pickens, S.C. p 2440
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal. p 2468
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill. p 2475
Capacitor Specialists, Inc., Escondido, Cal.
Capcon, Inc., New York, N.Y.
Components Specialties, Inc., Freeport, N.Y.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Elmag Corp., Newark, N.J.
Engineered Comps. Co., Gardena, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Paktron Div., Alexandria, Va.
"The Potter Co.", Inglewood, Calif
Royal Inds, El Segundo, Calif
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
TRW Capacitor Div., Ogallala, Neb.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Polycarbonate, Metallized

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2335
AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J. p 2346,2347
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal.... p 2378
Elctrn. Assocs., W. Long Branch, N.J.
F-Dyne Elctrns., Bridgeport, Conn. p 2382,2383
General Elec. Co., Schenectady, N.Y. p 2385
Gudeman Div., Chicago, Ill. p 2397-2400
Gulton Inds., Inc., Metuchen, N.J.
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2431
S & E I Mfg., Northridge, Cal. p 2438,2439
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal. p 2471
Standard Condenser Corp., Chicago, Ill. p 2475
Callins Inds., Greenfield, Tenn.
Components Specialties, Inc., Freeport, N.Y.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Engineered Comps. Co., Gardena, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
"The Potter Co.", Inglewood, Calif
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
TRW Capacitor Div., Ogallala, Neb.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Polystyrene

AVX Aerovox Corp., New Bedford, Mass.
Balco Capacitors, Orange, N.J. p 2346,2347
Centralab, Elctrns., Milwaukee, Wisc.
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y. p 2377
Electro Cube, San Gabriel, Cal.... p 2379
Elctrn. Assocs., W. Long Branch, N.J. p 2381
F-Dyne Elctrns., Bridgeport, Conn. p 2382,2383
Gulton Inds., Inc., Metuchen, N.J.
Interelectronics Corp., Congers, N.Y.
Int'l. Elctrns., Melville, N.Y.
Midwec Corp., Scottsbluff, Neb. p 2431
PFC Mfg. Div., Great Neck, N.Y... p 2339
Presin Co., Inc., Shelton, Conn.
S & E I Mfg., Northridge, Cal. p 2438,2439
San Fernando Elec. Mfg., San Fernando, Cal. ..... p 2437
Seacor, Inc., Norwood, N.J. ..... p 2441
Southern Elctrns., Burbank, Cal. p 2467,2468
Sprague Elec. Co., No. Adams, Mass.
Standard Condenser Corp., Chicago, Ill. p 2475
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Capacitor Specialists, Inc., Escondido, Cal.
Capcon, Inc., New York, N.Y.
Chicago Condenser Corp., Chicago, Ill.
Condenser Prods. Corp., Brooksville, Fla.
Connolly & Co., Inc., Mt. View, Calif.
Cornell-Dubilier Elctrns., Newark, N.J.
Dearborn Elctrns., Inc., Orlando, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Engineered Comps. Co., Gardena, Cal.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
Industrial Condenser Corp., Chicago, Ill.
Int'l. Elctrns., Melville, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Mullard, Inc., Farmingdale, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Sun Capacitors, Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Wesco Elec. Co., Inc., Greenfield, Mass.

Capacitors, Fixed, Porcelain, Enamel

American Tech. Ceramics, Huntington Sta., N.Y. .....p 2332,2333
Electro-Science Labs., Philadelphia, Pa.
Marshall Inds., Monrovia, Cal.
United Mineral & Chem. Corp., New York, N.Y.
Vitramon, Inc., Bridgeport, Conn.

Capacitors, Fixed, Power Factor Correction

AVX Aerovox Corp., New Bedford, Mass.
Del Elctrns. Corp., Mt. Vernon, N.Y.
General Elec. Co., Schenectady, N.Y. p 2384
Interelectronics Corp., Congers, N.Y.
RF Interonics, Bay Shore, N.Y.
S & E I Mfg., Northridge, Cal.
Sangamo Elec. Co., Pickens, S.C.
Sprague Elec. Co., No. Adams, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Condenser Prods. Corp., Brooksville, Fla.
Elctrn. Concepts, Inc., Eatontown, N.J.
Filtron Co., Flushing, N.Y.
Leclanche S A, CH 1401-Yverdon, Switzerland
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Vitramon, Inc., Bridgeport, Conn.
York Elctrns., Brooklyn, N.Y.

Capacitors, Fixed, Pulse-Forming Network

American Tech. Ceramics, Huntington Sta., N.Y.
Amp Inc., Elizabethtown, Pa. ..... p 2338
Amp Inc., Harrisburg, Pa.
AVX Aerovox Corp., New Bedford, Mass.
Component Resch., Santa Monica, Cal. p 2353
Del Elctrns. Corp., Mt. Vernon, N.Y.
F-Dyne Elctrns., Bridgeport, Conn.
General Elec. Co., Schenectady, N.Y. p 2384
Hipotronics, Inc., Brewster, N.Y. p 2415
San Fernando Elec. Mfg., San Fernando, Cal.
Southern Elctrns., Burbank, Cal.
Sprague Elec. Co., No. Adams, Mass.
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... p 2476
USCC/Centralab, Elctrns. Div., Burbank, Cal.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Capacitor Specialists, Inc., Escondido, Cal.
Condenser Prods. Corp., Brooksville, Fla.
Cornell-Dubilier Elctrns., Newark, N.J.
Custom Elctrns., Oneonta, N.Y.
Elmag Corp., Newark, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
EMC Technology Inc, Philadelphia, Pa.
Filtron Co., Flushing, N.Y.
General Lab. Assocs., Norwich, N.Y.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Leviant Int'l., New York, N.Y.
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Paktron Div., Alexandria, Va.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Skottie Elctrns., Inc., Archbald, Pa.
TRW Capacitor Div., Ogallala, Neb.
Vitramon, Inc., Bridgeport, Conn.

Capacitors, Fixed, Silvered Mica

AVX Aerovox Corp., New Bedford, Mass.
Electro Motive Mfg., Willimantic, Conn.
Erie Technological Prods. (EEM), Erie, Pa.
General Instr. Corp., Tazewell, Va. p 2386
PFC Mfg. Div., Great Neck, N.Y.
Sangamo Elec. Co., Pickens, S.C.
Seacor, Inc., Norwood, N.J.
Sprague Elec. Co., No. Adams, Mass.
Cornell-Dubilier Elctrns., Newark, N.J.
Filmohm Div., Long Island City, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Transitron Elctrn. Corp., Wakefield, Mass.
Underwood Elec. & Mfg., Maywood, Ill.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.

Capacitors, Fixed, Tantalum

General Elec. Co., Schenectady, N.Y. p 2384
Int'l. Elctrns., Melville, N.Y. ..... p 2418
Nippon Electric/NEC America, N.Y., N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C. ..... p 2434
Sprague Elec. Co., No. Adams, Mass. p 2474
Union Carbide Corp., Greenville, S.C. p 2424
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Components, Inc., Biddeford, Me.
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Gentronics, Inc., Clinton, Conn.
Hunter-Stanley Elctrns., Inc., Nashville, Tenn.
International Elctrn. Inds., Greenfield, Tenn.
Int'l. Elctrns., Melville, N.Y.
ITT Semiconductors, W. Palm Beach, Fla.
Leclanche S A, CH 1401-Yverdon, Switzerland
Mallory Capacitor, Indpls., Ind.
Mullard, Inc., Farmingdale, N.Y.
NCI, Inc., W. Palm Beach, Fla.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
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Condenser Prods. Corp., Brooksville, Fla.
Dearborn Elctrns., Inc., Orlando, Fla.
Elmag Corp., Newark, N.J.
Film Capacitors, Inc., Passaic, N.J.
Filtron Co., Flushing, N.Y.
"The Potter Co.", Inglewood, Calif
Royal Inds, El Segundo, Calif
TRW Capacitor Div., Ogallala, Neb.

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Filtron Co., Flushing, N.Y.
"The Potter Co.", Inglewood, Calif
Royal Inds, El Segundo, Calif
TRW Capacitor Div., Ogallala, Neb.

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Gudeman Div., Chicago, Ill.
Gulton Inds., Inc., Metuchen, N.J.
Interelectronics Corp., Congers, N.Y.
Nytronics, Inc., Capacitor Div., Darlington, S.C.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
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American Comps., Inc., Conshohocken, Pa.
Cornell-Dubilier Elctrns., Newark, N.J.
Electro Mat'ls., San Diego, Cal.
Elctrn. Concepts, Inc., Eatontown, N.J.
Leviant Int'l., New York, N.Y.
Maida Dev. Co., Hampton, Va.
Maxwell Labs., Inc., San Diego, Calif.
Skottie Elctrns., Inc., Archbald, Pa.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
3M Co., St. Paul, Minn.
TRW Capacitor Div., Ogallala, Neb.
United Mineral & Chem. Corp., New York, N.Y.
Voltronics Corp., Hanover, N.J.

Capacitors, Fixed, Vacuum

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Cardwell Condenser, Lindenhurst, N.Y.
Dolinko & Wilkens, Inc., Union City, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Overvoltage Protected

Centralab, Elctrns., Milwaukee, Wisc.
Standard Condenser Corp., Chicago, Ill.
Leclanche S A, CH 1401-Yverdon, Switzerland
Marshall Inds., Monrovia, Cal.
Maxwell Labs., Inc., San Diego, Calif.

Capacitors, Variable, Air

Amperex Elctrn. Corp., Hauppauge, N.Y.
Erie Technological Prods. (EEM), Erie, Pa.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
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Seacor, Inc., Norwood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
All Star Prods., Inc., Defiance, Ohio
Barker & Williamson, Bristol, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Cardwell Condenser, Lindenhurst, N.Y.
Components Specialties, Inc., Freeport, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Radio Co., Concord, Mass.
Hammarlund Mfg. Co., Red Bank, N.J.
La Pointe Inds., Inc., Rockville, Conn.
Leeds & Northrup Corp., No. Wales, Pa.
Lieco, Inc., Lindenhurst, N.Y.
Philmore Mfg. Co., Richmond Hill, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comm. Eq. Div., Iselin, N.J.
Underwood Elec. & Mfg., Maywood, Ill.
United Mineral & Chem. Corp., New York, N.Y.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Variable, Ceramic

American Tech. Ceramics, Huntington Sta., N.Y.
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Centralab, Elctrns., Milwaukee, Wisc. p 2348
Erie Technological Prods. (EEM), Erie, Pa.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. ..... p 2420
Johanson Mfg. Corp., Boonton, N.J. p 2421
Johnson E. F. Co., Waseca, Minn. p 2422
Miller, J.W. Co., Compton, Cal.
Murata Corp. of America, Elmsford, N.Y.
Murata Mfg. Co. Ltd., Kyoto, Japan
United Prods. Co., New Hyde Pk., N.Y. p 2508
Cambridge Thermionic, Cambridge, Mass
Lieco, Inc., Lindenhurst, N.Y.
Maida Dev. Co., Hampton, Va.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.

TDK Elctrns. Corp., Long Island City, N.Y.
3M Co., St. Paul, Minn.

Capacitors, Variable, Film

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2336
Del Elctrns. Corp., Mt. Vernon, N.Y.
Elctrn. Assocs., W. Long Branch, N.J.
Jackson Bros., (London) Ltd., New York, N.Y. p 2419
Film Capacitors, Inc., Passaic, N.J.
Leviant Int'l., New York, N.Y.
Spectrum Control, Inc., Fairview, Pa.

Capacitors, Variable, Gas

Cardwell Condenser, Lindenhurst, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Lieco, Inc., Lindenhurst, N.Y.

Capacitors, Variable, Glass

American Tech. Ceramics, Huntington Sta., N.Y.
Erie Technological Prods. (EEM), Erie, Pa.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johanson Mfg. Corp., Boonton, N.J. p 2421
Cambridge Thermionic, Cambridge, Mass
Owens-Illinois, C&TP Div., Elctrn. Mat'ls., Toledo, Ohio
Owens-Illinois, Consumer & Tech. Prods., Toledo, Ohio
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Variable, High Temperature

American Tech. Ceramics, Huntington Sta., N.Y.
Erie Technological Prods. (EEM), Erie, Pa.
Johanson Mfg. Corp., Boonton, N.J. p 2421
Johnson E. F. Co., Waseca, Minn. p 2422
Spectrum Control, Inc., Fairview, Pa.
Voltronics Corp., Hanover, N.J.

Capacitors, Variable, HV (Lab Type)-Also See Decade Boxes,Capacitance

American Tech. Ceramics, Huntington Sta., N.Y.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dow-Key, Santa Barbara, Cal. .... p 2428
Dranetz Engrg. Labs., Plainfield, N.J.
Johanson Mfg. Corp., Boonton, N.J. p 2421
Kilovac Corp., Santa Barbara, Cal. p 2428
Penta Labs., Santa Barbara, Cal. p 2428
PFC Mfg. Div., Great Neck, N.Y.
Lieco, Inc., Lindenhurst, N.Y.
Midg-Line Instr. Co., Miami, Fla.
Spectrum Control, Inc., Fairview, Pa.

Capacitors, Variable, Motor Driven

Dale Elctrns., Inc., Yankton, S.D.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.

Capacitors, Variable, Mica

Electro Motive Mfg., Willimantic, Conn. p 2380
Miller, J.W. Co., Compton, Cal.
PFC Mfg. Div., Great Neck, N.Y.
Cardwell Condenser, Lindenhurst, N.Y.
Leeds & Northrup Corp., No. Wales, Pa.
Lieco, Inc., Lindenhurst, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Underwood Elec. & Mfg., Maywood, Ill.

Capacitors, Variable, Neutralizing

ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Jackson Bros., (London) Ltd., New York, N.Y. p 2419
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Millen, James Mfg., Malden, Mass. p 2429
Cardwell Condenser, Lindenhurst, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Lieco, Inc., Lindenhurst, N.Y.
Voltronics Corp., Hanover, N.J.

Capacitors, Variable, Oil

Cardwell Condenser, Lindenhurst, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.

Capacitors, Variable, Padder

Electro Motive Mfg., Willimantic, Conn. p 2380
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. p 2420
Johnson E. F. Co., Waseca, Minn. p 2422
Millen, James Mfg., Malden, Mass. p 2429
Miller, J.W. Co., Compton, Cal.
PFC Mfg. Div., Great Neck, N.Y.
Cardwell Condenser, Lindenhurst, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Lieco, Inc., Lindenhurst, N.Y.
Underwood Elec. & Mfg., Maywood, Ill.
Voltronics Corp., Hanover, N.J.

Capacitors, Variable, Piston—See Capacitors, Variable, Trimmer (All Types)

Capacitors, Variable, Quartz

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JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johanson Mfg. Corp., Boonton, N.J. p 2421
Cardwell Condenser, Lindenhurst, N.Y.
Lieco, Inc., Lindenhurst, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Syncor Prods. Co., Inc., Malden, Mass.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Variable, Silicone

Computer Diode, Fair Lawn, N.J.
Eastron Corp., Haverhill, Mass.
Parametric Inds., Inc., Winchester, Mass.
Siemens Corp., Comps. Div., Iselin, N.J.
Spectrum Control, Inc., Fairview, Pa.

Capacitors, Variable, TFE

Amperex Elctrn. Corp., Hauppauge, N.Y.
Johnson E. F. Co., Waseca, Minn. p 2422
Film Capacitors, Inc., Passaic, N.J.
Royal Inds, El Segundo, Calif
Spectrum Control, Inc., Fairview, Pa.
Voltronics Corp., Hanover, N.J.

Capacitors, Variable, Temperature Compensating

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2336
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Elctrn. Assocs., W. Long Branch, N.J.
Erie Technological Prods. (EEM), Erie, Pa.
Interelectronics Corp., Congers, N.Y.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Eastron Corp., Haverhill, Mass.
Lieco, Inc., Lindenhurst, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Voltronics Corp., Hanover, N.J.

Capacitors, Variable, Trimmer (All Types)

American Tech. Ceramics, Huntington Sta., N.Y.
Amperex Elctrn. Corp., Hauppauge, N.Y. p 2336
Centralab, Elctrns., Milwaukee, Wisc. p 2348
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Motive Mfg., Willimantic, Conn. p 2380
Erie Technological Prods. (EEM), Erie, Pa.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Jackson Bros., (London) Ltd., New York, N.Y. p 2419
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y. p 2420
Johanson Mfg. Corp., Boonton, N.J. p 2421
Johnson E. F. Co., Waseca, Minn. p 2422,2423
Millen, James Mfg., Malden, Mass. p 2429
PFC Mfg. Div., Great Neck, N.Y.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
All Star Prods., Inc., Defiance, Ohio
Cardwell Condenser, Lindenhurst, N.Y.
Hammarlund Mfg. Co., Red Bank, N.J.
La Pointe Inds., Inc., Rockville, Conn.
Lieco, Inc., Lindenhurst, N.Y.
Philmore Mfg. Co., Richmond Hill, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Stettner-Trush Inc., Cazenovia, N.Y.
Underwood Elec. & Mfg., Maywood, Ill.
United Mineral & Chem. Corp., New York, N.Y.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Variable, Vacuum

Amperex Electronic Corp., Hicksville, N.Y.
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ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal. p 2417
ITT Jennings, Dunellen,, N.J. ..... p 2417
Kilovac Corp., Santa Barbara, Cal. p 2428
Penta Labs., Santa Barbara, Cal. p 2428
Cardwell Condenser, Lindenhurst, N.Y.
Dolinko & Wilkens, Inc., Union City, N.J.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Machlett Labs., Inc., Stamford, Conn.
Wilmad Glass Co., Inc., Buena, N.J.

Capacitors, Water Cooled

Del Elctrns. Corp., Mt. Vernon, N.Y.
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Elctrn. Concepts, Inc., Eatontown, N.J.

Caps, Connector

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Amphenol Sales Div., Broadview, Ill. p
Cinch Div. TRW INC., Elk Grove Village, Ill. p 2603
Millen, James Mfg., Malden, Mass.
Rye Inds., Inc., Mamaroneck, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Beman Mfg., Inc., New Cumberland, Pa.
Bendix Corp., Sidney, N.Y.
Bud Radio, Inc., Willoughby, Ohio
Burndy Corp., Norwalk, Conn.
Cable Elec. Prods., Inc., Providence, R.I.
Cam-Lok Div., Cincinnati, Ohio
Caton Inds., Inc., Clark, N.J.
Cinch Mfg. Co., Elk Grove Village, Ill.
Clover Inds. Div., Tonawanda, N.Y.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
General Elec., Providence, R.I.
GTE Sylvania Inc., Warren, Pa.
Hobson Bros., Inc., Chicago, Ill.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Javex Elctrns., Cherry Valley, Calif.
Jettron Prods., Hanover, N.J.
Kings Elctrns., Tuckahoe, N.Y.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Staver Co., Inc., Bay Shore, N.Y.
Teledyne Mecca, Houston, Tex.
Templet Ind., Inc., Plainview, N.Y.
Thomas & Betts Co., Elizabeth, N.J.
T.J. Elctrns., Ft. Worth, Tex.
Tri-State Elctrns. Corp., Camden, N.J.
Tru-Connector Corp., Peabody, Mass.
Waldom Elctrns., Inc., Chicago, Ill.
Zippertubing Co., Los Angeles, Calif.

Caps, Forms & Tapes, Heat Shrinkable-Also See Tubing, Heat Shrinkable

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Transcon Mfg. Co., Dallas, Tex.
American Pamcor, Inc., Paoli, Pa
Automatic Die Cutting Mach. Co., New York, N.Y.
Zippertubing Co., Los Angeles, Calif.

Caps, Grid & Plate—See Clips & Caps, Grid & Plate

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Caps, Wire-Splicing—See Splicers, Wire (Butt & Cap Types)

Carbides

Carborundum Co., Niagara Falls, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cerac, Inc., Butler, Wisc.
Fansteel Inc., N Chicago, Ill.
General Elec., Detroit, Mich.
GTE Sylvania, Inc., Towanda, Pa.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Insaco, Inc., Quakertown, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Mackay, A.D., Inc., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Carbon

Airco Speer Carbon-Graphite, Carbon Prods. Dept., St. Marys, Pa.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Carbone Corp., Boonton, N.J.
Carter's Ink Co., Cambridge, Mass.
Dixon Sintaloy, Inc., Stamford, Conn.
Duramic Prods., Inc., Palisades Park, N.J.
Helwig Carbon Prods., Inc., Milwaukee, Wisc.
Isomet Corp., Oakland, N.J.
Mackay, A.D., Inc., New York, N.Y.
Ohio Carbon Co., Cleveland, Ohio
Pure Carbon Co., Inc., St. Marys, Pa.
St. Marys Carbon Co., St. Marys, Pa.
Stackpole Carbon Co., Carbon Div., St. Marys, Pa.
Superior Carbon Prods., Inc., Cleveland, Ohio
Ultra Carbon Corp., Bay City, Mich.
Union Carbide, Carbon Prods. Div., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Card Holders, Circuit Board—See Racks, Circuit Board

Card Readers—See Punched Card Equipment—Vol 1

Cards, Linear Function (With Discrete Components)—See Vol 2

Cards, Linear Function (With IC'S)—See Vol 2

Cards, Logic (With Discrete Components)—See Vol 1

Cards, Logic (With IC'S)—See Vol 1

Carriages, Probe—See Vol 2

Carrier Current Systems—See Comm. Systems, Carrier Current—Vol 1

Carriers—See Holders & Carriers—Vol 2

Cartridges, Microphone—See Vol 1

Cartridges, Phono, Ceramic—See Vol 1

Cartridges, Phono, Crystal—See Vol 1

Cartridges, Phono, Magnetic —See Vol 1

Carts, Instrument & Equipment

Electronic Enclosures, El Segundo, Cal.
Hewlett-Packard, Palo Alto, Cal.
Tektronix, Inc., Beaverton, Ore.
Bal, William Corp., Elizabeth, N.J.
Barnes Engrg. Co., Santa Ana, Calif.
Basler Elec. Co., Highland, Ill.
Baumker Mfg. Co., Toledo, Ohio
BFC-Bernard Franklin Co., Phila., Pa.
Corning Glass Works, Lab. Prods. Dept., Corning, N.Y.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Equipment Co. of America, Hialeah, Fla.
Equipto, Aurora, Ill.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
General TV Network, Ferndale, Mich.
Hallowell, Hatfield, Pa.
Lindsay Structure, Evansville, Ind.
Metropolitan Wire Goods, Wilkes-Barre, Pa.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Mobil-Tronics, Tustin, Cal.
Neumade Prods. Corp., Scarsdale, N.Y.
Par-Metal Prods. Div., Brooklyn, N.Y.
Republic Steel Corp, Cleveland, Ohio
Rohde & Schwarz Sls., Passaic, N.J.
Skydyne, Inc., Port Jervis, N.Y.
Sturdilite Sci. Furniture Sys., Plainwell, Mich
Technibilt Corp., Burbank, Cal.
Technical Svc. Corp., Louisville, Ky.
Titchener, E.H. & Co., Binghamton, N.Y.
VWR Scientific, San Francisco, Cal.
Waber Elctrns., Inc., Philadelphia, Pa.
Warwick Prods. Co., Independence, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

Cases, Delay Line

Control Elctrns. Co., Inc., Farmingdale, N.Y.
Algo, S. Hackensack, N.J.
Dura Plastics N.Y., Inc., Westport, Conn.
Electro Assemblies, Inc., Chicago, Ill.
Eugene Engrg. Co., Inc., Rockland, Mass.
Gemp Terminals, Inc., Yonkers, N.Y.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Kinetron Corp., Asbury Park, N.J.
Mobil Elctrns., Inc., Anderson, Ind.
Norelcom Inds., Inc., Farmingdale, N.Y.
Resdel Corp., Rio Grande, N.J.
Skydyne, Inc., Port Jervis, N.Y.
Spec Plastics, No. Hollywood, Cal.
Stevens Prods., Inc., E. Orange, N.J.

Cases, Equipment, Instrument, Meter (Portable)

Electronic Enclosures, El Segundo, Cal.
Hewlett-Packard, Palo Alto, Cal.
M M Elctrn. Enclosures, Hicksville, N.Y. p 2319
(NES) Nationwide Elctrn. Sys., Itasca, Ill.
NOBEX Div., Burlingame, Cal..... p 1467
Optima Enclosures, Tucker, Ga. p 2320
Vero Electronics, Inc., Hauppauge, N.Y. p 2329
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Algo, S. Hackensack, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Amco Engrg. Co., Chicago, Ill.
American Aluminum Co., Mountainside, N.J.
Analogic, Wakefield, Mass.
Applied Design Co., Inc., Tonawanda, N.Y.
Bal, William Corp., Elizabeth, N.J.
Bogen Div., Paramus, N.J.
Boonton Molding Co., Inc., Boonton, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Components Specialties, Inc., Freeport, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Craig Sys. Corp., Lawrence, Mass.
Daniels, C.R., Inc., Daniels, Md.
Davies, Harry Molding Co., Chicago, Ill.
Dura Plastics N.Y., Inc., Westport, Conn.
E-Tronics, Van Nuys, Cal.
Edo Western Corp., Salt Lake City, Utah
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Environmental Container Sys., Union City, Calif.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Extrudonics Co., New Brunswick, N.J.
Fansteel Inc., N Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Kentucky Elctrns., Owensboro, Ky.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Koch, H. & Sons, Corte Madera, Cal.
Mobil Elctrns., Inc., Anderson, Ind.
Muckle Mfg. Co., Owatonna, Minn.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Skydyne, Inc., Port Jervis, N.Y.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Spring City Elec. Mfg. Co., Spring City, Pa.
Stahlin Bros., Inc., Belding, Mich.
Staver Co., Inc., Bay Shore, N.Y.
TA Mfg. Corp., Los Angeles, Cal.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Waber Elctrns., Inc., Philadelphia, Pa.
Waldom Elctrns., Inc., Chicago, Ill.
Warwick Prods. Co., Independence, Ohio
Watson Mfg. Co., Inc., Jamestown, N.Y.
Whitman Corp., Cincinnati, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

Cases, Equipment, Instrument, Meter (Stationary)

Douglas Electronics, Inc., San Leandro, Cal.
Electronic Enclosures, El Segundo, Cal. p 2315
Formica Metal Prods. Co., Inc., Medford, Mass.
M M Elctrn. Enclosures, Hicksville, N.Y. p 2319
(NES) Nationwide Elctrn. Sys., Itasca, Ill.
Optima Enclosures, Tucker, Ga. p 2320
Stantron, No. Hollywood, Cal. .... p 2325
Techmar Corp., Los Angeles, Cal. p 2327
Vector Elctrn. Co., Inc., Sylmar, Cal. p 2722
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Adalet Mfg., Cleveland, Ohio
Algo, S. Hackensack, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Amco Engrg. Co., Chicago, Ill.
American Aluminum Co., Mountainside, N.J.
Analogic, Wakefield, Mass.
Applied Design Co., Inc., Tonawanda, N.Y.
Bal, William Corp., Elizabeth, N.J.
Blickman, S., Inc., Weehawken, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Buckeye Stamping Co., Columbus, Ohio
Bud Radio, Inc., Willoughby, Ohio
Consolidated Resistance Sls., Yonkers, N.Y.
Craig Sys. Corp., Lawrence, Mass.
Daniels, C.R., Inc., Daniels, Md.
Dura Plastics N.Y., Inc., Westport, Conn.
E-Tronics, Van Nuys, Cal.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Environmental Container Sys., Union City, Calif.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Feiner, P. & Sons, Inc., New York, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
Honeywell, Apparatus Controls, Mpls., Minn.
Houston Magnetics Corp., Houston, Tex
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Ingersoll Prods., Chicago, Ill.
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Mid-West Metal Prods., Kansas City, Kans.
Mirro Aluminum Co., Manitowoc, Wisc.
Mobil Elctrns., Inc., Anderson, Ind.
Muckle Mfg. Co., Owatonna, Minn.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Skydyne, Inc., Port Jervis, N.Y.
Spring City Elec. Mfg. Co., Spring City, Pa.
Stahlin Bros., Inc., Belding, Mich.
TA Mfg. Corp., Los Angeles, Cal.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Waber Elctrns., Inc., Philadelphia, Pa.
Warwick Prods. Co., Independence, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

Cases, Relay—See Cans, Relay

Cases, Semiconductor—See Cans, Semiconductor

Cases, Shielded—See Containers, Shielded

Cases, Transit—See Transit Cases

Castings—See Metal Parts, Cast

Cathode-Ray Readout Tubes —See Tubes, Readout—Vol 2

Catv Systems & Equipment—See Vol 1

Cavities, Microwave—See Vol 2

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Cells, Fuel—See Fuel Cells—Vol 1

Cells, Kerr—See Vol 2

Cells, Load—See Vol 2

Cells, Photoconductive—See Vol 2

Cells, Photoemissive-Also See Tubes, Photomultiplier —See Vol 2

Cells, Photovoltaic—See Vol 2

Cells, Solar—See Cells, Photovoltaic—Vol 2

Cements—See Adhesives

Centrifuges-Also See Simulators, Motion—See Vol 1

Ceramic Resonators—See Vol 2

Ceramics—See Insulation Parts, Ceramic

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Chambers, Altitude—See Vol 1

Chambers, Anechoic—See Anechoic Chambers—Vol 1

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Chambers, Humidity—See Vol 1

Chambers, Ionization—See Vol 1

Chambers, Magnetic Environment—See Vol 1

Chambers, Pressure—See Vol 1

Chambers, Radiation—See Vol 1

Chambers, Salt Spray—See Vol 1

Chambers, Sand & Dust—See Vol 1

Chambers, Space Simulation —See Solar Simulators—Vol 1

Chambers, Sunshine—See Vol 1

Chambers, Temperature—See Vol 1

Chambers, Vacuum—See Vol 1

Chambers, Vibration—See Vol 1

Chargers, Battery—See Vol 1

Chargers, Magnet—See Magnetizers—Vol 1

Chassis, Circuit Board Mounting

California Elctrn. Mfg. Co., Alamo, Calif.
Datacom, Inc., Ft. Walton Bch., Fla.
Elco, Willow Grove, Pa.
Elctrn. Engrg. Co. Cal., Santa Ana, Cal.
(NES) Nationwide Elctrn. Sys., Itasca, Ill.
RDI, Glen Ellyn, Ill.
Re-el Circuits, Inc., Totowa Boro, N.J. p 326,327
Scanbe Mfg. Corp., El Monte, Cal. p 2324
Summit Engrg. Corp., Bozeman, Mont.
Tempo/UTI Div., Chatsworth, Cal.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Aydin Data Systems, Ft. Washington, Pa
Barnes Engrg. Co., Santa Ana, Calif.
Barry Controls, Watertown, Mass.
Birtcher Corp., Monterey Park, Cal.
Buckeye Stamping Co., Columbus, Ohio
Bud Radio, Inc., Willoughby, Ohio
Circuit Structures Lab., Burbank, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eugene Engrg. Co., Inc., Rockland, Mass.
Fansteel Inc., N Chicago, Ill.
Granite State Machine Co., Inc., Manchester, N.H.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HMW Enterprises, Inc., Steelton, Pa.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Incor Instr., Plainview, N.Y.
Interlind Elctrns., Doraville, Ga.
Lear Siegler, Inc., Santa Monica, Calif.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Rosemount Engrg. Co., Minneapolis, Minn.

Titchener, E.H. & Co., Binghamton, N.Y.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.

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Chassis, Metal

ACDC Elctrns., Oceanside, Cal.
Cabtron Corp., Chicago, Ill...... p 2314
Formica Metal Prods. Co., Inc., Medford, Mass.
Hipotronics, Inc., Brewster, N.Y. p 2955
Honeywell, Inc., Wabash, Ind.
Miller, J.W. Co., Compton, Cal..... p 2494
Multitech Power Sys., Costa Mesa, Cal.
Optima Enclosures, Tucker, Ga. p 2320
Premier Metal Prods. Co., Bronx, N.Y. p 2322
Rosemount Plug-In, Nashville, Tenn.
Scanbe Mfg. Corp., El Monte, Cal. p 2324
Signal Transformer, Bklyn., N.Y. p 2981
Stantron, No. Hollywood, Cal. .... p 2325
Techmar Corp., Los Angeles, Cal. p 2327
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Acme Model Engrg. Co., Ridgefield, N.J.
Acro Prods. Corp., Chicago, Ill.
Algo, S. Hackensack, N.J.
American Aluminum Co., Mountainside, N.J.
Apahouser Corp. of N.E., Boston, Mass.
Barnes Engrg. Co., Santa Ana, Calif.
Barry Controls, Watertown, Mass.
Baumker Mfg. Co., Toledo, Ohio
BFC-Bernard Franklin Co., Phila., Pa.
Birtcher Corp., Monterey Park, Cal.
Bossert Mfg. Corp., Utica, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Chassis-Trak, Inc., Indianapolis, Ind.
Circuit Structures Lab., Burbank, Calif.
Control Prods. Corp., Chicago, Ill.
Danco Metal Products, Inc., Westlake, Ohio
Data Technology Corp., Palo Alto, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Donnelly Mfg. Co., Waltham, Mass.
Eljay Corp., Columbia, Md.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Extrudonics Co., New Brunswick, N.J.
Falstrom Co., Passaic, N.J.
Fansteel Inc., N Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
GAF Corp., New York, N.Y.
Glar-Ban Corp., Buffalo, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Granite State Machine Co., Inc., Manchester, N.H.
GTE Sylvania Inc., Danvers, Mass.
Gyrotronics, Inc., Asbury Park, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
Holbrook-Merrill Co., Sunnyvale, Cal.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Micro Scan., Boston, Mass.
Kinetron Corp., Asbury Park, N.J.
Lear Siegler, Inc., Santa Monica, Calif.
Lynch, R.H. Mfg. Co., S. San Gabriel, Calif.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Muckle Mfg. Co., Owatonna, Minn.
Pabst Engineering Equipment Co., Inc., Elizabeth, N.J.
Par-Metal Prods. Div., Brooklyn, N.Y.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Radiation Sys., Inc., McLean, Va.
Riester & Thesmacher Co., Cleveland, Ohio
Robinson-Nugent, New Albany, Ind.
Rosemount Engrg. Co., Minneapolis, Minn.
Rowe L. L. Co., Boston, Mass.
SKG Assocs., Inc., Boston, Mass.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.
Templet Ind., Inc., Plainview, N.Y.
Titchener, E.H. & Co., Binghamton, N.Y.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Waber Elctrns., Inc., Philadelphia, Pa.
Watson Mfg. Co., Inc., Jamestown, N.Y.
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

Chassis Slides—See Slides, Cabinet, Chassis & Drawer

Checkers—See Analyzers; Testers—Vol 1

Chemically Milled Parts—See Metal Parts, Chemically Milled

Chemicals, Anti-Static—See Coatings, Anti-Static

Chemicals, Degreasing—See Cleaners & Solvents

Chemicals, Dehumidifying

Aluminum Co. America, Pittsburgh, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Barium & Chems., Inc., Steubenville, Ohio
Dow Chemical Co., Midland, Mich.
LPS Research Labs., Los Angeles, Cal.
Merix Chem. Co., Chicago, Ill.
Pall Trinity Micro Corp., Cortland, N.Y.
Union Carbide, Chemicals & Plastics, New York, N.Y.

Chemicals, Electroplating

Engelhard Minerals & Chem., Murray Hill, N.J.
Allied Chemical Corp., Morristown, N.J.
American Smelting & Refining Co., New York, N.Y.
Arnold Labs., N. Hollywood, Cal.
Atomergic Chemetals, Carle Place, N.Y.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Barco Chem. Prods. Co., Chicago, Ill.
Barium & Chems., Inc., Steubenville, Ohio
City Chemical Corp., New York, N.Y.
Colonial Alloys, Phila., Pa.
Conversion Chem. Corp., Rockville, Conn.
Dow Chemical Co., Midland, Mich.
DuBois Chems., Cincinnati, Ohio
Dynachem Corp., Santa Fe Springs, Cal.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elctrn. Space Prods., Los Angeles, Cal.
Enthone, Inc., New Haven, Conn.
Fairmount Chem. Co., Inc., Newark, N.J.
Fidelity Chem. Prods. Corp., Newark, N.J.
GAF Corp., New York, N.Y.
Harshaw Chem. Co., Cleveland, Ohio
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
LEA Mfg. Co., Waterbury, Conn
London Chemical Co., Bensenville, Ill.
M & T Chemicals Inc., Rahway, N.J.
Mac Dermid, Inc., Waterbury, Conn.
Materials Development, Los Angeles, Cal.
Matthey Bishop Inc., Malvern, Pa.
Metaplast Electrochemicals, Bronx, N.Y.
Nitine, Inc., Clifton, N.J.
Oakite Prods., Inc., Berkeley Hgts., N.J.
Octagon Process, Inc., Edgewater, N.J.
Richardson Co., Des Plaines, Ill.
Sel-Rex Corp., Nutley, N.J.
Selectrons, Ltd., New York, N.Y.
Sifco Metachemical, Cleveland, Ohio
Technic, Inc., Providence, R.I.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Uniroyal, Inc., New York, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Chemicals, Epoxy Stripping

Applied Plastics Co., El Segundo, Cal.
Arnold Labs., N. Hollywood, Cal.
Clarkson Labs., Inc., Camden, N.J.
Conversion Chem. Corp., Rockville, Conn.
DuBois Chems., Cincinnati, Ohio
Dynaloy, Inc., Hanover, N.J.
Hardman Inc., Belleville, N.J.
LEA Mfg. Co., Waterbury, Conn
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Nitine, Inc., Clifton, N.J.
Octagon Process, Inc., Edgewater, N.J.
Pennwalt Corp., Phila., Pa.
Ram Chems., Gardena, Calif.

Chemicals, Etching

Acton Assocs., Pittston, Pa.
Allaco Prods., Braintree, Mass.
Allied Chemical Corp., Morristown, N.J.
Alpha Metals, Inc., Jersey City, N.J.
Applied Plastics Co., El Segundo, Cal.
Arnold Labs., N. Hollywood, Cal.
Atomergic Chemetals, Carle Place, N.Y.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Chemplast, Inc., Wayne, N.J.
City Chemical Corp., New York, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Colonial Alloys, Phila., Pa.
Conversion Chem. Corp., Rockville, Conn.
Dow Chemical Co., Midland, Mich.
DuBois Chems., Cincinnati, Ohio
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elctrn. Space Prods., Los Angeles, Cal.
Enthone, Inc., New Haven, Conn.
Fairmount Chem. Co., Inc., Newark, N.J.
Fidelity Chem. Prods. Corp., Newark, N.J.
GAF Corp., New York, N.Y.
Gates, Geo. W. & Co., Franklin Sq., N.Y.
Gore, W.L. & Assocs., Inc., Newark, Del.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Kepro Cir. Sys., Inc., St. Louis, Mo.
Mac Dermid, Inc., Waterbury, Conn.
Mackay, A.D., Inc., New York, N.Y.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Nitine, Inc., Clifton, N.J.
Oakite Prods., Inc., Berkeley Hgts., N.J.
Octagon Process, Inc., Edgewater, N.J.
Packaged Resins Co., Braintree, Mass.
Pennwalt Corp., Phila., Pa.
Phoenix Materials Corp., Kittanning, Pa.
Selectrons, Ltd., New York, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Union Carbide, Chemicals & Plastics, New York, N.Y.

Chemicals, Fungicidal—See Coatings, Fungicidal

Chemicals, Luminescent

RCA Elctrns. Comps., Harrison, N.J.
Allied Chemical Corp., Morristown, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Black Light Corp. Amer., San Gabriel, Cal.
Black Light Prods., Chicago, Ill.
Bycoski, Casmir T., Inc., Hartford, Conn.
Canrad Precision Inds., Inc., Pelham, N.Y.
Cerac, Inc., Butler, Wisc.
Dynachem Corp., Santa Fe Springs, Cal.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elctrn. Space Prods., Los Angeles, Cal.
General Elec. Co., Cleveland, Ohio
Mackay, A.D., Inc., New York, N.Y.
Shannon Luminous Mat'ls., Hollywood, Cal.
Stroblite Co., Inc., New York, N.Y.
Ultra-Violet Prods., Inc., San Gabriel, Cal.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Chemicals, Metal Stripping

Arnold Labs., N. Hollywood, Cal.
Bycoski, Casmir T., Inc., Hartford, Conn.
Clarkson Labs., Inc., Camden, N.J.
Conversion Chem. Corp., Rockville, Conn.
DuBois Chems., Cincinnati, Ohio
Dynachem Corp., Santa Fe Springs, Cal.
Enthone, Inc., New Haven, Conn.
Fidelity Chem. Prods. Corp., Newark, N.J.
GAF Corp., New York, N.Y.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Isochem Resins Co., Lincoln, R.I.
LEA Mfg. Co., Waterbury, Conn
Mac Dermid, Inc., Waterbury, Conn.
Nitine, Inc., Clifton, N.J.
Octagon Process, Inc., Edgewater, N.J.
Pennwalt Corp., Phila., Pa.
Richardson Co., Des Plaines, Ill.
Sel-Rex Corp., Nutley, N.J.

Chemicals, Photosensitive

RCA Elctrns. Comps., Harrison, N.J.
Allied Chemical Corp., Morristown, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bycoski, Casmir T., Inc., Hartford, Conn.
City Chemical Corp., New York, N.Y.
Dow Chemical Co., Midland, Mich.
Dynachem Corp., Santa Fe Springs, Cal.
Dynaloy, Inc., Hanover, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Etchomatic, Inc., Waltham, Mass.
Fairmount Chem. Co., Inc., Newark, N.J.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Kepro Cir. Sys., Inc., St. Louis, Mo.
Mackay, A.D., Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Moore John B. Corp., So. Amboy, N.J.
Nitine, Inc., Clifton, N.J.
Opticon Chem., Palos Verdes Peninsula, Cal.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Chemicals, Semiconductor (Production)

GC Elctrns., Rockford, Ill.
Alpha Metals, Inc., Jersey City, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Cerac, Inc., Butler, Wisc.
CGS Units, Inc., Rochester, N.Y.
Dynachem Corp., Santa Fe Springs, Cal.
Elctrn. Space Prods., Los Angeles, Cal.
Etchomatic, Inc., Waltham, Mass.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Isochem Resins Co., Lincoln, R.I.
Kerr-McGee Chem. Corp., Oklahoma City, Okla.
Mackay, A.D., Inc., New York, N.Y.
Materials Development, Los Angeles, Cal.
Materials Resch. Corp., Orangeburg, N.Y.
Nitine, Inc., Clifton, N.J.
Octagon Process, Inc., Edgewater, N.J.
Phoenix Materials Corp., Kittanning, Pa.
RCA Solid State Div., Somerville, N.J.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Chemicals, Wire Stripping

GC Elctrns., Rockford, Ill.
Acme Chemical & Insulation Co., New Haven, Conn.
Allied Chemical Corp., Morristown, N.J.
Arnold Labs., N. Hollywood, Cal.
Clarkson Labs., Inc., Camden, N.J.
Division Lead Co., Summit, Ill.
Dow Chemical Co., Midland, Mich.
DuBois Chems., Cincinnati, Ohio
Dynaloy, Inc., Hanover, N.J.
Eraser Co., Syracuse, N.Y.
Etchomatic, Inc., Waltham, Mass.
Fidelity Chem. Prods. Corp., Newark, N.J.
GAF Corp., New York, N.Y.
Isochem Resins Co., Lincoln, R.I.
LEA Mfg. Co., Waterbury, Conn
London Chemical Co., Bensenville, Ill.
Methode Elctrns., Inc., Chicago, Ill.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Mona Inds., Inc., Paterson, N.J.
Nitine, Inc., Clifton, N.J.
Oakite Prods., Inc., Berkeley Hgts., N.J.
Octagon Process, Inc., Edgewater, N.J.
Siemens Corp., Comps. Div., Iselin, N.J.
Wybar Elctrns., Inc., Syracuse, N.Y.

Chestsets—See Handsets, Chestsets & Operator Sets—Vol 1

Chips, Capacitor—See Capacitors, Chip

Chips, IC—See Circuits, Integrated, Silicon Monolithic, Unpackaged Chips—Vol 2

Chips, Transistor—See Transistors, Chip Unpackaged—Vol 2

Chokes, A-F—See Coils, A-F

Chokes, Air Core, DC

Ferrodyne Corp., Venice, Calif.
Hipotronics, Inc., Brewster, N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Coral Magnetics Co., Farmingdale, N.Y.
Eastern Co., North Branch, N.J.
Elctrn. Coils, Springfield, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnavolt Inc., Yonkers, N.Y.
National Moldite, Newark, N.J.
Polyphase Instr. Co., Bridgeport, Pa.
Tranex, Inc., Mountain View, Cal.
Transrex Div., Torrance, Cal.

Chokes, Filter

Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Douglas Randall Div., Pawcatuck, Conn.
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif. .. p 2951
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2958
North Elec. Co., Galion, Ohio
Ohmite Mfg. Co., Skokie, Ill.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
B.H. Inds., Los Angeles, Cal.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Eastern Co., North Branch, N.J.
Eastern Delta Corp., Fair Lawn, N.J.
Electrical Windings, Inc., Chicago, Ill.
Elctrn. Coils, Springfield, Mass.
Endicott Coil Co., Binghamton, N.Y.
General Instr. Corp., Chicopee, Mass.
Green Rectifier Corp., Fair Lawn, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
LectroMagnetics, Los Angeles, Cal.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Stancor, Chicago, Ill.
Stanford Applied Engrg., Santa Clara, Cal.
TDK Elctrns. Corp., Long Island City, N.Y.
Tranex, Inc., Mountain View, Cal.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.

Chokes, R-F

ADC Prods., Minneapolis, Minn.
A.L.A. Inds., Inc., Harrison, N.Y.. p 1645
Automatic Coil, New Hyde Pk., N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. .....p 2484,2485
Dale Elctrns., Inc., Yankton, S.D. p 2489
Delevan Div., Coil Prods., E. Aurora, N.Y.
Ferrodyne Corp., Venice, Calif.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johnson E. F. Co., Waseca, Minn.
Lambda Elctrns., Melville, N.Y.
Millen, James Mfg., Malden, Mass. p 2497
Miller, J.W. Co., Compton, Cal. p 2493-2495
Multitech Power Sys., Costa Mesa, Cal.
Ohmite Mfg. Co., Skokie, Ill.
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Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barker & Williamson, Bristol, Pa.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Collins Radio Co., Newport Beach, Calif.
Core-Tronics, Inc., Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
Electro Assemblies, Inc., Chicago, Ill.
Elctrn. Coils, Springfield, Mass.
Endicott Coil Co., Binghamton, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
General Instr. Corp., Chicopee, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Industrial Microwave, Scotch Plains, N.J.
LectroMagnetics, Los Angeles, Cal.
Linell Engrg. Corp., Chicago, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Microwave Assocs., Inc., Burlington, Mass.
Morey Corp, Downers Grove, Ill.
Olektron Corp., Dudley, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Inc., Minneapolis, Minn
Pulse Engrg., Inc., San Diego, Cal.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Stanford Applied Engrg., Santa Clara, Cal.
Syscon Int'l., Inc., So. Bend, Ind.
TDK Elctrns. Corp., Long Island City, N.Y.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Wilco Corp., Indianapolis, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

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ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Douglas Randall Div., Pawcatuck, Conn.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J.
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United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Coral Magnetics Co., Farmingdale, N.Y.
Eastern Co., North Branch, N.J.
Eastern Delta Corp., Fair Lawn, N.J.
Electrical Windings, Inc., Chicago, Ill.
Elgin Elctrns., Waterford, Pa.
Epco Prods., Inc., Wallkill, N.Y.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Green Rectifier Corp., Fair Lawn, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Peerless Elec. Prods., Anaheim, Cal.
Pem Mach. Tool Co., Inc., Cranford, N.J.
Polyphase Instr. Co., Bridgeport, Pa.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Tranex, Inc., Mountain View, Cal.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
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Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Budwig Mfg. Co., Ramona, Calif.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cole-Hersee Co., S. Boston, Mass.
Connectrol Corp., New York, N Y
E.C.P. Corp., Cleveland, Ohio
Electrovert, Inc., Mt. Vernon, N.Y.
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Glenair, Inc., Glendale, Calif.
Globe Plastics, Pomona, Cal.
Gries Reproducer Co., New Rochelle, N.Y.
Heyman Mfg. Co., Kenilworth, N.J.
Holub Inds., Inc., Sycamore, Ill.
Ico/Rally, Palo Alto, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Shim Co., Inc., Glenbrook, Conn.
Larson Charles O. Co., Sterling, Ill.
Miller Dial, El Monte, Calif.
O'Hara Metal Prods. Co., San Francisco, Calif.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Preformed Line Prods. Co., Cleveland, Ohio
Price & Rutzebeck, Hayward, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
SKG Assocs., Inc., Boston, Mass.
Superior Continental Corp., Hickory, N.C.
Switchcraft, Inc., Chicago, Ill.
TA Mfg. Corp., Los Angeles, Cal.
Teledyne Positive Connector, Ansonia, Conn.
Templet Ind., Inc., Plainview, N.Y.
Thomas & Betts Co., Elizabeth, N.J.
3M Co., St. Paul, Minn.
Tinnerman Div., Cleveland, Ohio
Triple-A Specialty Co., Chicago, Ill.
Tyton Corp., Milwaukee, Wisc.
Utilities Svc. Co., Allentown, Pa.
Waldom Elctrns., Inc., Chicago, Ill.
Weckesser Co., Inc., Chicago, Ill.

Whitaker Cable Corp., N. Kansas City, Mo.
Zeus Ind'l. Prods., Raritan, N.J.

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Accurate Spring & Wire Forming, River Grove, Ill.
Aeroquip Corp., Jackson, Mich.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Betzelt GMBH, Trogerstr. 32, W. Germany
Birnbach Co., Inc., Freeport, N.Y.
Birtcher Corp., Monterey Park, Cal.
Central Scientific Co., Chicago, Ill.
Connectrol Corp., New York, N Y
Dynamic Gear, Ft. Lauderdale, Fla.
Electrovert, Inc., Mt. Vernon, N.Y.
Hecht Rubber Corp., Jacksonville, Fla.
Hunter Spring, Hatfield, Pa.
Instru-Lec Corp., Mt. Vernon, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Kestler Elctrns., Temple City, Cal
Keystone Elctrns. Corp., New York, N.Y.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Naugler Engrg., Inc., Beverly, Mass.
Norelcom Inds., Inc., Farmingdale, N.Y.
O'Hara Metal Prods. Co., San Francisco, Calif.
Royal Inds, El Segundo, Calif
Samarius, Inc., Derby, Conn.
Seastrom Mfg. Co. Inc., Glendale, Cal.
SECS, Inc., Long Island City, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
SKG Assocs., Inc., Boston, Mass.
Staver Co., Inc., Bay Shore, N.Y.
Sterling Instr., New Hyde Pk., NY
Stock Drive Prods., New Hyde Pk., N.Y.
Stop Components, Inc., Freeport, N.Y.
TA Mfg. Corp., Los Angeles, Cal.
Templet Ind., Inc., Plainview, N.Y.
Tinnerman Div., Cleveland, Ohio
Waldom Elctrns., Inc., Chicago, Ill.
Weckesser Co., Inc., Chicago, Ill.
Western Coil & Elec. Co., Racine, Wisc.

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Allied Chemical Corp., Morristown, N.J.
Allied Elctrns. Corp., Chicago, Ill.
Alpha Metals, Inc., Jersey City, N.J.
Amicon Corp., Lexington, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Arnold Labs., N. Hollywood, Cal.
Atlas Coverall & Uniform Supply, L.A., Cal.
Bacon Inds., Watertown, Mass.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Barco Chem. Prods. Co., Chicago, Ill.
Baron-Blakeslee, Inc., Chicago, Ill.
Bendix Corp., Davenport, Iowa
Borden Chemical Co., Norristown, Pa.
Branson Instruments Co., Stamford, Conn.
Brulin & Co., Indianapolis, Ind.
Caig Labs., Inc., Westbury, N.Y.
Carter's Ink Co., Cambridge, Mass.
Cerac, Inc., Butler, Wisc.
Chemtronics, Inc., Brooklyn, N.Y.
City Chemical Corp., New York, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Cobehn, Inc., Fairfield, N.J.
Colonial Alloys, Phila., Pa.
Communications Tech. Corp., Los Angeles, Cal.
Conap, Inc., Allegany, N.Y.
Conversion Chem. Corp., Rockville, Conn.
DoAll Co., Des Plaines, Ill.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
DuBois Chems., Cincinnati, Ohio
Dynachem Corp., Santa Fe Springs, Cal.
Dynaloy, Inc., Hanover, N.J.
Dynasonics Corp., Pipestone, Minn.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elctrn. Chemical Corp., Jersey City, N.J.
Electronic Engrs., Inc., Chicago, Ill.
Elctrn. Space Prods., Los Angeles, Cal.
Enthone, Inc., New Haven, Conn.
Fidelity Chem. Prods. Corp., Newark, N.J.
Formulabs Ind'l. Inks, Escondido, Cal.
Friend's Mfg., Williamstown, N.J.
Fuller-O'Brien Corp., Menlo Park, Calif.
GAF Corp., New York, N.Y.
Gagne Assocs., Inc., Binghamton, N.Y.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Heeger, Inc., Los Angeles, Calif.
Hollis Engrg., Inc., Nashua, N.H.
Houghton, E.F. & Co., Philadelphia, Pa.
Humble Oil & Refining Co., Houston, Tex.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Industrial Formulations, Plainview, N.Y.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Isochem Resins Co., Lincoln, R.I.
Kester Solder Co, Chicago, Ill.
L & R Mfg. Co., Kearny, N.J.
LEA Mfg. Co., Waterbury, Conn
Loctite Corp., Newington, Conn.
London Chemical Co., Bensenville, Ill.
LPS Research Labs., Los Angeles, Cal.
M & T Chemicals Inc., Rahway, N.J.
Mac Dermid, Inc., Waterbury, Conn.
Magnaflux Corp., Chicago, Ill.
Merix Chem. Co., Chicago, Ill.
Miller, Harry Corp., Philadelphia, Pa.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Moore John B. Corp., So. Amboy, N.J.
Neumade Prods. Corp., Scarsdale, N.Y.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Nitine, Inc., Clifton, N.J.
Nopco Chem. Div., Morristown, NJ
Norelcom Inds., Inc., Farmingdale, N.Y.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
Oakite Prods., Inc., Berkeley Hgts., N.J.
Octagon Process, Inc., Edgewater, N.J.
Pennwalt Corp., Phila., Pa.
Philadelphia Quartz Co., Phila., Pa.
Phillips Mfg. Co., Chicago, Ill.
Pro-Chem, Inc., Cleveland, Ohio
R-Columbia Prods., Inc., Highland Park, Ill.
Ram Chems., Gardena, Calif.
Randolph Prods. Co., Carlstadt, N.J.
Rawn Co., Inc., Spooner, Wisc.
Rogers Anti-Static Chems., Inc., Chicago, Ill.
Sara Scientific Co., San Francisco, Calif.
Shanda Labs., Closter, N.J.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Superior Flux & Mfg., Cleveland, Ohio
Techni-Tool, Inc., Philadelphia, Pa.
Ultra Sonic Inds., Lindenhurst, N.Y.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Westinghouse Elec., Sykesville, Md.

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Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
GC Elctrns., Rockford, Ill.
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Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
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Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Pamcor, Inc., Paoli, Pa
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Components Specialties, Inc., Freeport, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
IE Mfg. Co., Chicago, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Shigoto Inds., Ltd., New York, N.Y.
Triple-A Specialty Co., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Clips, Battery

Augat Inc., Attleboro, Mass.
GC Elctrns., Rockford, Ill.
Mueller Elec. Co., Cleveland, Ohio
Shigoto Inds., Ltd., New York, N.Y.
Whitaker Cable Corp., N. Kansas City, Mo.

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National Tel-Tronics Corp., Great Neck, N.Y.
Panduit Corp., Tinley Pk., Ill.
Smith, Herman H., Inc., Bklyn., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abadak Inds., Inc., Farmingdale, N.Y.
Beman Mfg., Inc., New Cumberland, Pa.
Electrovert, Inc., Mt. Vernon, N.Y.
Fastex Div., Des Plaines, Ill.
Ico/Rally, Palo Alto, Cal.
MacDonald & Co., Glendale, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
SKG Assocs., Inc., Boston, Mass.
Templet Ind., Inc., Plainview, N.Y.
Thomas & Betts Co., Elizabeth, N.J.
Tinnerman Div., Cleveland, Ohio
Weckesser Co., Inc., Chicago, Ill.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Clips, Component

Augat Inc., Attleboro, Mass.
Barnes Corp., Lansdowne, Pa.
Berg Elctrns., Inc., New Cumberland, Pa.
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AAVID Engrg., Inc., Laconia, N.H.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Beman Mfg., Inc., New Cumberland, Pa.
Birtcher Corp., Monterey Park, Cal.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Cambridge Thermionic, Cambridge, Mass
Connectrol Corp., New York, N Y
Connor Spring & Mfg. Co., San Jose, Cal.
Electrovert, Inc., Mt. Vernon, N.Y.
Fastex Div., Des Plaines, Ill.
GTE Sylvania Inc., Warren, Pa.
Int'l. Elctrn. Resch., Burbank, Cal.
Kestler Elctrns., Temple City, Cal
Keystone Elctrns. Corp., New York, N.Y.
O'Hara Metal Prods. Co., San Francisco, Calif.
Seastrom Mfg. Co. Inc., Glendale, Cal.
Sjoberg, C. & Son, Inc., Cranston, R.I.
SKG Assocs., Inc., Boston, Mass.
Staver Co., Inc., Bay Shore, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Tinnerman Div., Cleveland, Ohio
Waldom Elctrns., Inc., Chicago, Ill.

Clips, Fahnestock, Spring Wire

GC Elctrns., Rockford, Ill.
Smith, Herman H., Inc., Bklyn., N.Y.
Acme Model Engrg. Co., Ridgefield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Birnbach Co., Inc., Freeport, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
Hunter Spring, Hatfield, Pa.
Philmore Mfg. Co., Richmond Hill, N.Y.
Tinnerman Div., Cleveland, Ohio
Waldom Elctrns., Inc., Chicago, Ill.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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Smith, Herman H., Inc., Bklyn., N.Y.
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Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Aerotronic Assocs., Inc., Contoocook, N.H.
Air-O-Tronics Prods., Morrisville, N.Y.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anchor Specialty Mfg., Teterboro, N.J.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Contact, Inc., Hudson, N.H.
Daymarc Corp., Waltham, Mass.
Eastern Specialty Co., Philadelphia, Pa.
Eby Sls. Co., Jamaica, N.Y.
Electraid, Inc., Cambridge, Mass.
IE Mfg. Co., Chicago, Ill.
Jettron Prods., Hanover, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Ostby & Barton Co., Providence, R.I.
Philmore Mfg. Co., Richmond Hill, N.Y.
Pylon Co., Inc., Attleboro, Mass.
Rapid Specialties Co., Chicago, Ill.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Shigoto Inds., Ltd., New York, N.Y.
Techni-Tool, Inc., Philadelphia, Pa.
Teradyne, Inc., Boston, Mass.
Whitaker Cable Corp., N. Kansas City, Mo.
Workman Elctrn. Prods., Inc., Sarasota, Fla.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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GC Elctrns., Rockford, Ill.
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National Tel-Tronics Corp., Great Neck, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Beman Mfg., Inc., New Cumberland, Pa.
Hobson Bros., Inc., Chicago, Ill.
Industrial Elctrn. Hardware, New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Staver Co., Inc., Bay Shore, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Tinnerman Div., Cleveland, Ohio
Warren Comps. Corp., Warren, Pa.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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National Tel-Tronics Corp., Great Neck, N.Y.
Raytheon Co., Quincy, Mass.
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan **p 2715**
Smith, Herman H., Inc., Bklyn., N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Carbone Corp., Boonton, N.J.
Chase-Shawmut Co., Newburyport, Mass.
Cole-Hersee Co., S. Boston, Mass.
Dante Elec. Mfg. Co., Bantam, Conn.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
Ercona Corp., Bellmore, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
General Elec., Providence, R.I.
Industrial Elctrn. Hardware, New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Littelfuse, Inc., Des Plaines, Ill.
Master Specialties, Costa Mesa, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Staver Co., Inc., Bay Shore, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Whitaker Cable Corp., N. Kansas City, Mo.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Clocks (All Types)—See Vol 1

Closed Circuit Tv Systems—See Television Systems, Closed Circuit—Vol 1

Cloth & Fabrics—See Insulation Materials, Fabric

Cloth, Speaker Grille—See Vol 1

Cloth, Woven Wire—See Vol 2

Clutches, Friction—See Vol 2

Clutches, Magnetic—See Vol 2

Clutches, Positive—See Vol 2

Coatings, Anti-Laser Beam

Bausch & Lomb, Rochester, N.Y.
Dell Optics Co., Inc., N. Bergen, N.J.
Emerson & Cuming, Inc., Canton, Mass.
Energy Sciences Inc., Burlington, Mass.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Exotic Materials, Inc., Costa Mesa, Cal.
Infrared Inds., Inc., Santa Barbara, Cal.
Isochem Resins Co., Lincoln, R.I.
Isomet Corp., Oakland, N.J.
Liberty Mirror Div., Brackenridge, Pa.
Spectra-Physics, Inc., Mountain View, Calif.
Valpey Corp., Holliston, Mass.

Coatings, Anti-Static

GC Elctrns., Rockford, Ill.
Micro-Circuits Co., New Buffalo, Mich. **p 2480**
Acheson Colloids Co., Port Huron, Mich.
A.O.I.P., 75/Paris 12eme, France
Barco Chem. Prods. Co., Chicago, Ill.
Caig Labs., Inc., Westbury, N.Y.
Carboline Co., St. Louis, Mo.
Chemtronics, Inc., Brooklyn, N.Y.
Chomerics, Inc., Woburn, Mass.
Custom Materials, Inc., Chelmsford, Mass.
Denton Vacuum, Inc., Cherry Hill, N.J.
Dynaloy, Inc., Hanover, N.J.
Elecpac Inc., Cary, Ill.
Electrofilm, Inc., N. Hollywood, Calif.
Elctrn. Comm., Inc., St. Petersburg, Fla.
Emerson & Cuming, Inc., Canton, Mass.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Filmohm Div., Long Island City, N.Y.
Furane Plastics, Los Angeles, Cal.
GAF Corp., New York, N.Y.
Grafo Colloids Corp., Sharon, Pa.
Hecht Rubber Corp., Jacksonville, Fla.
Houghton, E.F. & Co., Philadelphia, Pa.
Industrial Formulations, Plainview, N.Y.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Isochem Resins Co., Lincoln, R.I.
LEA Mfg. Co., Waterbury, Conn
Liberty Mirror Div., Brackenridge, Pa.
LPS Research Labs., Los Angeles, Cal.
Merix Chem. Co., Chicago, Ill.
Miller, Harry Corp., Philadelphia, Pa.
Nopco Chem. Div., Morristown, NJ
Puritan-Zep, El Segundo, Cal.
Randolph Prods. Co., Carlstadt, N.J.
Rogers Anti-Static Chems., Inc., Chicago, Ill.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Uniroyal, Inc., New York, N.Y.
Weston Instruments, Inc., Newark, N.J.
Zenith Optical Lab., Dobbs Ferry, N.Y.

Coatings, Conductive

Engelhard Minerals & Chem., Murray Hill, N.J.
GC Elctrns., Rockford, Ill.
Multitech Microelctrns., Monterey Pk., Cal.
RCA Elctrns. Comps., Harrison, N.J.
Acheson Colloids Co., Port Huron, Mich.
Allaco Prods., Braintree, Mass.
Alpha Metals, Inc., Jersey City, N.J.
Amicon Corp., Lexington, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Bacon Inds., Watertown, Mass.
Betzelt GMBH, Trogerstr. 32, W. Germany
Carboline Co., St. Louis, Mo.
Cerac, Inc., Butler, Wisc.
Chomerics, Inc., Woburn, Mass.
Conap, Inc., Allegany, N.Y.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Dell Optics Co., Inc., N. Bergen, N.J.
Dynachem Corp., Santa Fe Springs, Cal.
Dynaloy, Inc., Hanover, N.J.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Elctrn. Comm., Inc., St. Petersburg, Fla.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Energy Sciences Inc., Burlington, Mass.
Enthone, Inc., New Haven, Conn.
Etchomatic, Inc., Waltham, Mass.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Fansteel Inc., N Chicago, Ill.
Filmohm Div., Long Island City, N.Y.
Furane Plastics, Los Angeles, Cal.
Grafo Colloids Corp., Sharon, Pa.
Hardman Inc., Belleville, N.J.
Hysol Div., Olean, N.Y.
Icore, Inc., Santa Clara, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
Isochem Resins Co., Lincoln, R.I.
Kenics Corp., Danvers, Mass.
Liberty Mirror Div., Brackenridge, Pa.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Megadyne Inds., Inc., Rochester, N.Y.
Merix Chem. Co., Chicago, Ill.
Metaplast Electrochemicals, Bronx, N.Y.
Packaged Resins Co., Braintree, Mass.
Plasmadyne, Santa Ana, Calif.
Schweitzer, Peter J. Div., Lee, Mass.
Sel-Rex Corp., Nutley, N.J.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Techni-Tool, Inc., Philadelphia, Pa.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Thomas & Betts Co., Elizabeth, N.J.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Union Carbide, Indpls., Ind.
Uniroyal, Inc., New York, N.Y.

Coatings, Electromagnetic Wave Absorbing-Also See Materials

Acheson Colloids Co., Port Huron, Mich.
Coax Devices Inc., Chelsea, Mass.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Filmohm Div., Long Island City, N.Y.
Goodyear Aerospace Corp., Akron, Ohio
Herley Inds., Inc., Syosset, N.Y.
Isochem Resins Co., Lincoln, R.I.
McMillan Radiation Labs, Inc., Ipswich, Mass.
Micro-Line; Jamestown, N.Y.
Wolfson, P.J. Co., New Rochelle, N.Y.

Coatings, Films, Transfers, etc., Etchant-Resisting

Engelhard Minerals & Chem., Murray Hill, N.J.
Ablestik Adhesive Div., Gardena, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Conversion Chem. Corp., Rockville, Conn.
Dynachem Corp., Santa Fe Springs, Cal.
Energy Sciences Inc., Burlington, Mass.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Isochem Resins Co., Lincoln, R.I.
London Chemical Co., Bensenville, Ill.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Micro-Line, Jamestown, N.Y.
Naz-Dar Int'l., Chicago, Ill.
Optical Inds., Santa Ana, Cal.
Randolph Prods. Co., Carlstadt, N.J.
Russell Inds., Inc., Lynbrook, N.Y.
3M Co., St. Paul, Minn.

Coatings, Fluorescent

RCA Elctrns. Comps., Harrison, N.J.
Applied Plastics Co., El Segundo, Cal.
Black Light Prods., Chicago, Ill.
Borden Chemical Co., Norristown, Pa.
Conap, Inc., Allegany, N.Y.
Dynachem Corp., Santa Fe Springs, Cal.
Isochem Resins Co., Lincoln, R.I.
Randolph Prods. Co., Carlstadt, N.J.
Shannon Luminous Mat'ls., Hollywood, Cal.
Stroblite Co., Inc., New York, N.Y.

Coatings, Fungicidal

Columbia Tech., Woodside, N.Y. **p 2478,2479**
GC Elctrns., Rockford, Ill.
Millen, James Mfg., Malden, Mass.
Acme Chemical & Insulation Co., New Haven, Conn.
Carboline Co., St. Louis, Mo.
Conap, Inc., Allegany, N.Y.
Coricone Corp., Long Beach, Cal.
Dilectrix Corp., Farmingdale, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fuller-O'Brien Corp., Menlo Park, Calif.
GAF Corp., New York, N.Y.
Hi-Lo Mfg. Corp., Chicago, Ill.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Isochem Resins Co., Lincoln, R.I.
M & T Chemicals Inc., Rahway, N.J.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Randolph Prods. Co., Carlstadt, N.J.
Resin Formulators Co., Culver City, Cal.
Rogers Anti-Static Chems., Inc., Chicago, Ill.
Schenectady Chems., Schenectady, N.Y.
Sterling, Sewickley, Pa.
Stevenson-Bro & Co., Inc., Phila., Pa.
Techform Labs., Inc., Venice, Cal.
3M Co., St. Paul, Minn.
Tricraft Prods., Chicago, Ill.
Westinghouse Elec., W. Mifflin, Pa.
Zophar Mills, Inc., Brooklyn, N.Y.

Coatings, Compounds, Lubricants, etc., Heat Conductive

Columbia Tech., Woodside, N.Y. **p 2478,2479**
GC Elctrns., Rockford, Ill.
Acheson Colloids Co., Port Huron, Mich.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Carboline Co., St. Louis, Mo.
Cerac, Inc., Butler, Wisc.
Chomerics, Inc., Woburn, Mass.
Conap, Inc., Allegany, N.Y.
Dow Corning Corp., Midland, Mich.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Elctrn. Space Prods., Los Angeles, Cal.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Energy Sciences Inc., Burlington, Mass.
Fuller-O'Brien Corp., Menlo Park, Calif.
GAF Corp., New York, N.Y.
General Elec. Co., Waterford, N.Y.
Glidden-Durkee Div., Cleveland, Ohio
Grafo Colloids Corp., Sharon, Pa.
Hardman Inc., Belleville, N.J.
Houghton, E.F. & Co., Philadelphia, Pa.
Hughes Aircraft Co, Culver City, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
Isochem Resins Co., Lincoln, R.I.
Loctite Corp., Newington, Conn.
LPS Research Labs., Los Angeles, Cal.
MacDonald & Co., Glendale, Calif.
Materials Resch. Corp., Orangeburg, N.Y.
Merix Chem. Co., Chicago, Ill.
National Beryllia Corp., Haskell, N.J.
Packaged Resins Co., Braintree, Mass.
Sauereisen Cements Co., Pittsburgh, Pa.
Schenectady Chems., Schenectady, N.Y.
Sperex Corp., Los Angeles, Calif.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Stock Drive Prods., New Hyde Pk., N.Y.
Thermalloy Co., Dallas, Tex.
3M Co., St. Paul, Minn.
Tickle, Arthur Engrg. Works, Inc., Brooklyn, N.Y.
Uniroyal, Inc., New York, N.Y.
Wakefield Engrg., Inc., Wakefield, Mass.

Coatings, High-Temperature, Ceramic, Plasma Spray—See Services, Coating

Coatings, Infrared

Barnes Engrg. Co., Stamford, Conn.
Bausch & Lomb, Rochester, N.Y.
Betzelt GMBH, Trogerstr. 32, W. Germany
Dell Optics Co., Inc., N. Bergen, N.J.
Denton Vacuum, Inc., Cherry Hill, N.J.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Esco Products, Oak Ridge, NJ
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Exotic Materials, Inc., Costa Mesa, Cal.
Infrared Inds., Inc., Santa Barbara, Cal.
Isochem Resins Co., Lincoln, R.I.
Isomet Corp., Oakland, N.J.
Kinney Vacuum Co., Boston, Mass.
Liberty Mirror Div., Brackenridge, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Optical Inds., Santa Ana, Cal.
Optics Technology, Palo Alto, Calif.
Servo Corp. America, Hicksville, N.Y.
Spectra-Physics, Inc., Mountain View, Calif.
Texas Instruments, Inc., Dallas, Tex.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Torr Labs., Los Angeles, Cal.
Valpey Corp., Holliston, Mass.

Coatings, Insulating

Carborundum Co., Niagara Falls, N.Y.
Columbia Tech., Woodside, N.Y.
p 2478,2479
GC Elctrns., Rockford, Ill.
Millen, James Mfg., Malden, Mass.
Spectra-Strip Corp., Garden Grove, Cal.
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Acme Chemical & Insulation Co., New Haven, Conn.
Allaco Prods., Braintree, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Armstrong Prods. Co., Warsaw, Ind.
Caig Labs., Inc., Westbury, N.Y.
Chase & Sons, Inc., Randolph, Mass.
Chemical Prods. Corp., E. Providence, R.I.
Chemplast, Inc., Wayne, N.J.
Chemtronics, Inc., Brooklyn, N.Y.
Conap, Inc., Allegany, N.Y.
Coors Porcelain Co., Golden, Colo.
Coricone Corp., Long Beach, Cal.
Dennis Chem. Co., St. Louis, Mo.
Denton Vacuum, Inc., Cherry Hill, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elecpac Inc., Cary, Ill.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Energy Sciences Inc., Burlington, Mass.
Epoxylite Corp., S. El Monte, Calif.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Fluorocarbon Co., Anaheim, Cal.
Furane Plastics, Los Angeles, Cal.
General Elec. Co., Waterford, N.Y.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Hi-Lo Mfg. Corp., Chicago, Ill.
Hightemp Resins, Inc., Stamford, Conn.
Hysol Div., Olean, N.Y.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
London Chemical Co., Bensenville, Ill.
Materials Resch. Corp., Orangeburg, N.Y.
National Beryllia Corp., Haskell, N.J.
Natvar Corp., Rahway, N.J.
Nitine, Inc., Clifton, N.J.
Paisley, Edison, N.J.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Permaluster, Inc., Burbank, Calif.
Plasmadyne, Santa Ana, Calif.
Polymer Corp., Reading, Pa.
Ram Chems., Gardena, Calif.
Resin Formulators Co., Culver City, Cal.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Sauereisen Cements Co., Pittsburgh, Pa.
Schenectady Chems., Schenectady, N.Y.
Sperex Corp., Los Angeles, Calif.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Sterling, Sewickley, Pa.
Stevenson-Bro & Co., Inc., Phila., Pa.
Techform Labs., Inc., Venice, Cal.
3M Co., St. Paul, Minn.
Tricraft Prods., Chicago, Ill.
Union Carbide, Indpls., Ind.
Uniroyal, Inc., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.
Zophar Mills, Inc., Brooklyn, N.Y.

Coatings, Mold Releasing

Acheson Colloids Co., Port Huron, Mich.
Cerac, Inc., Butler, Wisc.
Chemplast, Inc., Wayne, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Corning Corp., Midland, Mich.
Emerson & Cuming, Inc., Canton, Mass.
Fluorocarbon Co., Anaheim, Cal.
Fuller-O'Brien Corp., Menlo Park, Calif.
Grafo Colloids Corp., Sharon, Pa.
Hardman Inc., Belleville, N.J.
Houghton, E.F. & Co., Philadelphia, Pa.
Isochem Resins Co., Lincoln, R.I.
Joy Mfg. Co., New Phila., Ohio
LPS Research Labs., Los Angeles, Cal.
Merix Chem. Co., Chicago, Ill.
Miller, Harry Corp., Philadelphia, Pa.
Nopco Chem. Div., Morristown, NJ
Ram Chems., Gardena, Calif.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Uniroyal, Inc., New York, N.Y.
Whittaker Corp., Los Angeles, Cal.

Coatings, Optical

Barnes Engrg. Co., Stamford, Conn.
Bausch & Lomb, Rochester, N.Y.
Betzelt GMBH, Trogerstr. 32, W. Germany
Burke & James, Inc., Chicago, Ill.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Electrotec, Inc., Garland, Tex.
Energy Sciences Inc., Burlington, Mass.
Esco Products, Oak Ridge, NJ
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Exotic Materials, Inc., Costa Mesa, Cal.
FJW Inds., Inc., Mt. Prospect, Ill.
Heliotek, Sylmar, Calif.
Infrared Inds., Inc., Santa Barbara, Cal.
Isochem Resins Co., Lincoln, R.I.
Isomet Corp., Oakland, N.J.
Keystone Micro Scan., Boston, Mass.
Liberty Mirror Div., Brackenridge, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Merix Chem. Co., Chicago, Ill.
Micro-Line, Jamestown, N.Y.
O & S Research, Inc., Riverton, N.J.
Optical Inds., Santa Ana, Cal.
Optics Technology, Palo Alto, Calif.
Pacific Universal Prods. Corp., Pasadena, Calif.
Syncor Prods. Co., Inc., Malden, Mass.
Texas Instruments, Inc., Dallas, Tex.

Coatings, Protective

Columbia Tech., Woodside, N.Y.
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GC Elctrns., Rockford, Ill.
Alpha Metals, Inc., Jersey City, N.J.
American Nickeloid Co., Peru, Ill.
Amicon Corp., Lexington, Mass.
Applied Plastics Co., El Segundo, Cal.
Armstrong Prods. Co., Warsaw, Ind.
Borden Chemical Co., Norristown, Pa.
Carboline Co., St. Louis, Mo.
Cerac, Inc., Butler, Wisc.
Chase & Sons, Inc., Randolph, Mass.
Chemical Prods. Corp., E. Providence, R.I.
Conap, Inc., Allegany, N.Y.
Conversion Chem. Corp., Rockville, Conn.
Coors Porcelain Co., Golden, Colo.
Coricone Corp., Long Beach, Cal.
Daubert Chem. Co., Oak Brook, Ill.
Dell Optics Co., Inc., N. Bergen, N.J.
Denton Vacuum, Inc., Cherry Hill, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dow Chemical Co., Midland, Mich.
Dow Corning Corp., Midland, Mich.
Duramic Prods., Inc., Palisades Park, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Energy Sciences Inc., Burlington, Mass.
Fansteel Inc., N Chicago, Ill.
Fidelity Chem. Prods. Corp., Newark, N.J.
Force Chems. Div., Paoli, Pa.
Fuller-O'Brien Corp., Menlo Park, Calif.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Grafo Colloids Corp., Sharon, Pa.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Hughes Aircraft Co, Culver City, Cal.
Humble Oil & Refining Co., Houston, Tex.
Hysol Div., Olean, N.Y.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Isochem Resins Co., Lincoln, R.I.
London Chemical Co., Bensenville, Ill.
LPS Research Labs., Los Angeles, Cal.
M & T Chemicals Inc., Rahway, N.J.
Mac Dermid, Inc., Waterbury, Conn.
Markal Co., Chicago, Ill.
Materials Resch. Corp., Orangeburg, N.Y.
Miller, Harry Corp., Philadelphia, Pa.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Nopco Chem. Div., Morristown, NJ
Oakite Prods., Inc., Berkeley Hgts., N.J.
Pennwalt Corp., Phila., Pa.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plasmadyne, Santa Ana, Calif.
Pro-Chem, Inc., Cleveland, Ohio
Ram Chems., Gardena, Calif.
Randolph Prods. Co., Carlstadt, N.J.
Rawn Co., Inc., Spooner, Wisc.
Royal Inds, El Segundo, Calif
Seal-Peel, Inc., Royal Oak, Mich.
Sifco Metachemical, Cleveland, Ohio
Solder Removal Co., Covina, Cal.
Sperex Corp., Los Angeles, Calif.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Sterling, Sewickley, Pa.
Superior Continental Corp., Hickory, N.C.
Techni-Tool, Inc., Philadelphia, Pa.
Technic, Inc., Providence, R.I.
3M Co., St. Paul, Minn.
Union Carbide, Indpls., Ind.
Uniroyal, Inc., New York, N.Y.
Western Coating Co., Royal Oak, Mich.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.

Coatings, Radioactive

Energy Sciences Inc., Burlington, Mass.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
Soltec Corp., No. Hollywood, Cal.

Coatings, Transducer Forming—See Vol 2

Coatings, Weatherproofing

Columbia Tech., Woodside, N.Y.
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Datak Corp., Passaic, N.J.
Allaco Prods., Braintree, Mass.
Armstrong Prods. Co., Warsaw, Ind.
Arnold Labs., N. Hollywood, Cal.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Caig Labs., Inc., Westbury, N.Y.
Carboline Co., St. Louis, Mo.
Chemical Prods. Corp., E. Providence, R.I.
Colonial Alloys, Phila., Pa.
Communications Tech. Corp., Los Angeles, Cal.
Conap, Inc., Allegany, N.Y.
Dilectrix Corp., Farmingdale, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Corning Corp., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrotec, Inc., Garland, Tex.
Emerson & Cuming, Inc., Canton, Mass.
Epoxylite Corp., S. El Monte, Calif.
Force Chems. Div., Paoli, Pa.
Fuller-O'Brien Corp., Menlo Park, Calif.
Furane Plastics, Los Angeles, Cal.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hardman Inc., Belleville, N.J.
Humble Oil & Refining Co., Houston, Tex.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
Kano Labs., Inc., Nashville, Tenn.
LPS Research Labs., Los Angeles, Cal.
Markal Co., Chicago, Ill.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Polymer Corp., Reading, Pa.
Ram Chems., Gardena, Calif.
Randolph Prods. Co., Carlstadt, N.J.
Resin Formulators Co., Culver City, Cal.
Seal-Peel, Inc., Royal Oak, Mich.
Sperex Corp., Los Angeles, Calif.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Stevenson-Bro & Co., Inc., Phila., Pa.
3M Co., St. Paul, Minn.
Uniroyal, Inc., New York, N.Y.
Western Coating Co., Royal Oak, Mich.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.
Zophar Mills, Inc., Brooklyn, N.Y.

Code & Tab Markers—See Wire Markers (All Types)

Coded Discs, Optical—See Vol 1

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Coders, Beacon—See Vol 1

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JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
LTV Electrosystems, Huntington, Ind.
Millen, James Mfg., Malden, Mass.
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Miller, J.W. Co., Compton, Cal.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Ogallala Elctrns., Ogallala, Neb.
Spectra-Strip Corp., Garden Grove, Cal.
Thermotech Coil Forms & Comps. Div., Hopkins, Minn. ..... p 2766-2773
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United Prods. Co., New Hyde Pk., N.Y.
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American Trans-Coil Corp., Richmond Hill, N.Y.
Artisan Elctrns. Corp., Parsippany, N.J.
Atlas Fibre Co., Chicago, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Basic Ceramics Inc., Hawthorne, N.J.
Boonton Molding Co., Inc., Boonton, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Celestial Comps., Inc., Covina, Cal.
Ceram Corp., La Mesa, Calif.
Consolidated Resistance Sls., Yonkers, N.Y.
Coral Magnetics Co., Farmingdale, N.Y.
Cosmo Plastics Co., Cleveland, Ohio
deHart Mfg. Co., Norristown, Pa.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Du-Co Ceramics Co., Saxonburg, Pa.
Electro Assemblies, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Endicott Coil Co., Binghamton, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Form-It Prods., Inc., Chicago, Ill.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
Gries Reproducer Co., New Rochelle, N.Y.
GTE Sylvania Inc., Danvers, Mass.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Haydu Prods., Inc., Opa Locka, Fla.
High Voltage Engrg. Corp., Burlington, Mass.

Hydro Molding Co., Inc., Plattsburgh, N.Y.
Icore, Inc., Santa Clara, Cal.
Insulating Shapes, Inc., Bronx, N.Y.
Maryland Lava Co., Bel Air, Md.
Micrometals, City of Industry, Calif.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
National Moldite, Newark, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
NY-Glass Plastics, Paramount, Calif.
Penn Fibre & Specialty, Phila., Pa.
Permaluster, Inc., Burbank, Calif.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Paper Tube Co., Wheeling, Ill.
Prototype Transformer Corp., E. Orange, N.J.
REM-Tronics, Silver Creek, N.Y.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Resdel Corp., Rio Grande, N.J.
Resinite Corp. Div., Wheeling , Ill
RFL Inds., Comps. Div., Boonton, N.J.
Rosenthal China Corp., New York, N.Y.
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Smith, Judson A. Co., Boyertown, Pa.
Spec Plastics, No. Hollywood, Cal.
Staffall, Inc., Providence, R.I.
Stevens Prods., Inc., E. Orange, N.J.
Steward, D.M. Mfg., Chattanooga, Tenn.
Stone Ind'l. Corp., Washington, D.C.
Subminiature Instrs. Corp., Riverside, Calif.
Superex Elctrns. Corp., Yonkers, N.Y.
Superior Continental Corp., Hickory, N.C.
Syscon Int'l., Inc., So. Bend, Ind.
Telectro Sys. Corp., Corona, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Winatic Corp., Vestal, N.Y.

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Coil Testers—See Testers, Coil—Vol 1

Coil-Winding Equipment—See Machines, Coil-Winding—Vol 1

Coils, A F

ADC Prods., Minneapolis, Minn.
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Coast Coil Co., Los Angeles, Calif.
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2489
Data Delay Devices, Clifton, N.J. p 2745
Delevan Div., Coil Prods., E. Aurora, N.Y.
Douglas Randall Div., Pawcatuck, Conn.
Freed Transformer Co., Bklyn., N.Y.
Hisonic, Inc., Olathe, Kans. ..... p 2491
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal.
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
North Hills Elctrns., Inc., Glen Cove, N.Y.
NWL Transformers, Trenton, N.J.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Seg Elctrns., Richmond Hill, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J. p 2507
United Prods. Co., New Hyde Pk., N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
Bel-Tronics Corp., Addison, Ill.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Newport Beach, Calif.
Components Corp., Chicago, Ill.
De Coursey Engrg. Lab., Culver City, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
Electrical Windings, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Endicott Coil Co., Binghamton, N.Y.
Epco Prods., Inc., Wallkill, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Geo Space, Houston, Tex.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Otis Radio & Elec. Corp., Hawarden, Iowa
Philips Elctrns. Inds., Ltd., Toronto 17, Can.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Inc., Minneapolis, Minn
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
SKG Assocs., Inc., Boston, Mass.
Spatron Inc, Alhambra, Calif.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
Superex Elctrns. Corp., Yonkers, N.Y.
Transformer Tech., Inc., Chicago, Ill.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Warsaw Coil Co. Inc., Warsaw, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Antenna Loading

Automatic Coil, New Hyde Pk., N.Y. p 2483
Computer Comps., Jamaica, N.Y.
Delevan Div., Coil Prods., E. Aurora, N.Y.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johnson E. F. Co., Waseca, Minn.
United Prods. Co., New Hyde Pk., N.Y.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bel-Tronics Corp., Addison, Ill.
CCA Elctrns. Corp., Gloucester, N.J.
Delta Elctrns., Alexandria, Va.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Helix Spring Corp., Long Island City, N.Y.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
K-W Engrg. Works, Menomonee Falls, Wisc.
Lieco, Inc., Lindenhurst, N.Y.
Littelfuse, Inc., Des Plaines, Ill.
Master Mobile Mounts, Fort Myers, Fla.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
New-Tronics Corp., Brookpark, Ohio
Philips Elctrns. Inds., Ltd., Toronto 17, Can.
Pickard & Burns Inc., Lindenhurst, N.Y.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Premax Prods. Div., Niagara Falls, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
RCA Corp., Camden, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Workman Elctrn. Prods., Inc., Sarasota, Fla.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Broadcast

ADC Prods., Minneapolis, Minn.
Automatic Coil, New Hyde Pk., N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2485
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Johnson E. F. Co., Waseca, Minn.
Miller, J.W. Co., Compton, Cal.
United Prods. Co., New Hyde Pk., N.Y.
Americal Trans-Coil Corp., Richmond Hill, N.Y.
Audio-Vidio Engrg. Co., Merrick, N.Y.
Bel-Tronics Corp., Addison, Ill.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Eastern Co., North Branch, N.J.
Elctrn. Coils, Springfield, Mass.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Icore, Inc., Santa Clara, Cal.
Nat'l. Coil Co., Douglas, Ariz.
Otis Radio & Elec. Corp., Hawarden, Iowa
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Transformer Tech., Inc., Chicago, Ill.
Vanguard Elctrns., Inglewood, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Choke—See Chokes (As Modified)

Coils, Color Purity

Automatic Coil, New Hyde Pk., N.Y.
Douglas Randall Div,, Pawcatuck, Conn.
Torwico Elctrns., Inc., Lakewood, N.J.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Electronic Functions Div. TRW Inc., Candem, N.J.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Nat'l. Coil Co., Douglas, Ariz.
Otis Radio & Elec. Corp., Hawarden, Iowa
Wilco Corp., Indianapolis, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Crossover, Audio

Automatic Coil, New Hyde Pk., N.Y.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
A.P.W. Co., Inc., Rockaway, N.J.
Bel-Tronics Corp., Addison, Ill.
C.B.C. Inds., Inc., Ft. Washington, Pa.
El-Rad Mfg. Co., Chicago, Ill.
Elctrn. Coils, Springfield, Mass.
Forbes & Wagner, Inc., Silver Creek, N.Y.
Geo Space, Houston, Tex.
Grand Transformers, Grand Haven, Mich.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
RFL Inds., Comps. Div., Boonton, N.J.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Transformer Mfrs., Inc., Chicago, Ill.
Warsaw Coil Co. Inc., Warsaw, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Degausing

A.L.A. Inds., Inc., Harrison, N.Y.. p 1645

Coils, Field

Ogallala Elctrns., Ogallala, Neb.
Advanced Kinetics, Costa Mesa, Calif.
A.P.W. Co., Inc., Rockaway, N.J.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Custom Coil Co., Zanesville, Ohio
Electronic Functions Div. TRW Inc., Candem, N.J.
Gencom Div., Plainview, N.Y.
Littelfuse, Inc., Des Plaines, Ill.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.
Waldom Elctrns., Inc., Chicago, Ill.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Focusing

CELCO, Mahwah, N.J. ..... p 339
Coto-Coil Co., Inc., Providence, R.I.
Douglas Randall Div., Pawcatuck, Conn.
Ogallala Elctrns., Ogallala, Neb.
Syntronic Instrs., Inc., Addison, Ill. p 2499
Altec, Anaheim, Calif.
ATV Research, Dakota City, Neb.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Cleveland Elctrns., Inc., Cleveland, Ohio
Delta Elctrn. Control, Costa Mesa, Cal.
Electronic Functions Div. TRW Inc., Candem, N.J.
Ferranti Ltd., Hollinwood, Lancs., England
Gencom Div., Plainview, N.Y.
Litton Inds., San Carlos, Calif.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Otis Radio & Elec. Corp., Hawarden, Iowa
Precision Elctrns., Inc., Amityville, N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Tranex, Inc., Mountain View, Cal.
Varian Assocs., Palo Alto, Cal.
Varian Assocs.Electron Tube & Device Grp., Palo Alto, Cal.
Varian Assocs., Radiation Div., Palo Alto, Cal.
Workman Elctrn. Prods., Inc., Sarasota, Fla.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Foil-Wound

ADC Prods., Minneapolis, Minn.
Ferrodyne Corp., Venice, Calif.
Ogallala Elctrns., Ogallala, Neb.
Torwico Elctrns., Inc., Lakewood, N.J.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
B.H. Inds., Los Angeles, Cal.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Litton Inds., San Carlos, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Permaluster, Inc., Burbank, Calif.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Reynolds Metals Co., Richmond, Va.
Rollan Electric Co., Chicago, Ill
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
Tapecon, Inc., Rochester, N.Y.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, High-Q, Low-Frequency

ADC Prods., Minneapolis, Minn.
Allen Avionics, Mineola, N.Y.
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Coast Coil Co., Los Angeles, Calif. p 2487
Dale Elctrns., Inc., Yankton, S.D. p 2488
Data Delay Devices, Clifton, N.J.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynamics Instr. Co., Monterey Pk., Cal.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.

Genisco Tech. Corp., Genistron Div., Compton, Cal.
Hisonic, Inc., Olathe, Kans. ..... p 2491
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johnson E. F. Co., Waseca, Minn.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal.
Microtran Co., Valley Stream, N.Y. p 2962
Millen, James Mfg., Malden, Mass. p 2497
Miller, J.W. Co., Compton, Cal..... p 2493
Neshaminy Transformer, Furlong, Pa.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C. ..... p 2498
San Fernando Elec. Mfg., San Fernando, Cal.
Seg Elctrns., Richmond Hill, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torotel, Inc., Grandview, Mo. p 2502,2503
Torwico Elctrns., Inc., Lakewood, N.J. p 2507
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 1533
Vari-L Co., Inc., Denver, Colo. .... p 2509
Zaring Inds., Inc., Carmel, Ind.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
Bel-Tronics Corp., Addison, Ill.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bradohm, Inc., Salamanca, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Collins Radio Co., Newport Beach, Calif.
Components Corp., Chicago, Ill.
Eastern Co., North Branch, N.J.
El-Rad Mfg. Co., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Epco Prods., Inc., Wallkill, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Lenox-Fugle Elctrns., Inc., S. Plainfield, N.J.
Magnetico, Inc., E. Northport, N.Y.
Master Mobile Mounts, Fort Myers, Fla.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Otis Radio & Elec. Corp., Hawarden, Iowa
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Shane Inds., Sunny Vale, Cal.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Sterling Transformer Corp., Brooklyn, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Superex Elctrns. Corp., Yonkers, N.Y.
Superior Continental Corp., Hickory, N.C.
Syscon Int'l., Inc., So. Bend, Ind.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Torelco Inc., Irvington, N.J.
Transformer Tech., Inc., Chicago, Ill.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Vanguard Elctrns., Inglewood, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Hybrid & Repeat

ADC Prods., Minneapolis, Minn.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2485
Computer Comps., Jamaica, N.Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Seg Elctrns., Richmond Hill, N.Y.
Torotel, Inc., Grandview, Mo.
United Prods. Co., New Hyde Pk., N.Y.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
B.H. Inds., Los Angeles, Cal.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Components Corp., Chicago, Ill.
Eastern Co., North Branch, N.J.
Electronic Functions Div. TRW Inc., Candem, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
RFL Inds., Comps. Div., Boonton, N.J.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Transformer Tech., Inc., Chicago, Ill.
Vanguard Elctrns., Inglewood, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, I-F

ADC Prods., Minneapolis, Minn.
Allen Avionics, Mineola, N.Y.
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. .....p 2484,2485
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2489
LTV Electrosystems, Huntington, Ind.
Microtran Co., Valley Stream, N.Y. p 2962
Millen, James Mfg., Malden, Mass. p 2497
Miller, J.W. Co., Compton, Cal..... p 2493
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
San Fernando Elec. Mfg., San Fernando, Cal.
Torotel, Inc., Grandview, Mo. ..... p 2505
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bel-Tronics Corp., Addison, Ill.
Bicron Elctrns. Co., Canaan, Conn.
Bradohm, Inc., Salamanca, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Clippard Instr., Inc., Cincinnati, Ohio
Components Specialties, Inc., Freeport, N.Y.
Defense Elctrns., Inc., Rockville, Md.
Eastern Co., North Branch, N.J.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Endicott Coil Co., Binghamton, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Icore, Inc., Santa Clara, Cal.
Linell Engrg. Corp., Chicago, Ill.
Littelfuse, Inc., Des Plaines, Ill.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Olektron Corp., Dudley, Mass.
Otis Radio & Elec. Corp., Hawarden, Iowa
Piconics Inc., Tyngsboro, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Rollan Electric Co., Chicago, Ill
Shigoto Inds., Ltd., New York, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Metallized Glass

JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
United Prods. Co., New Hyde Pk., N.Y.
American Trans-Coil Corp., Richmond Hill, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Dell Optics Co., Inc., N. Bergen, N.J.
GTE Sylvania Inc., Danvers, Mass.
Syncor Prods. Co., Inc., Malden, Mass.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Molded

Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D. p 2488,2489
Delevan Div., Coil Prods., E. Aurora, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
Ferrodyne Corp., Venice, Calif.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
K.G.S. Elctrns., Pasadena, Cal.
Solid State Elctrns., Sepulveda, Cal.
United Prods. Co., New Hyde Pk., N.Y.
Aladdin Elctrns., Nashville, Tenn.
B.H. Inds., Los Angeles, Cal.
Bradohm, Inc., Salamanca, N.Y.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Component Specialties, Temple City, Cal.
Cosmo Plastics Co., Cleveland, Ohio
Cycle Transformer Corp., West Orange, N.J.
Electro Magnetic Prods., Wabash, Ind.
Electro Windings & Comps., Kenilworth, N.J.
Endicott Coil Co., Binghamton, N.Y.
Geo Space, Houston, Tex.
Johnson Elec. Coil Co., Elmhurst, Ill.
Polyphase Instr. Co., Bridgeport, Pa.
Subminiature Instrs. Corp., Riverside, Calif.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.
Warsaw Coil Co. Inc., Warsaw, Ind.

Coils, Oscillator, Phono Test

Dale Elctrns., Inc., Yankton, S.D.
Miller, J.W. Co., Compton, Cal..... p 2496
San Fernando Elec. Mfg., San Fernando, Cal.
Solid State Elctrns., Sepulveda, Cal.
United Prods. Co., New Hyde Pk., N.Y.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bel-Tronics Corp., Addison, Ill.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Electro Magnetic Prods., Wabash, Ind.
Electronic Functions Div. TRW Inc., Candem, N.J.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Linell Engrg. Corp., Chicago, Ill.
Littelfuse, Inc., Des Plaines, Ill.
Morey Corp, Downers Grove, Ill.
Piconics Inc., Tyngsboro, Mass.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Syscon Int'l., Inc., So. Bend, Ind.
Warsaw Coil Co. Inc., Warsaw, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Relay

A.L.A. Inds., Inc., Harrison, N.Y.. p 1645
Chicago Dynamic Inds., Chicago, Ill.
Computer Comps., Jamaica, N.Y.
Coto-Coil Co., Inc., Providence, R.I. p 1682
Dale Elctrns., Inc., Yankton, S.D.
Douglas Randall Div., Pawcatuck, Conn.
Dow-Key, Santa Barbara, Cal.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Guardian Elec. Mfg. Co., Chicago, Ill.
James Elctrns., Inc., Chicago, Ill. p 1743
San Fernando Elec. Mfg., San Fernando, Cal.
United Prods. Co., New Hyde Pk., N.Y.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
A.P.W. Co., Inc., Rockaway, N.J.
Artisan Elctrns. Corp., Parsippany, N.J.
Barron Controls & Relay Corp., Grayslake, Ill.
B.H. Inds., Los Angeles, Cal.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Custom Coil Co., Zanesville, Ohio
Dormeyer Inds., Chicago, Ill.
El-Rad Mfg. Co., Chicago, Ill.
Electrical Windings, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Elctrn. Coils, Springfield, Mass.
Endicott Coil Co., Binghamton, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Guardian California, Culver City, Cal.
Helix Spring Corp., Long Island City, N.Y.
Jerome Elec. Corp., Orange, N.J.
Morey Corp, Downers Grove, Ill.
Oeco Corp., Portland, Ore.
Pacific Switch Controls, Inc., Van Nuys, Calif.
Piconics Inc., Tyngsboro, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
REM-Tronics, Silver Creek, N.Y.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Relay Service Co., Chicago, Ill.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Rollan Electric Co., Chicago, Ill
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
Sartron, Inc., Newberg, Ore.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Stromberg Carlson Corp., Rochester, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.
U.S. Elctrns., Lyndhurst, N.J.
Warsaw Coil Co. Inc., Warsaw, Ind.
Winatic Corp., Vestal, N.Y.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, R-F

ADC Prods., Minneapolis, Minn.
A.L.A. Inds., Inc., Harrison, N.Y.. p 1645
Allen Avionics, Mineola, N.Y.
American Precision Inds., Inc., E. Aurora, N.Y. ..... p 2490
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2488,2489
Data Delay Devices, Clifton, N.J.
Delevan Div., Coil Prods., E. Aurora, N.Y. ..... p 2490
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Hisonic, Inc., Olathe, Kans. ..... p 2491
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johnson E. F. Co., Waseca, Minn.
Kappa Networks, Inc., Carteret, N.J.
LTV Electrosystems, Huntington, Ind.
Microtran Co., Valley Stream, N.Y. p 2962

Millen, James Mfg., Malden, Mass. p 2497
Miller, J.W. Co., Compton, Cal. p 2492,2493,2496
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C. p 2498
RF Interonics, Bay Shore, N.Y.
San Fernando Elec. Mfg., San Fernando, Cal.
Shallco, Inc., Smithfield, N.C.
Spellman High Voltage Elctrns. Corp., Bronx, N.Y. p 876
Torotel, Inc., Grandview, Mo. p 2504,2505
United Prods. Co., New Hyde Pk., N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y. p 1533
Vari-L Co., Inc., Denver, Colo. p 1570,2509
A C Electronics Co., Santa Monica, Cal.
Airco Speer Elctrns., Nogales, Ariz.
Airco Speer Elctrns, Bradford, Pa.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barker & Williamson, Bristol, Pa.
Bel-Tronics Corp., Addison, Ill.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bradohm, Inc., Salamanca, N.Y.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Clippard Instr., Inc., Cincinnati, Ohio
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Collins Radio Co., Newport Beach, Calif.
Connor Spring & Mfg. Co., San Jose, Cal.
Delta Elctrns., Alexandria, Va.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Eastern Co., North Branch, N.J.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Endicott Coil Co., Binghamton, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Helix Spring Corp., Long Island City, N.Y.
Hughes Aircraft Co, Culver City, Cal.
La Pointe Inds., Inc., Rockville, Conn.
Lenox-Fugle Elctrns., Inc., S. Plainfield, N.J.
Linell Engrg. Corp., Chicago, Ill.
Master Mobile Mounts, Fort Myers, Fla.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Olektron Corp., Dudley, Mass.
Otis Radio & Elec. Corp., Hawarden, Iowa
Phoenix Materials Corp., Kittanning, Pa.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Pulse Engrg., Inc., San Diego, Cal.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Shigoto Inds., Ltd., New York, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Superex Elctrns. Corp., Yonkers, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Warsaw Coil Co. Inc., Warsaw, Ind.
Whistler Elctrns., Inc., Northridge, Cal.
Wilco Corp., Indianapolis, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Saturable Reactor

ADC Prods., Minneapolis, Minn.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. p 2484
Coast Coil Co., Los Angeles, Calif. p 2487
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Ind'l. Control Co., Farmingdale, N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Light Elec. Corp., Rancocas, N.J. p 809
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
NWL Transformers, Trenton, N.J.
Tohoku Metal Inds., Ltd., Tokyo, Japan p 2501
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Newport Beach, Calif.
Components Corp., Chicago, Ill.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
EMP Elctrns., Inc., Phoenix, Ariz.
Epco Prods., Inc., Wallkill, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Morey Corp, Downers Grove, Ill.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Rae Co. Inc., Indianapolis, Ind.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Ramm Rectifier Co., Inc., Bronx, N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
RtroN Corp., Skokie, Ill.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transrex Div., Torrance, Cal.
Vanguard Elctrns., Inglewood, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Shielded

ADC Prods., Minneapolis, Minn.
American Precision Inds., Inc., E. Aurora, N.Y. p 2490
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. p 2485
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D.
Data Delay Devices, Clifton, N.J.
Delevan Div., Coil Prods., E. Aurora, N.Y. p 2490
Ferrodyne Corp., Venice, Calif.
Hisonic, Inc., Olathe, Kans. p 2491
LTV Electrosystems, Huntington, Ind.
Miller, J.W. Co., Compton, Cal. p 2493,2496
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C. p 2498
Torotel, Inc., Grandview, Mo. p 2505
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y. p 2508
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
B.H. Inds., Los Angeles, Cal.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Endicott Coil Co., Binghamton, N.Y.
General Instr. Corp., Chicopee, Mass.
Lenox-Fugle Elctrns., Inc., S. Plainfield, N.J.
Linell Engrg. Corp., Chicago, Ill.
Morey Corp, Downers Grove, Ill.
PCA Elctrns., Inc., Sepulveda, Calif.
Piconics Inc., Tyngsboro, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Subminiature Instrs. Corp., Riverside, Calif.
Syscon Int'l., Inc., So. Bend, Ind.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transrex Div., Torrance, Cal.
Warsaw Coil Co. Inc., Warsaw, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Solenoid

A.L.A. Inds., Inc., Harrison, N.Y.. p 1645
American Precision Inds., Inc., E. Aurora, N.Y. p 2490
Automatic Coil, New Hyde Pk., N.Y.
Chicago Dynamic Inds., Chicago, Ill.
Computer Comps., Jamaica, N.Y.
Coto-Coil Co., Inc., Providence, R.I.
Dale Elctrns., Inc., Yankton, S.D. p 2489
Delevan Div., Coil Prods., E. Aurora, N.Y. p 2490
Douglas Randall Div., Pawcatuck, Conn.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
James Elctrns., Inc., Chicago, Ill.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Ogallala Elctrns., Ogallala, Neb.
Ohmite Mfg. Co., Skokie, Ill.
San Fernando Elec. Mfg., San Fernando, Cal.
Staco, Inc., Dayton, Ohio
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Zaring Inds., Inc., Carmel, Ind.
Advanced Kinetics, Costa Mesa, Calif.
Airco Speer Elctrns., Nogales, Ariz.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
A.P.W. Co., Inc., Rockaway, N.J.
Artisan Elctrns. Corp., Parsippany, N.J.
Avionics, Inc., South Bend, Ind.
Bel-Tronics Corp., Addison, Ill.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bradohm, Inc., Salamanca, N.Y.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Electrical Windings, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Endicott Coil Co., Binghamton, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Jerome Elec. Corp., Orange, N.J.
Koontz-Wagner Elec., South Bend, Ind.
Linell Engrg. Corp., Chicago, Ill.
Lisk, G.W. Co., Clifton Springs, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetec Corp., Van Nuys, Calif.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Modelectric Prods. Corp., Asbury Park, N.J.
Morey Corp, Downers Grove, Ill.
National Acme, Cleveland, Ohio
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Otis Radio & Elec. Corp., Hawarden, Iowa
Pacific Switch Controls, Inc., Van Nuys, Calif.
Piconics Inc., Tyngsboro, Mass.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Projects Unlimited, Inc., Dayton, Ohio
REM-Tronics, Silver Creek, N.Y.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Rollan Electric Co., Chicago, Ill
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Standard Winding Co., Newsburgh, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tranex, Inc., Mountain View, Cal.
Tri-Dex Co., Visalia, Calif.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.
U.S. Elctrns., Lyndhurst, N.J.
Vanguard Elctrns., Inglewood, Cal.
Varian Assocs., Radiation Div., Palo Alto, Cal.
Voltronics, Inc., Chicago, Ill.
Warsaw Coil Co. Inc., Warsaw, Ind.
Winatic Corp., Vestal, N.Y.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Telephone

ADC Prods., Minneapolis, Minn.
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D.
Microtran Co., Valley Stream, N.Y. p 2963
Sangamo Elec. Co., Pickens, S.C.
Torotel, Inc., Grandview, Mo.
United Prods. Co., New Hyde Pk., N.Y.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dyna Magnetic Devices, Inc., Hicksville, N.Y.
Electro Magnetic Prods., Wabash, Ind.
Electrocom Inds., So. Bend, Indiana
Elctrn. Transformer Corp., Paterson, N.J.
Endicott Coil Co., Binghamton, N.Y.
Morey Corp, Downers Grove, Ill.
Pacific Switch Controls, Inc., Van Nuys, Calif.
Precision Inc., Minneapolis, Minn
Stromberg Carlson Corp., Rochester, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Transformer Tech., Inc., Chicago, Ill.
U.S. Elctrns., Lyndhurst, N.J.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Telephone Pickup (For Recording)—See Pickups, Telephone—Vol 1

Coils, Toroidal

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Airpax Elctrns., Inc., Cambridge, Md.
Allen Avionics, Mineola, N.Y.
Allen Elctrns. Div., Macungie, Pa. p 2481
American Precision Inds., Inc., E. Aurora, N.Y. p 2490
Arnold Magnetics, Culver City, Cal. p 65
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. p 2484
Coast Coil Co., Los Angeles, Calif. p 2487
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2488,2489
Data Delay Devices, Clifton, N.J.
Delevan Div., Coil Prods., E. Aurora, N.Y. p 2490
Ferrodyne Corp., Venice, Calif. p 2951
Freed Transformer Co., Bklyn., N.Y.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Hisonic, Inc., Olathe, Kans. p 2491
Ind'l. Control Co., Farmingdale, N.Y.
James Elctrns., Inc., Chicago, Ill.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal.
Microtran Co., Valley Stream, N.Y. p 2962
Miller, J.W. Co., Compton, Cal. p 2492
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C. p 2498
RF Interonics, Bay Shore, N.Y.
San Fernando Elec. Mfg., San Fernando, Cal.
Sangamo Elec. Co., Pickens, S.C.
Seg Elctrns., Richmond Hill, N.Y.
Shallco, Inc., Smithfield, N.C.
Solid State Elctrns., Sepulveda, Cal.
Sprague Elec. Co., No. Adams, Mass. p 2502,2503
Torotel, Inc., Grandview, Mo. p 2506,2507
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y. p 1533
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barger Corp., Sunnyvale, Cal.
Barker & Williamson, Bristol, Pa.
Barwood Elctrns., Inc., Glendale, Cal.
Bel-Tronics Corp., Addison, Ill.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Ceramic Magnetics, Inc., Fairfield, N.J.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Collins Radio Co., Newport Beach, Calif.
Components Corp., Chicago, Ill.
Coral Magnetics Co., Farmingdale, N.Y.
Crystal Network Prods. Corp., Erie, Pa.
De Coursey Engrg. Lab., Culver City, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
El-Rad Mfg. Co., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
EMP Elctrns., Inc., Phoenix, Ariz.
Engineered Comps. Co., Gardena, Cal.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Gorman Machine Corp., Costa Mesa, Cal.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Morey Corp, Downers Grove, Ill.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Raytheon Co., Waltham, Mass.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
RtroN Corp., Skokie, Ill.
Sartron, Inc., Newberg, Ore.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Standard Winding Co., Newsburgh, N.Y.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
Superior Continental Corp., Hickory, N.C.
Syscon Int'l., Inc., So. Bend, Ind.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Torelco Inc., Irvington, N.J.
Transformer Tech., Inc., Chicago, Ill.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Western Transformer Co., Tijeras, N. M.
White Instrs., Inc., Austin, Tex.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Transducer

Control Elctrns. Co., Inc., Farmingdale, N.Y.
Coto-Coil Co., Inc., Providence, R.I.
Dale Elctrns., Inc., Yankton, S.D.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Avionics, Inc., South Bend, Ind.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
Electro Magnetic Prods., Wabash, Ind.
Elctrn. Coils, Springfield, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
Endicott Coil Co., Binghamton, N.Y.
Flow Technology, Inc., Tempe, Ariz.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Jerome Elec. Corp., Orange, N.J.
Morey Corp, Downers Grove, Ill.
Oeco Corp., Portland, Ore.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Sensor Corp., Greenwich, Conn.
Spatron Inc, Alhambra, Calif.
Subminiature Instrs. Corp., Riverside, Calif.
Transducer Systems, Inc., Willow Grove, Pa.
Tri-Dex Co., Visalia, Calif.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.
Waldom Elctrns., Inc., Chicago, Ill.
Winatic Corp., Vestal, N.Y.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Transformer

ADC Prods., Minneapolis, Minn.
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Coast Coil Co., Los Angeles, Calif. p 2487
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2489
Del Elctrns. Corp., Mt. Vernon, N.Y.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Douglas Randall Div., Pawcatuck, Conn.
Ferrodyne Corp., Venice, Calif.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
James Elctrns., Inc., Chicago, Ill.
K.G.S. Elctrns., Pasadena, Cal.
Microtran Co., Valley Stream, N.Y. p 2958
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Zaring Inds., Inc., Carmel, Ind.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barger Corp., Sunnyvale, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Component Specialties, Temple City, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Co., North Branch, N.J.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Functions Div. TRW Inc., Candem, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Endicott Coil Co., Binghamton, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Grand Transformers, Grand Haven, Mich.
Hughes Aircraft Co, Culver City, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Morey Corp, Downers Grove, Ill.
Olektron Corp., Dudley, Mass.
Permaluster, Inc., Burbank, Calif.
Peschel Instrs., Cape Coral, Fla.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Rae Co. Inc., Indianapolis, Ind.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Syscon Int'l., Inc., So. Bend, Ind.
Tranex, Inc., Mountain View, Cal.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Warsaw Coil Co. Inc., Warsaw, Ind.
Winatic Corp., Vestal, N.Y.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, TV (All Types)

A.L.A. Inds., Inc., Harrison, N.Y. p 1645
Allen Avionics, Mineola, N.Y.
Automatic Coil, New Hyde Pk., N.Y.
Dale Elctrns., Inc., Yankton, S.D.
Douglas Randall Div., Pawcatuck, Conn.
Miller, J.W. Co., Compton, Cal. p 2496
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Syntronic Instrs., Inc., Addison, Ill. p 2499
United Prods. Co., New Hyde Pk., N.Y.
American Trans-Coil Corp., Richmond Hill, N.Y.
Beebe Instrs., Inc., N. White Plains, N.Y.
Bel-Tronics Corp., Addison, Ill.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Clippard Instr., Inc., Cincinnati, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electronic Functions Div. TRW Inc., Candem, N.J.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
GTE Sylvania Inc., Danvers, Mass.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Littelfuse, Inc., Des Plaines, Ill.
Otis Radio & Elec. Corp., Hawarden, Iowa
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Rollan Electric Co., Chicago, Ill
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Standard Winding Co., Newsburgh, N.Y.
Workman Elctrn. Prods., Inc., Sarasota, Fla.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Variable

Allen Avionics, Mineola, N.Y.
American Precision Inds., Inc., E. Aurora, N.Y. p 2490
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. p 2485
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D. p 2489
Data Delay Devices, Clifton, N.J. p 2745
Delevan Div., Coil Prods., E. Aurora, N.Y. p 2490
Freed Transformer Co., Bklyn., N.Y.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
Johnson E. F. Co., Waseca, Minn.
Kappa Networks, Inc., Carteret, N.J.
LTV Electrosystems, Huntington, Ind.
Microtran Co., Valley Stream, N.Y.
Millen, James Mfg., Malden, Mass.
Miller, J.W. Co., Compton, Cal. p 2496
North Hills Elctrns., Inc., Glen Cove, N.Y.
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C. p 2498
San Fernando Elec. Mfg., San Fernando, Cal.
Sangamo Elec. Co., Pickens, S.C. p 2440
United Prods. Co., New Hyde Pk., N.Y.
Vari-L Co., Inc., Denver, Colo. p 2509
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bicron Elctrns. Co., Canaan, Conn.
Cambridge Thermionic, Cambridge, Mass
Clippard Instr., Inc., Cincinnati, Ohio
Component Specialties, Temple City, Cal.
Delta Elctrns., Alexandria, Va.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Eastern Co., North Branch, N.J.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electrocom Inds., So. Bend, Indiana

Electronic Functions Div. TRW Inc., Candem, N.J.
General Instr. Corp., Chicopee, Mass.
Linell Engrg. Corp., Chicago, Ill.
Littelfuse, Inc., Des Plaines, Ill.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Nat'l. Coil Co., Douglas, Ariz.
Otis Radio & Elec. Corp., Hawarden, Iowa
Piconics Inc., Tyngsboro, Mass.
Profile Elctrns., Inc., Concord, N.H.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
RFL Inds., Comps. Div., Boonton, N.J.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Stanford Applied Engrg., Santa Clara, Cal.
Subminiature Instrs. Corp., Riverside, Calif.
Superex Elctrns. Corp., Yonkers, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Transrex Div., Torrance, Cal.
Vanguard Elctrns., Inglewood, Cal.
Voltronics, Inc., Chicago, Ill.
Warsaw Coil Co. Inc., Warsaw, Ind.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Vidicon Alignment

CELCO, Mahwah, N.J. ..... p 339
Syntronic Instrs., Inc., Addison, Ill. p 2499
American Trans-Coil Corp., Richmond Hill, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Cleveland Elctrns., Inc., Cleveland, Ohio
Electro Magnetic Prods., Wabash, Ind.
Gencom Div., Plainview, N.Y.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Voice

ADC Prods., Minneapolis, Minn.
Automatic Coil, New Hyde Pk., N.Y.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Avionics, Inc., South Bend, Ind.
Barger Corp., Sunnyvale, Cal.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Component Specialties, Temple City, Cal.
Electro Magnetic Prods., Wabash, Ind.
Endicott Coil Co., Binghamton, N.Y.
Geo Space, Houston, Tex.
ISC/Telephonics Div, Huntington, N.Y.
Morey Corp, Downers Grove, Ill.
Permaluster, Inc., Burbank, Calif.
Prototype Transformer Corp., E. Orange, N.J.
R-Columbia Prods., Inc., Highland Park, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Superior Continental Corp., Hickory, N.C.
Transformer Tech., Inc., Chicago, Ill.
Waldom Elctrns., Inc., Chicago, Ill.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Coils, Water—See Water Coils, Tube Cooling—Vol 2

Coincidence Analyzers—See Analyzers, Coincidence—Vol 1

Cold-Cathode Readout—See Tubes, Readout—Vol 2

Cold Traps—See Vol 1

Collars

Amatom Elctrn. Hardware, New Rochelle, N.Y.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Cooke Vacuum Prods., S. Norwalk, Conn.
Dynamic Gear, Ft. Lauderdale, Fla.
Franklin Fibre-Lamitex, Wilmington, Del.
Instru-Lec Corp., Mt. Vernon, N.Y.
Naugler Engrg., Inc., Beverly, Mass.
PIC Design Corp., Ridgefield,, Conn.
Sloan Technology Corp., Santa Barbara, Calif.
Sterling Instr., New Hyde Pk., NY
Stop Components, Inc., Freeport, N.Y.
Veeco Instrs., Inc., Plainview, N.Y.

Collimators, Infrared—See Vol 2

Collimators, Optical—See Vol 2

Colorimeters—See Vol 2

Color TV Equipment—See Cameras, TV (Color); Monitors, Video; Recorders, Video Tape—Vol 1

Combiners, Diversity, Post Detection—See Vol 1

Combustion Indicators—See Fire Detection & Fighting Equip.—Vol 2

Comm. Systems, Broadcast—See Vol 1

Comm. Systems, Carrier Current—See Vol 1

Comm. Systems, Data—See Vol 1

Comm. Systems, F-M—See Vol 1

Comm. Systems, Facsimile—See Vol 1

Comm. Systems, Frequency Shift—See Vol 1

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Comm. Systems, Laser—See Vol 1

Comm. Systems, Microwave—See Vol 2

Comm. Systems, Multiplex—See Vol 1

Comm. Systems, Portable (Industrial)—See Vol 1

Comm. Systems, Radiotelephone—See Vol 1

Comm. Systems, Selective Paging—See Vol 1

Comm. Systems, Single-Sideband—See Vol 1

Comm. Systems, Telemetering—See Vol 1

Comm. Systems, Telephone—See Vol 1

Comm. Systems, Teletype—See Vol 1

Comm. Systems, Vehicle Mounted—See Vol 1

Commutators, Rotary—See Vol 2

Commutators, Switching—See Vol 2

Comparators, Attenuation—See Vol 1

Comparators, Capacitance—See Bridges, Capacitance—Vol 1

Comparators, Circuit Linearity—See Vol 1

Comparators, Density—See Densitometers—Vol 1

Comparators, Digital—See Vol 1

Comparators, Frequency—See Vol 1

Comparators, Impedance—See Bridges, Impedance—Vol 1

Comparators, Inductance—See Bridges, Inductance—Vol 1

Comparators, Optical—See Vol 2

Comparators, Phase—See Vol 1

Comparators, Q—See Vol 1

Comparators, Reluctance—See Vol 1

Comparators, Resistance—See Bridges, Resistance—Vol 1

Comparators, Surface—See Indicators, Surface Roughness—Vol 1

Comparators, Voltage—See Vol 1

Compasses, Electronic Gyro—See Vol 2

Compensators, Angular Motion—See Vol 2

Compensators, Lead Resistance—See Vol 1

Component Substitutors-See Test Equipment, Component Substituting—See Vol 1

Compounds, Antistatic—See Coatings, Antistatic

Compounds, Encapsulating, Molding, Potting-Also See Plastic Raw Materials

Amphenol Cadre Div., Endicott, N.Y.
Columbia Tech., Woodside, N.Y.
Ablestik Adhesive Div., Gardena, Calif.
Acme Chemical & Insulation Co., New Haven, Conn.
Acme Resin Co., Forest Pk., Ill.
Adams & Assoc., Inc., Hollywood, Cal.
Adhesive Prods. Corp., Bronx, N.Y.
Allaco Prods., Braintree, Mass.
Amicon Corp., Lexington, Mass.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Applied Plastics Co., El Segundo, Cal.
Armstrong Cork Co., Lancaster, Pa.
Armstrong Prods. Co., Warsaw, Ind.
Bacon Inds., Watertown, Mass.
Boonton Molding Co., Inc., Boonton, N.J.
Burlington Opers. Div., Burlington, Mass.
Chemical Prods. Corp., E. Providence, R.I.
Chemtronics, Inc., Brooklyn, N.Y.
Communications Tech. Corp., Los Angeles, Cal.
Conap, Inc., Allegany, N.Y.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Dennis Chem. Co., St. Louis, Mo.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
Dow Corning Corp., Midland, Mich.
Durez Plastics Div., N. Tonawanda, N.Y.
Dynaloy, Inc., Hanover, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Epoxy Plastic Molders, Irvington, N J
Epoxylite Corp., S. El Monte, Calif.
Fiberite Corp., Winona, Minn.
Fuller-O'Brien Corp., Menlo Park, Calif.
Furane Plastics, Los Angeles, Cal.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
Hardman Inc., Belleville, N.J.
Haysite Div., Erie, Pa.
Hightemp Resins, Inc., Stamford, Conn.
Hughes Aircraft Co, Culver City, Cal.
Hysol Div., Olean, N.Y.
Isochem Resins Co., Lincoln, R.I.
Joy Mfg. Co., New Phila., Ohio
Kenics Corp., Danvers, Mass.
MacDonald & Co., Glendale, Calif.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Minisink Rubber Co., Inc., Unionville, N.Y.
Morton Chemical Co., Chicago, Ill.
National Beryllia Corp., Haskell, N.J.
Nitine, Inc., Clifton, N.J.
Pacific Resins & Chems., Milwaukee, Wisc.
Packaged Resins Co., Braintree, Mass.
Plastic Wire & Cable Corp., Jewett City, Conn.
Polymer Corp., Reading, Pa.
Polyphase Instr. Co., Bridgeport, Pa.
Ram Chems., Gardena, Calif.
Rawn Co., Inc., Spooner, Wisc.
Reichhold Chemicals, Inc., White Plains, N.Y.
Resin Formulators Co., Culver City, Cal.
Richardson Co., Des Plaines, Ill.
Rogers Anti-Static Chems., Inc., Chicago, Ill.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Sauereisen Cements Co., Pittsburgh, Pa.
Schenectady Chems., Schenectady, N.Y.
Seal-Peel, Inc., Royal Oak, Mich.
Semicon Assoc., Inc., Lexington, Ky.
Shur-Lok Corp., Santa Ana, Calif.
Smooth-On, Inc., Gillette, N.J.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Sterling, Sewickley, Pa.
Stevenson-Bro & Co., Inc., Phila., Pa.
Techform Labs., Inc., Venice, Cal.
Teledyne Penn-Union Elec., Edinboro, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Tra-Con, Inc., Medford, Mass.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Uniroyal, Inc., New York, N.Y.
United American Metals Div., Brooklyn, N.Y.
Universal Shellac & Supply Co., Inc., Hicksville, NY
U.S. Polymeric,, Stamford, Conn.
Western Coating Co., Royal Oak, Mich.
Westinghouse Elec., W. Mifflin, Pa.
Zophar Mills, Inc., Brooklyn, N.Y.

Compounds, Weatherproofing—See Coatings, Weatherproofing

Compressors, Data & Speech—See Vol 1

Computer Logic Circuits—See Cards, Logic; Circuits, Hybrid; Circuits, Integrated; Modules, Logic—Vol 2

Computer Memory Testers—See Testers, Computer Memory—Vol 1

Computer Tape Recorders—See Data Recorders—Vol 1

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Computer Type Indicators—See Lights; Dials; Readouts—Vol 2

Computers, Analog—See Vol 1

Computers, Desk Top (Digital)—See Vol 1

Computers, Digital (General Purpose)—See Vol 1

Computers, Digital (Special Purpose)—See Vol 1

Computers, Hybrid, Analog-Digital—See Vol 1

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Condensers—See Capacitors

Conductive Fabrics, Films & Tapes—See Fabrics, Conductive

Conductive Plastic—See Materials, Conductive Plastic

Conduit, Electrical

Wiremold Co., W. Hartford, Conn. p 2727
Anaconda American Brass Co., Waterbury, Conn.
Cerro Corp., New York, N.Y.
Co-Operative Inds., Inc., Chester, N.J.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Ideal Industries, Inc., Sycamore, Ill.
Ideas, Inc., Laramie, Wyo.
Johns-Manville Sls. Corp., New York, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Porcelain Prods. Co., Carey, Ohio
Republic Steel Corp, Cleveland, Ohio
Reynolds Metals Co., Richmond, Va.
Taylor Elec., Howell, Mich.
Whitaker Cable Corp., N. Kansas City, Mo.
Zippertubing Co., Los Angeles, Calif.

Cones, Speaker—See Speaker Cones—Vol 1

Connector Adapters

Alford Mfg. Co., Winchester, Mass.
Amp Inc., Harrisburg, Pa.
Amphenol Connector Div., Broadview, Ill.....p 2577-2580,2582,2588
Amphenol Ind'l. Div., Chicago, Ill.
Amphenol RF Div., Danburry, Conn. p 2521-2523,2525,2527,2532-2537
Amphenol Sales Div., Broadview, Ill.
Arra Inc., Bayshore, N.Y.
Barnes Corp., Lansdowne, Pa.
Bendix, Franklin, Ind.
Bird Elctrn., Cleveland, Ohio
Cinch-Nu Line, Minneapolis, Minn. p 2610
Connector Corp., Chicago, Ill. p 2612,2613
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dow-Key, Santa Barbara, Cal.
Elctrn. Molding Corp., Woonsocket, R.I.
GC Elctrns., Rockford, Ill.
Gulton Inds., Inc., Metuchen, N.J.
Hughes Aircraft Co., Connecting Devices, Newport Beach, Cal.
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2655-2657,2661,2664,2697,2699,2701
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Chem Aero, Inc., Wilmington, Cal.
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Deutsch Co., Banning, Calif.
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Ferranti Ltd., Hollinwood, Lancs., England
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Specialty Connector, Indpls., Ind.
Staffall, Inc., Providence, R.I.
Subminiature Instrs. Corp., Riverside, Calif.
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Astrolab Inc., Linden, N J
Auto-Swage Products, Inc., Shelton, Conn.
Bendix Corp., Sidney, N.Y.
Betzelt GMBH, Trogerstr. 32, W. Germany
Birnbach Co., Inc., Freeport, N.Y.
Burndy Corp., Norwalk, Conn.
Cambridge Thermionic, Cambridge, Mass
Chem Aero, Inc., Wilmington, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Collins Radio Co., Cedar Rapids, Iowa
Components Corp., Denville, N.J.
Deutsch Co., Banning, Calif.

Device Seals, Inc., Sun Valley, Calif.
Dynatech Corp., Santa Ana, Cal.
Fabri-Tek, Inc., Minneapolis, Minn.
Ferranti Ltd., Hollinwood, Lancs., England
GTE Sylvania Inc., Warren, Pa.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Hypertronics Corp., Watertown, Mass.
Indit Corp., Albertson, N.Y.
Industrial Elctrn. Hardware, New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Lemosa, Inc., San Francisco, Cal.
Loranger Mfg. Corp., Warren, Pa.
Magnum Elec. Corp., Erie, Mich.
Malco Mfg. Co., Chicago, Ill.
Masterite Inds., Inc., Torrance, Calif.
Methode Elctrns., Inc., Chicago, Ill.
MI-KRO Connector Div., Long Island City, N.Y.
Microdot Inc., S. Pasadena, Calif.
Molex Prods. Co., Downers Grove, Ill.
Plessey Elctrns. Corp., Farmingdale, N.Y.
Precision Paper Tube Co., Wheeling, Ill.
Pyle-National Div., Harvey Hubbell, Chicago, Ill.
Pylon Co., Inc., Attleboro, Mass.
Robinson-Nugent, New Albany, Ind.
Space Prods., Inc., Long Beach, Calif.
Spec Plastics, No. Hollywood, Cal.
Specialty Connector, Indpls., Ind.
Staffall, Inc., Providence, R.I.
Stanford Applied Engrg., Santa Clara, Cal.
Subminiature Instrs. Corp., Riverside, Calif.
Switchcraft, Inc., Chicago, Ill.
Teledyne Kinetics, Solana Beach, Cal.
Teledyne Positive Connector, Ansonia, Conn.
3M Co., St. Paul, Minn.
Transitron Elctrn. Corp., Wakefield, Mass.
Tru-Connector Corp., Peabody, Mass.
Viking Inds., Inc., Chatsworth, Calif.
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Astrolab Inc., Linden, N J
Caton Inds., Inc., Clark, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Connectron Corp., Van Nuys, Cal
Electro Oceanics, Inc., Compton, Calif.
General Radio Co., Concord, Mass.
GRFF, Port Salerno, Fla.
Hypertronics Corp., Watertown, Mass.
Indit Corp., Albertson, N.Y.
ITT Gremar, Inc., Woburn, Mass.
Jerrold/Watkins Div., Toronto, 395, Ont., Can.
Kings Elctrns., Tuckahoe, N.Y.
Lemosa, Inc., San Francisco, Cal.
Maury Microwave Corp., Cucamonga, Calif.
MI-KRO Connector Div., Long Island City, N.Y.
Phelps Dodge Comm., North Haven, Conn.
Physical Sciences, Arcadia,, Cal.
T.J. Elctrns., Ft. Worth, Tex.
VIKOA, Hoboken, N.J.

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Bendix, Franklin, Ind.
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Astrolab Inc., Linden, N J
GRFF, Port Salerno, Fla.
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Indit Corp., Albertson, N.Y.
ITT Gremar, Inc., Woburn, Mass.
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Deutsch Co., Banning, Calif.
Fabri-Tek, Inc., Minneapolis, Minn.
Hypertronics Corp., Watertown, Mass.
Indit Corp., Albertson, N.Y.
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Glass Tech., Newport Bch., Cal.
ITT Cannon Electric, Santa Ana, Cal.
Micro Elctrns. Corp., Palmdale, Cal
Positronic Inds., Springfield, Mo.
A. J. Abrams Co., Westport, Conn.
Accratronics Seals Corp., Burbank, Calif.
Adre Co., Milwaukee, Wisc.
American Standard, Franklin Pk., Ill.
Cambridge Thermionic, Cambridge, Mass
Ceramaseal, Inc., New Lebanon Center, N.Y.
Connector Inds. Amer., Cincinnati, Ohio
Control Prods. Corp., Chicago, Ill.
Deutsch Co., Banning, Calif.
Device Seals, Inc., Sun Valley, Calif.
Exotic Materials, Inc., Costa Mesa, Cal.
General Lab. Assocs., Norwich, N.Y.
Harco Labs., Inc., Branford, Conn.
Honeywell, Ft. Washington, Pa.
KDI Sealtron Corp., Cincinnati, Ohio
Lemosa, Inc., San Francisco, Cal.
Lewis Engrg. Co., Naugatuck, Conn.
Marlin Mfg. Corp., Cleveland, Ohio
Omega Engrg., Inc., Stamford, Conn.
Pyle-National Co., Chgo., Ill.
Pyle-National Div., Harvey Hubbell, Chicago, Ill.
Richards Arklay S., Newton Highlands, Mass.
Thermo Elec. Co., Inc., Saddle Brook, N.J.
Viking Inds., Inc., Chatsworth, Calif.

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Tapeswitch Corp. Amer., Farmingdale, N.Y.
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Alloys Unlimited, Inc., Encino, Calif.
American Silver Co. Div., Flushing, N.Y.
Beman Mfg., Inc., New Cumberland, Pa.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eimac, San Carlos, Calif.
Fabri-Tek, Inc., Minneapolis, Minn.
Gibson Elec., Delmont, Pa.
Keystone Elctrns. Corp., New York, N.Y.
Masterite Inds., Inc., Torrance, Calif.
Methode Elctrns., Inc., Chicago, Ill.
Micro Contacts Inc., Hicksville, N.Y.
Micro Science Assocs., Mt. View, Cal.
Ney, J.M. Co., Bloomfield, Conn.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Spectrum Control, Inc., Fairview, Pa.
Wilkinson Co., Westlake Village, Cal.

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Airflyte Elctrns. Co., Bayonne, N.J.
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Winchester Elctrns. Div., Oakville, Conn.
Accurate Elctrns. Corp., Elyria, Ohio
Alloys Unlimited, Inc., Encino, Calif.
American Silver Co. Div., Flushing, N.Y.
Armel Elctrns., Inc., N. Bergen, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Carbone Corp., Boonton, N.J.
Chronomatic Div., Burbank, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Cleveland Refractory Metals Div., Solon, Ohio
Cole-Hersee Co., S. Boston, Mass.
Connectron Corp., Van Nuys, Cal
Crimpco Engrg., Cangoga Park, Calif.
D-Cemco, Inc., Burbank, Calif.
Deringer Metallurgical Corp., Mundelein, Ill.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electric Terminal Corp., Warwick, R.I.
Fabri-Tek, Inc., Minneapolis, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
Gibson Elec., Delmont, Pa.
GTE Sylvania Inc., Warren, Pa.
Holmberg, Inc., Melville, N.Y.
Improved Laminated Metal Co., Providence, R.I.
Keystone Elctrns. Corp., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Malco Mfg. Co., Chicago, Ill.
Mallory Metallurgical, Indianapolis, Ind.
Matthey Bishop Inc., Malvern, Pa.
Metex Corp., Edison, N.J.
Methode Elctrns., Inc., Chicago, Ill.
MI-KRO Connector Div., Long Island City, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Molex Prods. Co., Downers Grove, Ill.
Ney, J.M. Co., Bloomfield, Conn.
Ohio Carbon Co., Cleveland, Ohio
Ostby & Barton Co., Providence, R.I.
Philips Elmet Corp., Lewiston, Me.
Polymer Corp., Reading, Pa.
Pyle-National Co., Chgo., Ill.
Pylon Co., Inc., Attleboro, Mass.
R. I. Metpro, Inc., Warwick, R.I.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Servometer Corp., Clifton, N.J.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Stackpole Carbon Co., Carbon Div., St. Marys, Pa.
Staffall, Inc., Providence, R.I.
Stanley Ind'l. Comps. Div., Forestville, Conn.
Superior Carbon Prods., Inc., Cleveland, Ohio
Tech-Etch, Inc., Hingham, Mass.
Technical Wire Prods., Inc., Cranford, NJ
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Tri-State Elctrns. Corp., Camden, N.J.
Union Carbide, Carbon Prods. Div., New York, N.Y.
Viking Inds., Inc., Chatsworth, Calif.
Volkert Stampings, Inc., Queens Village, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Wilkinson Co., Westlake Village, Cal.

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Bal, William Corp., Elizabeth, N.J.
Calabro Unitrack, Upper Darby, Pa.
Consolidated Resistance Sls., Yonkers, N.Y.
Craig Sys. Corp., Lawrence, Mass.
Division Lead Co., Summit, Ill.
Environmental Container Sys., Union City, Calif.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Estes Engrg. Co., Gardena, Calif.
Eugene Engrg. Co., Inc., Rockland, Mass.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Heeger, Inc., Los Angeles, Calif.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Koch, H. & Sons, Corte Madera, Cal.
LectroMagnetics, Los Angeles, Cal.
Metex Corp., Edison, N.J.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
Precision Paper Tube Co., Wheeling, Ill.
Russell Inds., Inc., Lynbrook, N.Y.
Skydyne, Inc., Port Jervis, N.Y.

South Shore Metal Prods., Inc., Farmingdale, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
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Applied Design Co., Inc., Tonawanda, N.Y.
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Bossert Mfg. Corp., Utica, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Corrugated Paper Prods., Inc., Roosevelt, N.Y.
Environmental Container Sys., Union City, Calif.
Eugene Engrg. Co., Inc., Rockland, Mass.
Goldsman, Inc., Philadelphia, Pa.
Goodyear Aerospace Corp., Akron, Ohio
Insulating Fabricators, E. Rutherford, N.J.
Kinetron Corp., Asbury Park, N.J.
Koch, H. & Sons, Corte Madera, Cal.
Lewis G. B. Co, Watertown, Wisc
Lindsay Structure, Evansville, Ind.
McMillan Radiation Labs, Inc., Ipswich, Mass.
Muckle Mfg. Co., Owatonna, Minn.
Neumade Prods. Corp., Scarsdale, N.Y.
NVF Co., Yorklyn, Del.
Republic Steel Corp, Cleveland, Ohio
Skydyne, Inc., Port Jervis, N.Y.
Whittaker Corp., Los Angeles, Cal.
Zero Mfg. Co., Burbank, Cal.

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Akro-Mils, Inc., Akron, Ohio
Althor Prods., Brooklyn, N.Y.
American Aluminum Co., Mountainside, N.J.
Applied Design Co., Inc., Tonawanda, N.Y.
Bal, William Corp., Elizabeth, N.J.
Ballonoff Home Prods. Co., Cleveland, Ohio
Bradley Inds., Franklin Park, Ill.
Brooks & Perkins, Inc., Livonia, Mich.
Corrugated Paper Prods., Inc., Roosevelt, N.Y.
Environmental Container Sys., Union City, Calif.
Equipment Co. of America, Hialeah, Fla.
Eugene Engrg. Co., Inc., Rockland, Mass.
Goldsman, Inc., Philadelphia, Pa.
Goodyear Aerospace Corp., Akron, Ohio
Kinetron Corp., Asbury Park, N.J.
Koch, H. & Sons, Corte Madera, Cal.
Kole Enterprises, Inc., Miami, Fla.
Lewis G. B. Co, Watertown, Wisc
Lindsay Structure, Evansville, Ind.
Lyon Metal Prod., Inc., Aurora, Ill.
Metropolitan Wire Goods, Wilkes-Barre, Pa.
Muckle Mfg. Co., Owatonna, Minn.
NVF Co., Yorklyn, Del.
Plastofilm Inds., Wheaton, Ill.
Republic Steel Corp, Cleveland, Ohio
Robins Inds. Corp., Flushing, N Y
Skydyne, Inc., Port Jervis, N.Y.
Uniroyal, Inc., New York, N.Y.
Vlchek Plastics Co., Middlefield, Ohio
Zero Mfg. Co., Burbank, Cal.

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Magnedyne Inc., Carlsbad, Calif.
Atlas Engrg. Corp., W. Hartford, Conn.
Dow Chemical Co., Midland, Mich.
Dow Corning Corp., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Elctrn. Chemical Corp., Jersey City, N.J.
General Elec. Co., Waterford, N.Y.
Heeger, Inc., Los Angeles, Calif.
Humble Oil & Refining Co., Houston, Tex.
Hydro-Aire Div., Burbank, Calif.

Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Puritan-Zep, El Segundo, Cal.
Rawn Co., Inc., Spooner, Wisc.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stauffer-Wacker Silicone Corp., Adrian, Mich.
3M Co., St. Paul, Minn.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Wakefield Engrg., Inc., Wakefield, Mass.

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Bentley-Harris Mfg. Co., Conshohocken, Pa.
Bevin-Wilcox Line Co., Moodus, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Communications Tech. Corp., Los Angeles, Cal.
Gudebrod Bros. Silk Co., Inc., New York, N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Ico/Rally, Palo Alto, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Porter, H.K. Co., Inc., Pittsburgh, Pa.

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Amphenol Cadre Div., Endicott, N.Y.
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
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Standard Wire & Cable, Los Angeles, Cal.
Belden Corp., Chicago, Ill.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Cable Elec. Prods., Inc., Providence, R.I.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
Carol Cable Co. W., Compton, Cal.
Circle "F" Industries, Trenton, N.J.
Coleman Cable & Wire Co., River Grove, Ill.
Cord Specialties Co., Franklin Park, Ill.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
Electri-Cord Mfg. Co., Inc., Westfield, Pa.
Electric Parts Corp., Georgetown, Ky.
Excel Specialty Corp., Chicago, Ill.
General Elec., Providence, R.I.
Holyoke Wire & Cable, Holyoke, Mass.
Ideas, Inc., Laramie, Wyo.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Koss Elctrns., Inc., Milwaukee, Wisc.
Lectrodyne Sys. Corp., Philadelphia, Pa.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Linemaster Switch Corp., Woodstock, Conn.
Miller Elec. Co., Woonsocket, R.I.
Morey Corp, Downers Grove, Ill.
Noel Mfg. Co. Inc., Bronx, N.Y.
Pacific Electricord, Gardena, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Shigoto Inds., Ltd., New York, N.Y.
Superior Insulated Wire Corp., Stony Point, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Tri-State Elctrns. Corp., Camden, N.J.
Waber Elctrns., Inc., Philadelphia, Pa.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.

Cords, Line (Lamp)—See Cable, Multiconductor

Cords, Line, Resistance

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Dearborn Wire & Cable Co., Rosemont, Ill.
Standard Wire & Cable, Los Angeles, Cal.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Carol Cable Co. W., Compton, Cal.
Electri-Cord Mfg. Co., Inc., Westfield, Pa.
Electric Parts Corp., Georgetown, Ky.
Holyoke Wire & Cable, Holyoke, Mass.
Morey Corp, Downers Grove, Ill.
Tri-State Elctrns. Corp., Camden, N.J.

Cords, Patch

ADC Prods., Minneapolis, Minn... p 2512
Amp Inc., Harrisburg, Pa.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
GC Elctrns., Rockford, Ill. ..... p 2629
LVC Ind's., Inc., Corona, N.Y.
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2664,2672,2673,2688-2690,2698-2703
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y. p 2716
Standard Wire & Cable, Los Angeles, Cal.
Trimm, Inc., Libertyville, Ill. ..... p 2718
Trompeter Elctrns., Chatsworth, Cal. p 2719
Vector Elctrn. Co., Inc., Sylmar, Cal.
Victor Wire & Cable, L.A., Cal.
Virginia Panel Corp., Waynesboro, Va. p 2723
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Audio Accessories, Inc., Gilsum, N.H.
Barker Prods. Co., Saugus, Mass.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
California Avionics Labs., Inc., Palo Alto, Calif.
Cam-Lok Div., Cincinnati, Ohio
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Computer Components Int'l, Palm Beach Gardens, Fla.
Conrac Corp., New York, N.Y.
Consolidated Prods., Gardena, Calif.
Cooke Engrg. Co., Alexandria, Va.
De Soto Elec. Prods., De Soto, Mo.
EV/Game, Inc., Freeport, N.Y.
Eby Sls. Co., Jamaica, N.Y.
Electri-Cord Mfg. Co., Inc., Westfield, Pa.
Electric Parts Corp., Georgetown, Ky.
Electro Assemblies, Inc., Chicago, Ill.
Excel Specialty Corp., Chicago, Ill.
Farmer Elec. Prods. Co., Inc., Natick, Mass.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Radio Co., Concord, Mass.
GTE Lenkurt Inc., San Carlos, Calif.
Haydu Prods., Inc.; Opa Locka, Fla.
Holyoke Wire & Cable, Holyoke, Mass.
Info-Lite Corp., Ft. Lee, N.J.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Lynn Elctrns. Corp., Philadelphia, Pa.
Mac Panel Co., High Pt., N.C.
Malco Mfg. Co., Chicago, Ill.
Manger Elec. Co., Inc., Stamford, Conn.
Massey Dickinson Co., Inc., Saxonville, Mass.
McKee-Pedersen Instrs., Danville, Calif.
Morey Corp, Downers Grove, Ill.
Paraplegics Mfg., Bensenville, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Projects Unlimited, Inc., Dayton, Ohio
RCA Corp., Camden, N.J.
Rectico, Inc., Cedar Grove, N.J.
Roberts Div., Los Angeles, Cal.
Seven Assocs., Sunnyvale, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Stromberg Carlson Corp., Rochester, N.Y.
Switchcraft, Inc., Chicago, Ill.
Technical Mat'l., Mamaroneck, N.Y.
Tri-State Elctrns. Corp., Camden, N.J.
Tru-Connector Corp., Peabody, Mass.
Varied Ind'l. Prods., Inc., Paterson, N.J.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Waber Elctrns., Inc., Philadelphia, Pa.
Whistler Elctrns., Inc., Northridge, Cal.

Cords, Power—See Cable, Power

Cords, Retractile

Alpha Wire Corp., Elizabeth, N.J. p 2995
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3030
Electrospace Corp., Westbury
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2689
Smith, Herman H., Inc., Bklyn., N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Aero-Motive Mfg. Co., Kalamazoo, Mich.
Barker Prods. Co., Saugus, Mass.
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Carol Cable Co. W., Compton, Cal.
Consolidated Prods., Gardena, Calif.
Flexible Circuits, Inc., Warrington, Pa.
Gavitt Wire & Cable Div., Brookfield, Mass.
Holyoke Wire & Cable, Holyoke, Mass.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Morey Corp, Downers Grove, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plastic Wire & Cable Corp., Jewett City, Conn.
Russell Inds., Inc., Lynbrook, N.Y.
Secode Elctrns., Dallas, Texas
Telephone Dynamics Corp., N. Bellmore, N.Y.
Tri-State Elctrns. Corp., Camden, N.J.

Cords, Speaker Extension—See Cable, Audio

Cords, Twin Lead—See Cable, Multiconductor

Core Arrays, Memory—See Memory Arrays—Vol 1

Core Planes, Memory—See Memory Planes—Vol 1

Core Stacks, Memory—See Memory Stacks—Vol 1

Core Memory Systems—See Memory Systems, Core—Vol 1

Cores, Ceramic

American Lava Corp., Chattanooga, Tenn.
Arnold Engrg. Co., Marengo, Ill.
Carborundum Co., Niagara Falls, N.Y.
United Prods. Co., New Hyde Pk., N.Y.
Alloys Unlimited, Inc., Encino, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Brush Beryllium Co., Cleveland, Ohio
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Du-Co Ceramics Co., Saxonburg, Pa.
Duramic Prods., Inc., Palisades Park, N.J.
Electrical Refractories Co., E. Palestine, Ohio
Elctrn. Memories, Hawthorne, Cal.
Ferro Corp., E. Liverpool, Ohio
Honeywell, Aerospace & Def., Minneapolis, Minn.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kirchberger, M & Co., Inc., Englewood, N.J.
Lockheed Elctrns. Co., Watchung, N.J.
Maryland Lava Co., Bel Air, Md.
Metal Ceram, Inc., Mt. Vernon, N.Y.
National Beryllia Corp., Haskell, N.J.
Norton Co., Worcester, Mass.
Permag Corp., Jamaica, N.Y.
Quartzite Processing, Inc., Malden, Mass.
Rosenthal China Corp., New York, N.Y.
Star Porcelain Co., Trenton, N.J.
Steward, D.M. Mfg., Chattanooga, Tenn.
Superior Steatite & Ceramic Corp., Englewood, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
3M Co., St. Paul, Minn.
Trans-Tech, Gaithersburg, Md.
United Mineral & Chem. Corp., New York, N.Y.
Zirconium Corp. of Amer., Solon, Ohio

Cores, Magnetic, Ferrite, EL & E

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ferronics, Inc., Fairport, N.Y. ..... p 2757
Gould, Inc., Cleveland, Ohio
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Ampex Corp., Redwood City, Calif.
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Data Prods. Corp., Woodland Hills, Calif.
Electrical Plastics Corp., Lyndhurst, N.J.
Ferroxcube Corp., Saugerties, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
TDK Elctrns. Corp., Long Island City, N.Y.

Cores, Magnetic, Ferrite, Pot/Cup

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Ferroxcube Corp., Saugerties, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
TDK Elctrns. Corp., Long Island City, N.Y.

Cores, Magnetic, Ferrite, Slug

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Cambridge Thermionic, Cambridge, Mass
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
TDK Elctrns. Corp., Long Island City, N.Y.

Cores, Magnetic, Ferrite, Toroid

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
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Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Ampex Corp., Redwood City, Calif.
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Fabri-Tex, Inc., Minneapolis, Minn.
Ferroxcube Corp., Saugerties, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
TDK Elctrns. Corp., Long Island City, N.Y.
Trans-Tech, Gaithersburg, Md.

Cores, Magnetic, Ferrite, Yoke Section

Ferronics, Inc., Fairport, N.Y. ..... p 2757
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Comps., Fairfield, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
TDK Elctrns. Corp., Long Island City, N.Y.

Cores, Magnetic, Metal Alloy (Other Than Silicon & Nickel-Iron)

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
United Prods. Co., New Hyde Pk., N.Y.
Data Prods. Corp., Woodland Hills, Calif.
Magnetic Core Corp., Newburgh, N.Y.
Magnetics, Inc., Butler, Pa.

Cores, Magnetic, Nickel-Iron, EL, EE, F & Ring Laminations

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y. ..... p 2759
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Dentronics, Inc., Hackensack, N.J.
Magnetics, Inc., Butler, Pa.

Cores, Magnetic, Nickel-Iron, Toroid

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y. ..... p 2759
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
United Prods. Co., New Hyde Pk., N.Y.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Dynacor, Rockville, Md.
Ferroxcube Corp., Saugerties, N.Y.
Infinetics, Inc., Wilmington, Del.
Magnetic Core Corp., Newburgh, N.Y.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.

Cores, Magnetic, Powdered Iron, Pot/Cup

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Magnetic Core Corp., Newburgh, N.Y.
Micrometals, City of Industry, Calif.
National Moldite, Newark, N.J.
Permacor, Oak Lawn, Ill.
Pyroferric - N. Y., Inc., Bronx, N.Y.

Cores, Magnetic, Powdered Iron, Slug

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
Tohoku Metal Inds., Ltd., Tokyo, Japan
United Prods. Co., New Hyde Pk., N.Y.
Core-Tronics, Inc., Orange, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Magnetic Core Corp., Newburgh, N.Y.
Micrometals, City of Industry, Calif.
National Moldite, Newark, N.J.
Permacor, Oak Lawn, Ill.
Pyroferric - N. Y., Inc., Bronx, N.Y.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Cores, Magnetic, Powdered Iron, Toroid

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Tohoku Metal Inds., Ltd., Tokyo, Japan p 2501
United Prods. Co., New Hyde Pk., N.Y.
Core-Tronics, Inc., Orange, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Magnetic Core Corp., Newburgh, N.Y.
Micrometals, City of Industry, Calif.
National Moldite, Newark, N.J.
Permacor, Oak Lawn, Ill.
Pyroferric - N. Y., Inc., Bronx, N.Y.

Cores, Magnetic, Powdered Permalloy, Toroid

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
United Prods. Co., New Hyde Pk., N.Y.
Magnetic Core Corp., Newburgh, N.Y.
Magnetics, Inc., Butler, Pa.

Cores, Magnetic, Silicon, "C"

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y. ..... p 2759
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Barker Elec. Sls., Ship Bottom, NJ
Magnetics, Inc., Butler, Pa.
Tempel Steel Co., Chicago, Ill.
Westinghouse Elec., Greenville, Pa.

Cores, Magnetic, Silicon El, EE & F, Laminations

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y. ..... p 2759
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
Magnetics, Inc., Butler, Pa.
Tempel Steel Co., Chicago, Ill.
Thomas & Skinner, Inc., Indianapolis, Ind.

Cores, Magnetic, Silicon, Toroid

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Inter-Tech. Grp., Inc., Irvington-on-Hudson, N.Y. ..... p 2759
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
SGL Inds., Inc., Westville, N.J. .... p 2774
United Prods. Co., New Hyde Pk., N.Y.
Barker Elec. Sls., Ship Bottom, NJ
Dynacor, Rockville, Md.
Westinghouse Elec., Greenville, Pa.

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Counters, Directional—See Vol 2

Counters, Electro-Magnetic—See Vol 2

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Counters, Gating—See Vol 2

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Couplings, Quick-Disconnect, Liquid or Gas

Micro Elctrns. Corp., Palmdale, Cal p 2646
Aeronautical Div, Bryan, Ohio
Aeroquip Corp., Jackson, Mich.
Dial Prods. Co., Bayonne, N.J.
Eastern Inds. Div., Hamden, Conn.
Essex Cryogenics Inds., St. Louis, Mo.
Hecht Rubber Corp., Jacksonville, Fla.
High Voltage Engrg. Corp., Burlington, Mass.
Holmberg, Inc., Melville, N.Y.
Lear Siegler, Inc., Santa Monica, Calif.
Lear Siegler, Inc., Elyria, Ohio
Premier Microwave, Port Chester, N.Y.
Puritan-Zep, El Segundo, Cal.
Roylyn, Glendale, Cal.
Scanivalve, Inc., San Diego, Calif.
Veeco Instrs., Inc., Plainview, N.Y.

Couplings, Shaft, Rigid & Flexible—See Vol 2

Couplings, Vacuum—See Vol 1

Covers, Chassis

Premier Metal Prods. Co., Bronx, N.Y.
Scanbe Mfg. Corp., El Monte, Cal.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Erie Artisan Corp, Cleveland, Ohio
Falstrom Co., Passaic, N.J.
Feiner, P. & Sons, Inc., New York, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
GAF Corp., New York, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Kinetron Corp., Asbury Park, N.J.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Muckle Mfg. Co., Owatonna, Minn.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Wilmer Mfg. Co., Beltsville, Md.

Covers, Jack—See Jack Covers

Covers, Protective

Applied Design Co., Inc., Tonawanda, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Buckeye Bobbin Div., Westlake, Ohio
Bud Radio, Inc., Willoughby, Ohio
Clover Inds. Div., Tonawanda, N.Y.
Daniels, C.R., Inc., Daniels, Md.
Engineered Plastics, Inc., Gibsonville, N.C.
Franklin Fibre-Lamitex, Wilmington, Del.
Glenair, Inc., Glendale, Calif.
Globe Plastics, Pomona, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Zero Mfg. Co., Burbank, Cal.

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Crystals, Barium Titanate—See Vol 1

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Crystals, Sapphire—See Vol 1

Crystals, Scintillation Counter—See Vol 1

Crystals, Semiconductor(Ingots & Wafers)—See Vol 1

Crystals, Yig—See Vol 1

Cups, Encapsulation

Celestial Comps., Inc., Covina, Cal.
Consolidated Resistance Sls., Yonkers, N.Y.
Delta Plastics Co., Bellmawr, N.J.
Electrical Plastics Corp., Lyndhurst, N.J.
Electro Assemblies, Inc., Chicago, Ill.
Eljay Corp., Columbia, Md.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
Franklin Fibre-Lamitex, Wilmington, Del.
Gibson/Egan Co., Arcadia, Calif.
Globe Plastics, Pomona, Cal.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
GTE Sylvania Inc., Warren, Pa.
Keystone Elctrns. Corp., New York, N.Y.
Maryland Lava Co., Bel Air, Md.
Norelcom Inds., Inc., Farmingdale, N.Y.
NY-Glass Plastics, Paramount, Calif.
Pulse Engrg., Inc., San Diego, Cal.
Rayclad Tubes, Inc., Menlo Park, Calif.
Resdel Corp., Rio Grande, N.J.
R. I. Metpro, Inc., Warwick, R.I.
Robison Elctrns., Gardena, Cal.
Rostone Corp., Lafayette, Ind.
Spec Plastics, No. Hollywood, Cal.
Staffall, Inc., Providence, R.I.
Stevens Prods., Inc., E. Orange, N.J.
Topper Mfg. Co., Inc., Great Neck, N.Y.

Current Sensors-Also See Transducers, Volt, etc.—See Vol 2

Current Sources—See Vol 1

Cutters, Hole, Hand Operated

Jonard Inds. Corp., Bronx, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y.
American Safety Razor, Staunton, Va
Black & Decker Mfg. Co., The, Towson, Md.
General Hardware Mfg. Co., New York, N.Y.
Greenlee Tool Co., Rockford, Ill.
Janel, Inc., Stirling, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Mico Instr. Co., Cambridge, Mass.
Techni-Tool, Inc., Philadelphia, Pa.
Zephyr Mfg. Co., Inglewood, Calif.

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Dampers, Servo—See Vol 2

Dampers, Structural, Chassis, Panel, etc.—See Mounts, Shock & Vibration

Dashpots

Maxson Elctrns. Div., Great River, N.Y.

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Data Display Indicators—See Lights; Dials; Readouts—Vol 2

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Decade Boxes, Resistance—See Vol 1

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Decommutators, Telemetering—See Vol 1

Decontaminants—See Cleaners & Solvents

Deflection Yokes, Coils & Assemblies—See Yokes, Deflection

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Computer Devices, Commack, N.Y.
Control Elctrns. Co., Inc., Farmingdale, N.Y.
Data Delay Devices, Clifton, N.J.
Kappa Networks, Inc., Carteret, N.J.
Lorch-Adret Corp., Englewood, N.J.
General Microwave Corp., Farmingdale, N.Y.
Isomet Corp., Oakland, N.J.

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Allen Avionics, Mineola, N.Y.
Chronetics, Inc., Mt. Vernon, N.Y.
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Victor Wire & Cable, L.A., Cal.
Andrew Corp., Orland Pk., Ill.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
General Microwave Corp., Farmingdale, N.Y.
Gralex Inds., Inc., Farmingdale, N.Y.
Microwave Div, Nashua, N.H.
Nanosecond Systems, Inc., Fairfield, Conn.
Phelps Dodge Comm., North Haven, Conn.
Precision Tube, No. Wales, Pa.
Prodelin, Inc., Hightstown, N.J.
Spencer-Kennedy Labs., Inc., Winchester, Mass.
Stanford Applied Engrg., Santa Clara, Cal.
Thermax Wire Corp., Flushing, N.Y.
Times Wire & Cable, Wallingford, Conn.
Tru-Connector Corp., Peabody, Mass.
VIKOA, Hoboken, N.J.

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Uniform Tubes, Collegeville, Pa.
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Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edison Elctrns. Div., Manchester, N.H.
El-Rad Mfg. Co., Chicago, Ill.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Hughes Aircraft Co, Fullerton, Cal.
New London Instr. Co., Inc., New London, Conn.
Pace-Tronics, Newark, N.J.
PCA Elctrns., Inc., Sepulveda, Calif.
Precision Inc., Minneapolis, Minn
Pulse Engrg., Inc., San Diego, Cal.
Redman Elctrns. Corp., Enfield, Conn.
Stanford Applied Engrg., Santa Clara, Cal.
Vanguard Elctrns., Inglewood, Cal.

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Shallco, Inc., Smithfield, N.C.
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Audio Instr. Co., Union City, N.J.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edison Elctrns. Div., Manchester, N.H.
Geo Space, Houston, Tex.
Nanosecond Systems, Inc., Fairfield, Conn.
Pace-Tronics, Newark, N.J.
PCA Elctrns., Inc., Sepulveda, Calif.
Pulse Engrg., Inc., San Diego, Cal.
Stanford Applied Engrg., Santa Clara, Cal.
Television Microtime Inc., Bloomfield, Conn.

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Control Elctrns. Co., Inc., Farmingdale, N.Y.
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Inter-Computer Elctrns., Lansdale, Pa.
Nippon Electric/NEC America, N.Y., N.Y.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Andersen W. M. A. & Assocs., Tariffville, Conn.
Corning Glass Works, Raleigh, N.C.
Dell Optics Co., Inc., N. Bergen, N.J.
Isomet Corp., Oakland, N.J.
Litton Inds., San Carlos, Calif.
Microsonics, Inc., Weymouth, Mass.
Thomson-CSF Electron Tubes, N.Y., N.Y.
Wilmad Glass Co., Inc., Buena, N.J.

Delay Lines, Liquid

Control Elctrns. Co., Inc., Farmingdale, N.Y.
Microsonics, Inc., Weymouth, Mass.

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Components Corp., Chicago, Ill.
Consolidated Resistance Sls., Yonkers, N.Y.
Edison Elctrns. Div., Manchester, N.H.
Holex, Inc., Hollister, Cal.
Microwave Assocs., Inc., Burlington, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Rohde & Schwarz Sls., Passaic, N.J.
TDK Elctrns. Corp., Long Island City, N.Y.

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Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
RCL Elctrns., Inc., Irvington, N.J. p 2750,2751
Seg Elctrns., Richmond Hill, N.Y.
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Torotel, Inc., Grandview, Mo.
Universal Ad-Yu Elctrns., Inc., Passaic, N.J. p 2752
Aladdin Elctrns., Nashville, Tenn.
ASC Sys. Corp., Chicago, Ill.
Components Corp., Chicago, Ill.
Consolidated Resistance Sls., Yonkers, N.Y.
Edison Elctrns. Div., Manchester, N.H.
El-Rad Mfg. Co., Chicago, Ill.
Engineered Comps. Co., Gardena, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Hughes Aircraft Co, Fullerton, Cal.
Merrimac Resch. & Dev., Inc., West Caldwell, N.J.
Pace-Tronics, Newark, N.J.
PCA Elctrns., Inc., Sepulveda, Calif.
Pulse Engrg., Inc., San Diego, Cal.
Redman Elctrns. Corp., Enfield, Conn.
Stanford Applied Engrg., Santa Clara, Cal.
TDK Elctrns. Corp., Long Island City, N.Y.
Vanguard Elctrns., Inglewood, Cal.

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Chronetics, Inc., Mt. Vernon, N.Y.
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Control Elctrns. Co., Inc., Farmingdale, N.Y. ..... p 2743
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Audio Instr. Co., Union City, N.J.
Consolidated Resistance Sls., Yonkers, N.Y.
Edison Elctrns. Div., Manchester, N.H.
Engineered Comps. Co., Gardena, Cal.
Nanosecond Systems, Inc., Fairfield, Conn.
PCA Elctrns., Inc., Sepulveda, Calif.
Television Microtime Inc., Bloomfield, Conn.

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Baganoff Assocs., Inc., St. Louis, Mo.
General Instr. Corp., Hawthorne, Cal.
Microsonics, Inc., Weymouth, Mass.
TDK Elctrns. Corp., Long Island City, N.Y.

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Hisonic, Inc., Olathe, Kans.
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Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
RCL Elctrns., Inc., Irvington, N.J. p 2750,2751
Shallco, Inc., Smithfield, N.C.
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Sprague Elec. Co., No. Adams, Mass.
Uniform Tubes, Collegeville, Pa.
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Aladdin Elctrns., Nashville, Tenn.
Andersen W. M. A. & Assocs., Tariffville, Conn.
Components Corp., Chicago, Ill.
Edison Elctrns. Div., Manchester, N.H.
El-Rad Mfg. Co., Chicago, Ill.
Engineered Comps. Co., Gardena, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
General Instr. Corp., Chicopee, Mass.
Litton Inds., San Carlos, Calif.
Microsonics, Inc., Weymouth, Mass.
National Semiconductor, Santa Clara, Calif.
Pace-Tronics, Newark, N.J.
PCA Elctrns., Inc., Sepulveda, Calif.
Phelps Dodge Comm., North Haven, Conn.
Precision Tube, No. Wales, Pa.
Pulse Engrg., Inc., San Diego, Cal.
Stanford Applied Engrg., Santa Clara, Cal.
TDK Elctrns. Corp., Long Island City, N.Y.
Thermax Wire Corp., Flushing, N.Y.

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Control Elctrns. Co., Inc., Farmingdale, N.Y. ..... p 2743
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General Elec., Richmond Hgts., Ohio
Corning Glass Works, Raleigh, N.C.
Dell Optics Co., Inc., N. Bergen, N.J.
Isomet Corp., Oakland, N.J.
Microsonics, Inc., Weymouth, Mass.
Valpey Corp., Holliston, Mass.

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General Instr. Corp., Chicopee, Mass.
GRFF, Port Salerno, Fla.
Isomet Corp., Oakland, N.J.
Microsonics, Inc., Weymouth, Mass.
Microwave Div, Nashua, N.H.
Pulse Engrg., Inc., San Diego, Cal.
Radiation Sys., Inc., McLean, Va.
Sanders Assocs., Nashua, N.H.
Wilmad Glass Co., Inc., Buena, N.J.

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Pace-Tronics, Newark, N.J.

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Control Elctrns. Co., Inc., Farmingdale, N.Y. ..... p 2743
Nippon Electric/NEC America, N.Y., N.Y.
Aladdin Elctrns., Nashville, Tenn.
Andersen W. M. A. & Assocs., Tariffville, Conn.
Corning Glass Works, Raleigh, N.C.
Crystal Technology, Mountain View, Cal
General Instr. Corp., Chicopee, Mass.
Isomet Corp., Oakland, N.J.
Microsonics, Inc., Weymouth, Mass.
TDK Elctrns. Corp., Long Island City, N.Y.

Delay Lines, Waveguide

Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Uniform Tubes, Collegeville, Pa.
Aircom, Inc., Union, N.H.
Cardwell Condenser, Lindenhurst, N.Y.
Guide Inds., Inc., Sun Valley, Calif.
Herley Inds., Inc., Syosset, N.Y.
Hughes Aircraft Co, Fullerton, Cal.
Isomet Corp., Oakland, N.J.
Lieco, Inc., Lindenhurst, N.Y.
MCS Corp., Monrovia, Calif.
Microwave Filter Co., Inc., East Syracuse, N.Y.
Premier Microwave, Port Chester, N.Y.
TRG Prods., E. Boston, Mass.

Delay Lines, Wire

Allen Avionics, Mineola, N.Y.
Andersen Labs. Inc., Bloomfield, Conn. p 2728
Bel Fuse, Inc., Jersey City, N.J.
Computer Devices, Commack, N.Y.
Control Elctrns. Co., Inc., Farmingdale, N.Y.
Victor Wire & Cable, L.A., Cal.
Beckman Instrs., Helipot Div., Fullerton, Cal.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Hamilton Watch Co., Lancaster, Pa.
Microsonics, Inc., Weymouth, Mass.
Thermax Wire Corp., Flushing, N.Y.

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Alloys Unlimited, Inc., Encino, Calif.
Auburn Mfg. Co., Middletown, Conn.
Beckman Instrs., Process Instrs., Fullerton, Cal.
Bellofram Corp., Burlington, Mass.
Insulating Shapes, Inc., Bronx, N.Y.
Kollsman Instr. Corp., Syosset, N.Y.
Optical Inds., Santa Ana, Cal.
Sparta Mfg. Co., Dover, Ohio
Transducer Systems, Inc., Willow Grove, Pa.
Trish Energetics, Harvard, Mass.
Uniroyal, Inc., New York, N.Y.
Vernay Labs., Yellow Springs, Ohio
Viz Mfg. Co., Philadelphia, Pa.
Waldom Elctrns., Inc., Chicago, Ill.

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Beckman Instrs., (AISSD), Fullerton, Cal.
Bendix, Greenfield, Mass.
DoAll Co., Des Plaines, Ill.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Kikusui Elctrns. Corp., Kawasaki City, Kanagawa-Pref., Japan
Lear Siegler, Inc., Santa Monica, Calif.
Moody Machine Prods. Co., Inc., Providence, R.I.
Morris, J.I. Co., Southbridge, Mass.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Templet Ind., Inc., Plainview, N.Y.
Upson Tools, Inc., Rochester, N.Y.

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Dietzgen, Eugene Co., Chicago, Ill.
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Gagne Assocs., Inc., Binghamton, N.Y.
Gerber Sci. Instr. Co., Hartford, Conn.
Hughes Aircraft Co, Culver City, Cal.
Keuffel & Esser Co., Morristown, N.J.
Mechanical Enterprises, Alexandria, Va.
Stacor Corp., Newark, N.J.
Universal Drafting Mach., Bedford Hgts., Ohio
Xynetics, Inc., Canoga Pk., Cal.

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Avery Prods. Graphics Div., Santa Ana, Calif
Bishop Graphics, No. Hollywood, Cal.
Brady, W.H. Co., Milwaukee, Wisc.
By-Buk Co., Los Angeles, Calif.
C-Thru Ruler Co., Bloomfield, Conn.
Etchomatic, Inc., Waltham, Mass.
HAPCO, Boulder, Colo.
Keuffel & Esser Co., Morristown, N.J.
Russell Inds., Inc., Lynbrook, N.Y.
Stanpat Prods., Inc., Port Washington, N.Y.

Drafting Templates & Equip.

Avery Prods. Graphics Div., Santa Ana, Calif
C-Thru Ruler Co., Bloomfield, Conn.
Devonics Inc., San Diego, Cal.
Dietzgen, Eugene Co., Chicago, Ill.
HAPCO, Boulder, Colo.
Keuffel & Esser Co., Morristown, N.J.
Koh-I-Noor Rapidograph, Bloomsbury, N.J.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Pickett Industries, Inc., Santa Barbara, Calif.
Stacor Corp., Newark, N.J.
Stanpat Prods., Inc., Port Washington, N.Y.
Uber Grafic Instrs., Palo Alto, Calif.

Drawers, Sliding

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Premier Metal Prods. Co., Bronx, N.Y.
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Techmar Corp., Los Angeles, Cal. p 2327
BFC-Bernard Franklin Co., Phila., Pa.
Bud Radio, Inc., Willoughby, Ohio
Chassis-Trak, Inc., Indianapolis, Ind.
Eugene Engrg. Co., Inc., Rockland, Mass.
Lyon Metal Prod., Inc., Aurora, Ill.
Republic Steel Corp, Cleveland, Ohio
Riester & Thesmacher Co., Cleveland, Ohio
Wilmer Mfg. Co., Beltsville, Md.

Drills & Accessories, Hand & Power

Standard Pneumatic Motor Co., Whittier, Calif.
Ace Drill Corp., Adrian, Mich.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Bendix, Greenfield, Mass.
Black & Decker Mfg. Co., The, Towson, Md.
Buffalo Forge Co., Buffalo, N.Y.
DoAll Co., Des Plaines, Ill.
Dri-Clave Corp., Westbury, N.Y.
Dumore Co., Racine, Wisc.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Excellon Inds., Torrance, Calif.
Gardner-Denver Co., Quincy, Ill.
General Hardware Mfg. Co., New York, N.Y.
High Speed Hammer Co., Inc., Rochester, N.Y.
Lear Siegler, Inc., Santa Monica, Calif.
Mico Instr. Co., Cambridge, Mass.
Moody Machine Prods. Co., Inc., Providence, R.I.
Petty Geophysical Engrg., San Antonio, Tex.
Portable Elec. Tools, Div., Geneva, Ill.
Price & Rutzebeck, Hayward, Calif.
Simonds Saw & Steel, Fitchburg, Mass.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Tilden Tool Mfg., Deming, N.M.
Townsend Co., West Newton, Pa.
Vigor Tool Co., New York, N.Y.
Wen Prods., Inc., Chicago, Ill.
Wheelabrator Corp., Mishawaka, Ind.
Zephyr Mfg. Co., Inglewood, Calif.

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Jonard Inds. Corp., Bronx, N.Y.
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Channellock, Inc., Meadville, Pa.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Gardner-Denver Co., Quincy, Ill.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Hunter Tools, El Monte, Calif
Klein, Mathias & Sons, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
Moody Machine Prods. Co., Inc., Providence, R.I.
Portable Elec. Tools, Div., Geneva, Ill.
Porter, H.K., Inc., Somerville, Mass.
Proto Tool Co, Los Angeles, Calif.
Rosenberg Bros. & Co., Smithtown, N.Y.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Townsend Co., West Newton, Pa.
Upson Tools, Inc., Rochester, N.Y.
Williams J.H. & Co., Buffalo, N.Y.
Xcelite, Inc., Orchard Park, N.Y.

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Ducts, Flexible
Wiremold Co., W. Hartford, Conn.
Flexaust Co., New York, N.Y.
Hecht Rubber Corp., Jacksonville, Fla.
Icore, Inc., Santa Clara, Cal.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Uniroyal, Inc., New York, N.Y.
Zippertubing Co., Los Angeles, Calif.

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Cutler-Hammer, Milwaukee, Wisc.
E.C.P. Corp., Cleveland, Ohio
Feiner, P. & Sons, Inc., New York, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hoffman Engrg. Co., Anoka, Minn.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Ideas, Inc., Laramie, Wyo.
Keystone Columbia, Inc., Warren, Mich.
Square D Co., Park Ridge, Ill.
Stahlin Bros., Inc., Belding, Mich.
Taylor Elec., Howell, Mich.
Waber Elctrns., Inc., Philadelphia, Pa.
Wadsworth Elec. Mfg. Co., Inc., Covington, Ky.

Dummy Loads
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Corning Glass Works, Elctrn. Prods. Div., Corning, N.Y.
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Microwave Cavity Labs., La Grange, Ill.
Ohmite Mfg. Co., Skokie, Ill.
R L C Elctrns., Inc., Mt. Kisco, N.Y.
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Waveline, Inc., W. Caldwell, N.J.
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Aircom, Inc., Union, N.H.
Airtec, Inc., Roselle, N.J.
Astrolab Inc., Linden, N J
AUL Instrs., Inc., Flushng, N.Y.
Aviel Electronics Inc, Burbank, Calif.
Avtron Mfg., Inc., Cleveland, Ohio
Barth Elctrns., Inc., Cleveland, Ohio
CCA Elctrns. Corp., Gloucester, N.J.
CES Elctrns., Brooklyn, N.Y.
Chemalloy Elctrns., Santee, Cal.
Coax Devices Inc., Chelsea, Mass.
Collins Radio Co., Dallas, Tex.
Continental Elctrns. Mfg., Dallas, Tex.
Core-Tronics, Inc., Orange, N.J.
Custom Comps., Fairfield, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Elcom Sys., Deer Pk., N.Y.
Electrofilm, Inc., N. Hollywood, Calif.
Electronautics, Littleton, Mass.
EMC Technology Inc, Philadelphia, Pa.
Energy Systems, Palo Alto, Cal.
Fairchild Electro-Metrics, Amsterdam, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Filmohm Div., Long Island City, N.Y.
Guide Inds., Inc., Sun Valley, Calif.
Ham Kits, Cranford, N.J.
Heath Co., Benton Harbor, Mich.
Herley Inds., Inc., Syosset, N.Y.
Horlick, William I. Co., Inc., Boston, Mass.
Industrial Microwave, Scotch Plains, N.J.
Kahl Scientific Instr. Corp., El Cajon, Calif.
Kings Elctrns., Tuckahoe, N.Y.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Lectrodyne Sys. Corp., Philadelphia, Pa.
Lieco, Inc., Lindenhurst, N.Y.
Marathon Instrs. Div., Pico Rivera, Calif.
Maury Microwave Corp., Cucamonga, Calif.
MCS Corp., Monrovia, Calif.
Meca Elctrns., Inc., Denville, N.J.
MI-KRO Connector Div., Long Island City, N.Y.
Microlab/FXR, Livingston, N.J.
Microwave Development Labs., Inc., Needham Hgts., Mass.
Microwave Filter Co., Inc., East Syracuse, N.Y.
Microwave Labs. America, Brooklyn, N.Y.
Mobil Elctrns., Inc., Anderson, Ind.
Narda Microwave Corp., Plainview, N.Y.
New-Tronics Corp., Brookpark, Ohio
Omega Labs., Inc., Rowley, Mass.
OMNI Spectra, Farmington, Mich.
Polyphase Instr. Co., Bridgeport, Pa.
Premier Microwave, Port Chester, N.Y.
Pyrofilm Corp., Whippany, N.J.
Radiation Devices Co., Baltimore, Md.
Rantec Div., Calabasas, Calif.
Raytheon Co., Waltham, Mass.
RCA Corp., Camden, N.J.
Reeve Elctrns., Inc., Chicago, Ill.
Rex Rheostat & Co., Roosevelt, N.Y.
Rohde & Schwarz Sls., Passaic, N.J.
States Co., Hartford, Conn.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Sun Electric Corp., Chicago, Ill.
Systron-Donner Microwave Div., Van Nuys, Cal.
Technical Mat'l., Mamaroneck, N.Y.
Teledyne Inet, Gardena, Cal.
Tem-Pres Research Div., State College, Pa.
TRG Prods., E. Boston, Mass.
Tru-Connector Corp., Peabody, Mass.
Varian Assocs., Palo Alto, Cal.
Varian Assocs.Electron Tube & Device Grp., Palo Alto, Cal.
Victor Microwave, Inc., Wakefield, Mass.
Virginia Elctrns. Co., Inc., Falls Church, Va.

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Editing Equipment
Ampex Corp., Redwood City, Calif.
Elpa Mktg. Inds., New Hyde Park, N.Y.
Nuclear Supply Co., Washington, D.C.
Video Resch. Corp., Rockville, Md.

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Beckman Instrs., Cedar Grove, N.J. **p 415**
Avionics Resch. Prods., Los Angeles, Calif.
Biocom, Inc., Culver City, Cal.
Corning Glass Works, Lab. Prods. Dept., Corning, N.Y.
Hughes Aircraft Co., Vacuum Tube Prods. Div/Welding Equip., Oceanside, Calif.

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Eyelets

Berg Elctrns., Inc., New Cumberland, Pa.
Circon Corp., Goleta, Cal. ..... p 2937
Smith, Herman H., Inc., Bklyn., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abadak Inds., Inc., Farmingdale, N.Y.
Acme Model Engrg. Co., Ridgefield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anaconda American Brass Co., Waterbury, Conn.
Atlas Tack Corp., Fairhaven, Mass.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Device Seals, Inc., Sun Valley, Calif.
Eyelet Tool Co., Inc., Cambridge, Mass.
Federal Screw Prods., Inc., Chicago, Ill.
Fischer Special Mfg. Co., Cincinnati, Ohio
General Mfg. Co., Glendale, Calif.
GTE Sylvania Inc., Warren, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Kepro Cir. Sys., Inc., St. Louis, Mo.
Keystone Elctrns. Corp., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Micro Contacts Inc., Hicksville, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Revere Copper & Brass, Inc., New York, N.Y.
R. I. Metpro, Inc., Warwick, R.I.
Segal, Edward, Inc., New York, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Staver Co., Inc., Bay Shore, N.Y.
Stimpson Co., Inc., Bayport, N.Y.
3M Co., St. Paul, Minn.
USM Corp., Shelton, Conn.
Volkert Stampings, Inc., Queens Village, N.Y.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Fabric, Insulation—See Insulating Materials, Fabric

Fabrics, Acoustic, Sound-Transparent

Acoustone Corp., Brooklyn, N.Y.
Mellotone, Inc., New York, N.Y.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Wendell Fabrics Corp., New York, N.Y.

Fabrics, Conductive

Carbone Corp., Boonton, N.J.
Chase & Sons, Inc., Randolph, Mass.
Custom Materials, Inc., Chelmsford, Mass.
Electrofilm, Inc., N. Hollywood, Calif.
Emerson & Cuming, Inc., Canton, Mass.
Hecht Rubber Corp., Jacksonville, Fla.
Merix Chem. Co., Chicago, Ill.
Plymouth Rubber Co., Inc., Canton, Mass.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Unique Wire Weaving Co., Hillside, N.J.
Zippertubing Co., Los Angeles, Calif.

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Fasteners, Metal

Berg Elctrns., Inc., New Cumberland, Pa.
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Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Electronic Hardware, Jamaica, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
GC Elctrns., Rockford, Ill.
Pennwood Numechron, Pittsburgh, Pa.
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Vector Elctrn. Co., Inc., Sylmar, Cal.
Vemaline Prods. Co., Wyckoff, N.J.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Abbott Prods., Inc., College Point, N.Y.
ABSCOA Inds., Inglewood, Calif.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Acme Model Engrg. Co., Ridgefield, N.J.
Adams Rite Mfg. Co., Glendale, Calif.
Adjustable Bushing Corp., N Hollywood, Calif.
Allen Mfg. Co., Hartford, Conn.
Aluminum Co. America, Pittsburgh, Pa.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Anti-Corrosive Metal Prods. Co., Inc., Albany, N.Y.
APM Hexseal Corp., Englewood, N.J.
Armco Steel Corp., Middletown, Ohio
Arrow Fastener Co., Inc., Saddle Brook, N.J.
Associated Mfg. Co., Chicago, Ill.
Atlantic India Rubber Co., Chicago, Ill.
Atlas Screw & Specialty Co., Inc., Elizabeth, N.J.
Atlas Tack Corp., Fairhaven, Mass.
Auburn Mfg. Co., Middletown, Conn.
Auto-Swage Products, Inc., Shelton, Conn.
Avdel, Inc., Burbank, Calif.
Bell Fasteners Corp., Paramus, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Bland Co., Bloomfield, Conn.
Bostitch, E. Greenwich, R.I.
C.E.M. Co., Inc., Danielson, Conn.
Century Fastener Corp., Brooklyn, N.Y.
Chase Metal Service Div., Cleveland, Ohio
Cherry Rivet Div., Santa Ana, Calif.
Cinch-Monadnock, City of Industry, Cal.
Connectrol Corp., New York, N Y
Delbert Blinn. Co., Pomona, Calif.
Deutsch Fastener Corp., Los Angeles, Cal.
Dimco-Gray Co., Dayton, Ohio
DoAll Co., Des Plaines, Ill.
Elastic Stop Nut Div., Union, N.J.
Elco Inds., Rockford, Ill.
Eljay Corp., Columbia, Md.
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Fischer Special Mfg. Co., Cincinnati, Ohio
Garrett, George K. Co., Philadelphia, Pa.
Gemp Terminals, Inc., Yonkers, N.Y.
Gillen, John Co., Cicero, Ill.
Globe Plastics, Pomona, Cal.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Gries Reproducer Co., New Rochelle, N.Y.
Groov-Pin Corp., Ridgefield, N.J.
Harper, H.M. Co., Morton Grove, Ill.
Heli-Coil Prods., Danbury, Conn.
Helitronics Corp., Newark, N.J.
H.K. Metalcraft Mfg. Co., Lodi, N.J.
Holub Inds., Inc., Sycamore, Ill.
Indium Corp. America, Utica, N.Y.
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Kaynar Mfg. Co., Fullerton, Calif.
Kentucky Elctrns., Owensboro, Ky.
Keystone Elctrns. Corp., New York, N.Y.
Kinetron Corp., Asbury Park, N.J.
Laminated Shim Co., Inc., Glenbrook, Conn.
Lamson & Sessions Co., Cleveland, Ohio
Larson Charles O. Co., Sterling, Ill.
Litton Inds., Van Nuys, Calif.
Luke Line Fasteners, Beverly, N.J.
MacLean-Fogg Lock Nut Co., Mundelein, Ill.
Micro Contacts Inc., Hicksville, N.Y.
Milford Rivet & Mach., Milford, Conn.
Molex Prods. Co., Downers Grove, Ill.
Morris, J.I. Co., Southbridge, Mass.
Multi-Flex Seals, Inc., Bronx, N.Y.
Nelson Stud Welding Co., Lorain, Ohio
Nielsen Hardware Corp., Hartford, Conn.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nylok Co. Div., Paramus, N.J.
Olympic Fastening Sys., Downey, Cal.
Pan-L-Fast, N. Hollywood, Cal.
Paneloc Corp., Collinsville, Conn.
Penn Engrg. & Mfg. Corp., Doylestown, Pa.
Penn Fibre & Specialty, Phila., Pa.
Permonite Mfg. Co., Chicago, Ill.
PIC Design Corp., Ridgefield,, Conn.
Porcelain Prods. Co., Carey, Ohio
Pylon Co., Inc., Attleboro, Mass.
Ramsay Engrg. Co., Anaheim, Calif.
Reliance Div., Massillon, Ohio
Republic Steel Corp, Cleveland, Ohio
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Seastrom Mfg. Co. Inc., Glendale, Cal.
SECS, Inc., Long Island City, N.Y.
Shakeproof Div., Elgin, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Spec Plastics, No. Hollywood, Cal.
Stake Fastener Co., S. El Monte, Calif.
Standard Screw Co., Bellwood, Ill.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Star Stainless Screw Co., Totowa, N.J.
Sterling Instr., New Hyde Pk., NY
Stimpson Co., Inc., Bayport, N.Y.
Stock Drive Prods., New Hyde Pk., N.Y.
TA Mfg. Corp., Los Angeles, Cal.
Teale Machine Co., Rochester, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Timber-Top, Inc., Freeport, N.Y.
Tinnerman Div., Cleveland, Ohio
Townsend Co., Santa Ana, Calif.
Townsend Co., West Newton, Pa.
Tridair Inds., Torrance, Calif.
United American Metals Div., Brooklyn, N.Y.
USM Corp., Shelton, Conn.
Utilities Svc. Co., Allentown, Pa.
Waldes Kohinoor, Inc., Long Island City, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Waterbury Pressed Metal Co., Waterbury, Conn.
Western Sky Ind., Hayward, Calif.
Whittaker Corp., Los Angeles, Cal.
Wrought Washer Mfg. Co., Milwaukee, Wisc.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Fasteners, Non-Metallic

Bivar, Inc., Santa Ana, Cal.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Panduit Corp., Tinley Pk., Ill..... p 3047
Severna Operation, East Orange, N.J.
Smith, Herman H., Inc., Bklyn., N.Y.
Transcon Mfg. Co., Dallas, Tex.
Abadak Inds., Inc., Farmingdale, N.Y.
Abbott Prods., Inc., College Point, N.Y.
Acme Model Engrg. Co., Ridgefield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anti-Corrosive Metal Prods. Co., Inc., Albany, N.Y.
Bell Fasteners Corp., Paramus, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Bland Co., Bloomfield, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Century Fastener Corp., Brooklyn, N.Y.
Delbert Blinn. Co., Pomona, Calif.
Dennison Mfg., Framingham, Mass.
Electrovert, Inc., Mt. Vernon, N.Y.
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Globe Plastics, Pomona, Cal.
Gries Reproducer Co., New Rochelle, N.Y.
Hanscom, H.F. Co., Inc., Providence, R.I.
Harper, H.M. Co., Morton Grove, Ill.
Hecht Rubber Corp., Jacksonville, Fla.
Helitronics Corp., Newark, N.J.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Litton Inds., Van Nuys, Calif.
Loctite Corp., Newington, Conn.
Luke Line Fasteners, Beverly, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nylogrip Prods. Co., Waltham, Mass.
Nylomatic Corp., Morrisville, Pa.
Nyltite Corp. America, S. Plainfield, N.J.
Penn Fibre & Specialty, Phila., Pa.
PIC Design Corp., Ridgefield,, Conn.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Polymer Corp., Reading, Pa.
Pylon Co., Inc., Attleboro, Mass.
Royal Inds, El Segundo, Calif
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Seastrom Mfg. Co. Inc., Glendale, Cal.
SECS, Inc., Long Island City, N.Y.
Shakeproof Div., Elgin, Ill.
Shamban, W.S. & Co., Los Angeles, Calif.
Shur-Lok Corp., Santa Ana, Calif.
Star Stainless Screw Co., Totowa, N.J.
Sterling Instr., New Hyde Pk., NY
Stock Drive Prods., New Hyde Pk., N.Y.
3M Co., St. Paul, Minn.
Tinnerman Div., Cleveland, Ohio
Tridair Inds., Torrance, Calif.
Waldes Kohinoor, Inc., Long Island City, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Weckesser Co., Inc., Chicago, Ill.

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Feedthrus & Seals, Environmental

Elctrn. Molding Corp., Woonsocket, R.I.
Glass Tech., Newport Bch., Cal. p 2632
ITT Cannon Electric, Santa Ana, Cal.
Rowe Inds., Div., Toledo, Ohio
Sealectro Corp., Mamaroneck, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Bell & Howell Co., Monrovia, Calif.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Conax Corp., Buffalo, N.Y.
Cooke Vacuum Prods., S. Norwalk, Conn.
Denton Vacuum, Inc., Cherry Hill, N.J.
Device Seals, Inc., Sun Valley, Calif.
Edwards High Vacuum, Grand Island, N.Y.
Eimac, San Carlos, Calif.
Ferranti Ltd., Hollinwood, Lancs., England
Glasseal Prods. Co., Linden, N.J.
Granville-Phillips Co., Boulder, Colo.
High Vacuum Equip. Corp., Hingham, Mass.
Kinney Vacuum Co., Boston, Mass.
Latronics Corp., Latrobe, Pa.
Leybold-Heraeus, Monroeville, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Bellows Corp., Sharon, Mass.
Norton Co., Newton, Mass.
Parker Seal Co., Culver City, Calif.
Physical Sciences, Arcadia,, Cal.
Rosenthal China Corp., New York, N.Y.
Royal Inds, El Segundo, Calif
Sloan Technology Corp., Santa Barbara, Calif.
Ultek Div., Palo Alto, Calif.
USM Corp., Wakefield, Mass.
Vactronic Lab. Equip., Inc., E. Northport, N.Y.
Vacuum Equip. Div., Newton, Mass.
Vacuum Resch. Mfg., San Ramon, Cal.
Varian Assocs., Palo Alto, Cal.
Varian Assocs., Vacuum Div., Palo Alto, Cal.
Veeco Instrs., Inc., Plainview, N.Y.
Veritron West, Inc., Chatsworth, Calif.
Vernay Labs., Yellow Springs, Ohio
Warren Comps. Corp., Warren, Pa.
Westinghouse Elec., Elmira, N.Y.

Feedthrus, Terminal—See Terminals, Feedthru

Felt & Felt Parts

Acme Mfg. & Gasket Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Auburn Mfg. Co., Middletown, Conn.

Brady, W.H. Co., Milwaukee, Wisc.
Corkpak Co., Inc., New Rochelle, N.Y.
Fel-Pro Inc., Skokie, Ill.
Felters Co., Millbury, Mass.
Franklin Fibre-Lamitex, Wilmington, Del.
GAF Corp., New York, N.Y.
Morris, J.I. Co., Southbridge, Mass.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Fibre & Specialty, Phila., Pa.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Press-On Prods., Addison, Ill.
Syncor Prods. Co., Inc., Malden, Mass.
Universal Shellac & Supply Co., Inc., Hicksville, NY
Waldom Elctrns., Inc., Chicago, Ill.

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Allen-Bradley Co., Milwaukee, Wisc.
Arnold Engrg. Co., Marengo, Ill. **p 2754,2755**
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Seacor, Inc., Norwood, N.J.
Bell & Howell Co., Pasadena, Calif.
Ceramic Magnetics, Inc., Fairfield, N.J.
Commander Labs., Inc., Escondido, Calif.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Hughes Aircraft Co, Culver City, Cal.
Insaco, Inc., Quakertown, Pa.
Magnetics, Inc., Butler, Pa.
National Moldite, Newark, N.J.
Permag Corp., Jamaica, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
TDK Elctrns. Corp., Long Island City, N.Y.
Trans-Tech, Gaithersburg, Md.

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Field Plotters, Electric & Magnetic—See Vol 1

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Asheville-Schoonmaker Mica, Newport News, Va.
Celanese Plastics Co., Newark, N.J.
Chemplast, Inc., Wayne, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Elctrn. Concepts, Inc., Eatontown, N.J.
Filtron Co., Flushing, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
Hercules, Inc., Wilmington, Dela.
Marshall Inds., Monrovia, Cal.
Matthey Bishop Inc., Malvern, Pa.
Metallized Prods., Norwalk, Conn.
Natvar Corp., Rahway, N.J.
Permaluster, Inc., Burbank, Calif.
Schweitzer, Peter J. Div., Lee, Mass.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
3M Co., St. Paul, Minn.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.

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IRC Burlington Div. of TRW INC., Burlington, Iowa
Multitech Microelctrns., Monterey Pk., Cal.
Welwyn Int'l., Inc., Westlake, Ohio
American Comps., Inc., Conshohocken, Pa.
Celanese Plastics Co., Newark, N.J.
Dell Optics Co., Inc., N. Bergen, N.J.
Denton Vacuum, Inc., Cherry Hill, N.J.
Electro-Science Labs., Philadelphia, Pa.
Fansteel Inc., N Chicago, Ill.
Filmohm Div., Long Island City, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Megadyne Inds., Inc., Rochester, N.Y.
Polymer Resch., Milwaukee, Wis.
PRD Elctrns., Inc., Westbury, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
3M Co., St. Paul, Minn.

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Allied Chemical Corp., Morristown, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atlantic Ultraviolet Corp., Long Island City, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Black Light Corp. Amer., San Gabriel, Cal.
Black Light Prods., Chicago, Ill.
Canrad Precision Inds., Inc., Pelham, N.Y.
Carter's Ink Co., Cambridge, Mass.
City Chemical Corp., New York, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
GAF Corp., New York, N.Y.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Mackay, A.D., Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Pilot Chemicals, Inc., Watertown, Mass.
Shannon Luminous Mat'ls., Hollywood, Cal.
Stroblite Co., Inc., New York, N.Y.
Ultra-Violet Prods., Inc., San Gabriel, Cal.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Voltarc Tubes, Fairfield, Conn.
Westinghouse Elec., Bloomfield, N. J.

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Edsyn, Inc., Van Nuys, Cal.
Engelhard Minerals & Chem., Murray Hill, N.J.
GC Elctrns., Rockford, Ill.
Kahle Engrg. Co., Union City, N.J.
Multicore Sls. Corp., Westbury, N.Y. **p 2942**
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Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Silver Co. Div., Flushing, N.Y.
American Smelting & Refining Co., New York, N.Y.
ARC Prods. Div., Chicago, Ill.
Bow Solder Products, Newark, N.J.
Caig Labs., Inc., Westbury, N.Y.
Division Lead Co., Summit, Ill.
Dunton, M.W. Co., Providence, R.I.
Eutectic Corp., Flushing, N.Y.
Fairmount Chem. Co., Inc., Newark, N.J.
Force Chems. Div., Paoli, Pa.
Gardiner Solder Co., Chicago, Ill.
Handy & Harman, New York, N.Y.
Heeger, Inc., Los Angeles, Calif.
Hobart Bros. Co., Troy, Ohio
Indium Corp. America, Utica, N.Y.
Johnson Mfg. Co., Princeton, Iowa
Kester Solder Co, Chicago, Ill.
Kestler Elctrns., Temple City, Cal
Lake Chemical Co., Chicago, Ill.
Lenk Manufacturing Co., Inc., Franklin, Ky.
London Chemical Co., Bensenville, Ill.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Mueller Brass Co., Port Huron, Mich.
Nat'l. Lead Co., New York, N.Y.
Shanda Labs., Closter, N.J.
Solder Removal Co., Covina, Cal.
Superior Flux & Mfg., Cleveland, Ohio
Unibraze Corp, White Plains, N.Y.

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Foil, Capacitor Electrode

Aluminum Co. America, Pittsburgh, Pa.
Amax Aluminum Co., St. Louis, Mo.
Fansteel Inc., N Chicago, Ill.
Marshall Inds., Monrovia, Cal.
Paul, F.H. & Stein Bros., New York, N.Y.
Republic Foil, Inc., Danbury, Conn.
Reynolds Metals Co., Richmond, Va.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Foil, Magnetic

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American Silver Co. Div., Flushing, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Driver, Wilbur B. Co., Newark, N.J.
Emerson & Cuming, Inc., Canton, Mass.
Hamilton Watch Co., Lancaster, Pa.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Magnetics, Inc., Butler, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Revere Copper & Brass, Inc., New York, N.Y.
Russell Inds., Inc., Lynbrook, N.Y.
Westinghouse Elec., Blairsville, Pa.

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Alpha Metals, Inc., Jersey City, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Ce-Ja Springs, Inc., Newington, Conn.
Chronomatic Div., Burbank, Cal.
Connor Spring & Mfg. Co., San Jose, Cal.
Dudek & Bock Spring Mfg. Co., Chicago, Ill.
E.C.P. Corp., Cleveland, Ohio
Eltee, Inc., W. Caldwell, N.J.
Essex Cryogenics Inds., St. Louis, Mo.
Etamco, Industries, Belleville, N.J.
GTE Sylvania Inc., Warren, Pa.
Haydu Prods., Inc., Opa Locka, Fla.
Helix Spring Corp., Long Island City, N.Y.
Hunter Spring, Hatfield, Pa.
James Elctrn. Tool Co., Palo Alto, Calif.
Kentucky Elctrns., Owensboro, Ky.
King Laboratories, Inc., Syracuse, N.Y.
Marshall Inds., Monrovia, Cal.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Ney, J.M. Co., Bloomfield, Conn.
O'Hara Metal Prods. Co., San Francisco, Calif.
Stanley Ind'l. Comps. Div., Forestville, Conn.
Titchener, E.H. & Co., Binghamton, N.Y.
Varied Ind'l. Prods., Inc., Paterson, N.J.
Volkert Stampings, Inc., Queens Village, N.Y.
Wilkinson Co., Westlake Village, Cal.
Zims Mfg. Co., Irvington, N.J.

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Abtronics, Inc., Livermore, Calif.
Accessory Controls & Equip., Windsor, Conn.
Amco Engrg. Co., Chicago, Ill.
Barnes Engrg. Co., Santa Ana, Calif.
Bossert Mfg. Corp., Utica, N.Y.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
D-Cemco, Inc., Burbank, Calif.
Danco Metal Products, Inc., Westlake, Ohio
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Environmental Container Sys., Union City, Calif.
Eugene Engrg. Co., Inc., Rockland, Mass.
Falstrom Co., Passaic, N.J.
Feiner, P. & Sons, Inc., New York, N.Y.
GAF Corp., New York, N.Y.
Granite State Machine Co., Inc., Manchester, N.H.
GTE Lenkurt Inc., San Carlos, Calif.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
High Voltage Engrg. Corp., Burlington, Mass.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Republic Steel Corp, Cleveland, Ohio
Riester & Thesmacher Co., Cleveland, Ohio
Rosemount Engrg. Co., Minneapolis, Minn.
Waber Elctrns., Inc., Philadelphia, Pa.
Zero Mfg. Co., Burbank, Cal.

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Crystal Optics Resch., Inc., Ann Arbor, Mich.
Trans-Tech, Gaithersburg, Md.

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Air Prods. & Chems., Inc., Allentown, Pa.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Gardner Cryogenics Corp., Bethlehem, Pa.
Mackay, A.D., Inc., New York, N.Y.
TRW Semiconductor Div. TRW Inc., Lawndale, Cal.

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Instrument Specialties, Little Falls, N.J.
McLean Engrg. Labs., Princeton Jctn., N.J.
Scanbe Mfg. Corp., El Monte, Cal.
Abesto Corp., Bloomfield, N.J.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Auburn Mfg. Co., Middletown, Conn.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Chomerics, Inc., Woburn, Mass.
Connecticut Hard Rubber Co., New Haven, Conn.
Cooke Vacuum Prods., S. Norwalk, Conn.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Fel-Pro Inc., Skokie, Ill.
MCS Corp., Monrovia, Calif.
Metex Corp., Edison, N.J.
Microwave Development Labs., Inc., Needham Hgts., Mass.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Parker Seal Co., Culver City, Calif.
Penn Fibre & Specialty, Phila., Pa.
Polymer Corp., Reading, Pa.
Premier Microwave, Port Chester, N.Y.
Ray Proof Corp., Norwalk, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Spectrum Control, Inc., Fairview, Pa.
Tapecon, Inc., Rochester, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
United American Metals Div., Brooklyn, N.Y.

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Automatic Timing & Controls, Inc., King of Prussia, Pa.
Bendix, Dayton, Ohio
Bourns, Inc., Riverside, Calif.
Celtic Inds., Inc., Van Nuys, Cal.
Decker Corp., Bala-Cynwyd, Pa.
Gaertner Scientific Corp., Chicago, Ill.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Houston Scientific Inds., Inc., Houston, Tex
Lion Precision Div., Newton, Mass.
Mechanical Technology, Inc., Latham, N.Y.
Micro-Line, Jamestown, N.Y.
Minnetech Labs., Inc., Minneapolis, Minn.
Optron Corp., Woodbridge, Conn.
P.I. Tape, Lemon Grove, Calif.
Rank Precision Inds., W. Nyack, N.Y.
Starrett, L.S. Co., Athol, Mass.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Transducer Controls Corp., Covina, Calif.
West Coast Resch. Corp., Los Angeles, Calif.
Wintriss Controls, New York, N.Y.

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American Elctrns., Inc., Fullerton, Cal.
Analog General Corp., Oceanside, N.Y.
Aristo-Craft Distinctive Miniatures, New York, N.Y.
Beaver Gear Works, Inc., Rockford, Ill.
Bendix, Utica, N.Y.
Carbonara, Victor E. Inc., Port Washington, N.Y.
Dynamic Gear, Ft. Lauderdale, Fla.
Electronic Mach. Parts, College Point, N.Y.
Equitable Engrg. Co., Royal Oak, Mich.
Essex Engrg. Co., Inc., Essex, Conn.
Fastex Div., Des Plaines, Ill.
GAF Corp., New York, N.Y.
Geartronics Corp., N. Billerica, Mass.
Gibson/Egan Co., Arcadia, Calif.
Granite State Machine Co., Inc., Manchester, N.H.
Gries Reproducer Co., New Rochelle, N.Y.
Insco Corp., Groton, Mass.
Instru-Lec Corp., Mt. Vernon, N.Y.
Invincible Gear Co., Detroit, Mich.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Juall Gear Co., Inc., Hawthorne, N.J.
Kidde, Walter & Co., Belleville, N.J.
Kollsman Instr. Corp., Syosset, N.Y.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Larsen Importing Co., New York, N.Y.
Lear Siegler, Inc., Santa Monica, Calif.
Lem Instrument Corp., Farmingdale, N.Y.
Link Div., Binghamton, N.Y.
McNally Bros. Mach. & Gear, Mipls., Minn.
Melland Gear & Instr. Co., Inc., Westbury, N.Y.
Meltronics Inc., Wantagh, N.Y.
MPC Prods. Corp., Chicago, Ill.
Nylomatic Corp., Morrisville, Pa.
Orbit Instr. Corp., Syosset, N.Y.
Perfect Gear & Instr. Corp., Northridge, Calif.
Perkins Machine & Gear, W. Springfield, Mass.
PIC Design Corp., Ridgefield,, Conn.
Reliance Elec. Co., Cleveland, Ohio
Santa Fe Mfg. Co., Bronx, N.Y.
SECS, Inc., Long Island City, N.Y.
Singer-General Precision, Inc., Little Falls, N.J.
Sterling Instr., New Hyde Pk., NY
Stock Drive Prods., New Hyde Pk., N.Y.
Stop Components, Inc., Freeport, N.Y.
USM Corp., Wakefield, Mass.
Western Gear Corp., Pasadena, Cal.
Weston-Transicoil, Worcester, Pa.
Winzeler Mfg. & Tool Co., Chicago, Ill.
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Duramic Prods., Inc., Palisades Park, N.J.
Electrofilm, Inc., N. Hollywood, Calif.
Electrotools, Inc., Broadview, Ill.
Fansteel Inc., N Chicago, Ill.
Grafo Colloids Corp., Sharon, Pa.
Helwig Carbon Prods., Inc., Milwaukee, Wisc.
Kano Labs., Inc., Nashville, Tenn.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Maryland Lava Co., Bel Air, Md.
Ohio Carbon Co., Cleveland, Ohio
Pfizer-Minerals, New York, N.Y.
Poco Graphite, Inc., Decatur, Tex.
Pro-Chem, Inc., Cleveland, Ohio
Pure Carbon Co., Inc., St. Marys, Pa.
Servwell Prods. Co., Cleveland, Ohio
Sprayon Prods., Inc., Bedford Hgts., Ohio
Stackpole Carbon Co., Carbon Div., St. Marys, Pa.
Textool Prods., Inc., Irving, Tex.
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Union Carbide, Carbon Prods. Div., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

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Acheson Colloids Co., Port Huron, Mich.
Bendix, Rochester, N.Y.
Cerac, Inc., Butler, Wisc.
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Components Specialties, Inc., Freeport, N.Y.
Electro Assemblies, Inc., Chicago, Ill.
Eugene Engrg. Co., Inc., Rockland, Mass.
Fourjay Inds., Dayton, Ohio
Mobil Elctrns., Inc., Anderson, Ind.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Romar Plastics, Inc., St. Charles, Ill.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
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Federal Screw Prods., Inc., Chicago, Ill.
Fel-Pro Inc., Skokie, Ill.
Fischer Special Mfg. Co., Cincinnati, Ohio
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Heyman Mfg. Co., Kenilworth, N.J.
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Insulating Shapes, Inc., Bronx, N.Y.
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Lord Mfg. Co., Erie, Pa.
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Plastiglide Mfg. Corp., Santa Monica, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Royal Inds, El Segundo, Calif
Russell Inds., Inc., Lynbrook, N.Y.
Segal, Edward, Inc., New York, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Stimpson Co., Inc., Bayport, N.Y.
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HMW Enterprises, Inc., Steelton, Pa.
Hughes Aircraft Co, Culver City, Cal.
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Methode Elctrns., Inc., Chicago, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
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Stanford Applied Engrg., Santa Clara, Cal.
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Proto Tool Co, Los Angeles, Calif.
Rosenberg Bros. & Co., Smithtown, N.Y.
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Davies, Harry Molding Co., Chicago, Ill.
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Franklin Fibre-Lamitex, Wilmington, Del.
General Mfg. Co., Glendale, Calif.
Globe Plastics, Pomona, Cal.
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O'Hara Metal Prods. Co., San Francisco, Calif.
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Zero Mfg. Co., Burbank, Cal.
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Atlas/Uni-Seal, Valley Forge, Pa.
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Caton Inds., Inc., Clark, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Connector Inds. Amer., Cincinnati, Ohio
Device Seals, Inc., Sun Valley, Calif.
Eimac, San Carlos, Calif.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Electro Assemblies, Inc., Chicago, Ill.
Eltee, Inc., W. Caldwell, N.J.
Epoxy Plastic Molders, Irvington, N J
Glasseal Prods. Co., Linden, N.J.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
GTE Sylvania Inc., Warren, Pa.
Isotronics, Inc., New Bedford, Mass.
KDI Sealtron Corp., Cincinnati, Ohio
Keystone Elctrns. Corp., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Olektron Corp., Dudley, Mass.
Physical Sciences, Arcadia,, Cal.
Rosenthal China Corp., New York, N.Y.
Staffall, Inc., Providence, R.I.
Tekform Prods. Co., Anaheim, Cal.
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Glasseal Prods. Co., Linden, N.J.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
GTE Sylvania Inc., Warren, Pa.
Haydu Prods., Inc., Opa Locka, Fla.
Isotronics, Inc., New Bedford, Mass.
Keystone Elctrns. Corp., New York, N.Y.
Kidco, Inc., Medford, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Olektron Corp., Dudley, Mass.
Rosenthal China Corp., New York, N.Y.
Tekform Prods. Co., Anaheim, Cal.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Veritron West, Inc., Chatsworth, Calif.
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BTU Engrg. Corp., Waltham, Mass.
Cabot Corp., Kokomo, Ind.
Cargocaire Engrg. Corp., Amesbury, Mass.
Chem Aero, Inc., Wilmington, Cal.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
E-Tronics, Van Nuys, Cal.
Eastern Inds. Div., Hamden, Conn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fansteel Inc., N Chicago, Ill.
Gardner Cryogenics Corp., Bethlehem, Pa.
General Sci. Equip., Phila., Pa.
Hafstrom Tech. Prods., Inc., San Diego, Calif.
Heatron, Inc., York, Pa.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Janitrol Aero Div., Columbus, Ohio
Jersey Tech. Conslts., Morristown, N.J.
Johnson Corp., Three Rivers, Mich.
Kenics Corp., Danvers, Mass.
Kooltronic Fan Co., Princeton, N.J.
Lear Siegler, Inc., Elyria, Ohio
Lochart Inds., Inc., Paramount, Cal.
Master Appliance Corp., Racine, Wisc.
Pesco Prods., Bedford, Ohio
Phoenix Materials Corp., Kittanning, Pa.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Precision Dipbraze Tor., Van Nuys, Cal.
Robotron Corp., Detroit, Mich.
Ross Engrg. Div., New Brunswick, N.J.
Santa Barbara Resch. Ctr., Goleta, Calif.
Sentry Equip. Corp., Oconomowoc, Wisc.
Standard Cabinet Co., Inc., Totowa, N.J.
Standard-Thomson Corp., Waltham, Mass.
Wakefield Engrg., Inc., Wakefield, Mass.
Waukesha Motor Co., Waukesha, Wisc.
Wiegand, Edwin L. Co., Pittsburgh, Pa.

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Alpha Wire Corp., Elizabeth, N.J.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
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Burlington Opers. Div., Burlington, Mass.
Caig Labs., Inc., Westbury, N.Y.
Chemplast, Inc., Wayne, N.J.
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Commercial Elec. Heating Devices & Mfg., Inc., Monterey Park, Cal.
Corkpak Co., Inc., New Rochelle, N.Y.
Fostoria-Fannon, Inc., Fostoria, Ohio
Henes Mfg. Co., Phoenix, Ariz.
Holub Inds., Inc., Sycamore, Ill.
Ico/Rally, Palo Alto, Cal.
Ideal Industries, Inc., Sycamore, Ill.
MacDonald & Co., Glendale, Calif.
Master Appliance Corp., Racine, Wisc.
Materials Resch. Corp., Orangeburg, N.Y.
Port Plastics, Inc., Montebello, Cal.
Russell Inds., Inc., Lynbrook, N.Y.
Sara Scientific Co., San Francisco, Calif.
Sigma Sys. Corp., San Diego, Calif.
Techni-Tool, Inc., Philadelphia, Pa.
Thomas & Betts Co., Elizabeth, N.J.
Weldotron Corp., Piscataway, N.J.

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Clauss Cutlery Co., Fremont, Ohio
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Alloys Unlimited, Inc., Encino, Calif.
Avtron Mfg., Inc., Cleveland, Ohio
Calabro Unitrack, Upper Darby, Pa.
Channellock, Inc., Meadville, Pa.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
E-Tronics, Van Nuys, Cal.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Hunter Tools, El Monte, Calif
Indium Corp. America, Utica, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Janel, Inc., Stirling, N.J.
MacDonald & Co., Glendale, Calif.
Norelcom Inds., Inc., Farmingdale, N.Y.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Techni-Tool, Inc., Philadelphia, Pa.
Wakefield Engrg., Inc., Wakefield, Mass.
Xcelite, Inc., Orchard Park, N.Y.

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Feiner, P. & Sons, Inc., New York, N.Y.
Matrix Engineering Corp., Gardena, Calif.
Metropolitan Wire Goods, Wilkes-Barre, Pa.
Techni-Tool, Inc., Philadelphia, Pa.
Templet Ind., Inc., Plainview, N.Y.

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Birtcher Corp., Monterey Park, Cal.

Calabro Unitrack, Upper Darby, Pa.
General Hardware Mfg. Co., New York, N.Y.
Gibson/Egan Co., Arcadia, Calif.
K-Tech., Inc., Framingham, Mass.
Keystone Elctrns. Corp., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Matrix Engineering Corp., Gardena, Calif.
Metropolitan Wire Goods, Wilkes-Barre, Pa.
Modular Devices, Inc., Gardena, Calif.
Space Prods., Inc., Long Beach, Calif.
Techni-Tool, Inc., Philadelphia, Pa.
Tech. Devices Co., Culver City, Calif.
Templet Ind., Inc., Plainview, N.Y.
Western Elctrn. Prods. Co., San Clemente, Cal.
Zeva Elec. Corp., Hanover, N.J.

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Goodyear Aerospace Corp., Akron, Ohio
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Johns-Manville Sls. Corp., New York, N.Y.
LectroMagnetics, Los Angeles, Cal.
Metex Corp., Edison, N.J.
Nurad, Inc., Baltimore, Md.
Pioneer Metals, Inc., Harrodsburg, Ky.
Safeway Products Inc., Middletown, Conn.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Whittaker Corp., Los Angeles, Cal.
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Indicators, Material Thickness—See Vol 1

Indicators, Modulation—See Vol 1

Indicators, Moisture (Electronic)—See Vol 1

Indicators, Motor Load—See Vol 1

Indicators, Noise-Figure—See Meters, Noise-Figure—Vol 1

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Indicators, Phase—See Vol 1

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Indicators, Power Level—See Vol 1

Indicators, Pressure—See Gauges, Pressure—Vol 1

Indicators, Proximity—See Vol 2

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Indicators, R-F—See Meters, Frequency—Vol 1

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Indicators, Servo—See Vol 2

Indicators, Shaft Speed—See Tachometers, Electronic—Vol 2

Indicators, Shorted Turn—See Testers, Coil—Vol 1

Indicators, Smoke & Combustion (Electronic)-Also See Fire Detection & Fighting Equipment—See Vol 1

Indicators, Sound Level—See Meters, Audio Level—Vol 1

Indicators, Specific Gravity—See Vol 2

Indicators, Strain (For Use With Strain Gauges)—See Vol 1

Indicators, Surface Roughness—See Vol 1

Indicators, Telemetering—See Analyzers, Telemetric Data—Vol 1

Indicators, Temperature—See Meters, Temperature—Vol 1

Indicators, Time Delay Measurement—See Vol 1

Indicators, Torque—See Vol 1

Indicators, Transient Voltage—See Vol 1

Indicators, Vacuum-Also See Gauges, Vacuum—See Vol 1

Indicators, Viscosity—See Vol 2

Indicators, VSWR—See Meters, Standing Wave Ratio—Vol 1

Indicators, Weight—See Scales, Production Weight—Vol 1

Indicators, Wind Direction (Electronic)—See Vol 1

Indicators, Wind Speed (Electronic)—See Vol 1

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Inductance Standards—See Standards, Inductance—Vol 1

Induction Heating Equipment—See Heaters & Accessories, Induction—Vol 1

Induction Potentiometers—See Resolvers, Synchro—Vol 2

Inductors—See Coils

Infrared Equipment—See Comn. Systems; Detectors; Lamps; Spectrometers; etc. (As Modified By Infrared)—Vol 1

Inks For Thick Film Microcircuits—See Vol 2

Inks, Marking
Meloy Laboratories, Springfield, Va.
Raytheon Co., Quincy, Mass.
Spectra-Strip Corp., Garden Grove, Cal.
Ackerman Gould Co., Inc., Oceanside, N.Y.
Acromark Co., Berkeley Hts, N.J.
Allaco Prods., Braintree, Mass.
Apex Machine Co., Ft. Lauderdale, Fla.
Black Light Corp. Amer., San Gabriel, Cal.
Black Light Prods., Chicago, Ill.
Caig Labs., Inc., Westbury, N.Y.
Carter's Ink Co., Cambridge, Mass.
Dynachem Corp., Santa Fe Springs, Cal.
Eastern Marking Mach. Corp., Island Pk., N.Y.
Esterline Angus Div., Indianapolis, Ind.
Etchomatic, Inc., Waltham, Mass.
Formulabs Ind'l. Inks, Escondido, Cal.
Foxboro Co., Foxboro, Mass.
Geartronics Corp., N. Billerica, Mass.
General Elec. Co., Cleveland, Ohio
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Independent Ink, Inc., Gardena, 90248
Kingmann-White, Inc., Placentia, Calif.
Koh-I-Noor Rapidograph, Bloomsbury, N.J.
Lake Chemical Co., Chicago, Ill.

London Chemical Co., Bensenville, Ill.
M & T Chemicals Inc., Rahway, N.J.
Markal Co., Chicago, Ill.
Markem Corp., Keene, N.H.
Master Engraving, East Paterson, N.J.
Matthews, Jas & Co., Pittsburgh, Pa.
Omega Engrg., Inc., Stamford, Conn.
Organic Prods. Co., Irving, Tex.
Phillips Process Co., Inc., Rochester, N.Y.
Podgor, Joseph Co., Pennsauken, N.J.
Podgor, Joseph E. Co., Inc., Phila., Pa.
Popper & Sons, Inc., New York, N.Y.
Pryor Marking Prods., Chicago, Ill.
Randolph Prods. Co., Carlstadt, N.J.
Shannon Luminous Mat'ls., Hollywood, Cal.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Star Enterprises-Div., Lowell, Mass.
Techform Labs., Inc., Venice, Cal.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Ultra-Violet Prods., Inc., San Gabriel, Cal.
Westinghouse Elec., Bloomfield, N. J.

Insertion Loss Measurement Systems—See Vol 1

Inserts—See Bushings

Inspection Lighting & Equipment—See Fiber Optic Inspection Equipment; Lamps, Magnifying; Comparators, Optical; Ultraviolet Lighting Equipment—Vol 1

Instrument Cases—See Cabinets; Cases, Instrument

Instrument Parts, Precision—See Bearings; Gears; Springs; etc.—Vol 2

Instruments, Elect. Measuring—See Analyzers; Bridges; Comparators; Meters; etc.—Vol 1

Instruments, Graphic Recording—See Recorders, Graphic—Vol 1

Insulating Compounds, Acrylic

Columbia Tech., Woodside, N.Y.
GC Elctrns., Rockford, Ill.
Borden Chemical Co., Norristown, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Emerson & Cuming, Inc., Canton, Mass.
Isochem Resins Co., Lincoln, R.I.
Permaluster, Inc., Burbank, Calif.
Resin Formulators Co., Culver City, Cal.
Sperex Corp., Los Angeles, Calif.
Sterling, Sewickley, Pa.

Insulating Compounds, Asphalt & Pitch

Chemtronics, Inc., Brooklyn, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Sauereisen Cements Co., Pittsburgh, Pa.
Schenectady Chems., Schenectady, N.Y.
Sterling, Sewickley, Pa.
Stevenson-Bro & Co., Inc., Phila., Pa.
Universal Shellac & Supply Co., Inc., Hicksville, NY
Westinghouse Elec., W. Mifflin, Pa.
Zophar Mills, Inc., Brooklyn, N.Y.

Insulating Compounds, Coil Dope

Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Columbia Tech., Woodside, N.Y.
GC Elctrns., Rockford, Ill.
Chemtronics, Inc., Brooklyn, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
General Elec., Schenectady, N.Y.
Isochem Resins Co., Lincoln, R.I.
Sauereisen Cements Co., Pittsburgh, Pa.
3M Co., St. Paul, Minn.

Insulating Compounds, Enamel

Datak Corp., Passaic, N.J.
Acme Chemical & Insulation Co., New Haven, Conn.
Borden Chemical Co., Norristown, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Chemtronics, Inc., Brooklyn, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
General Elec., Schenectady, N.Y.
Isochem Resins Co., Lincoln, R.I.
Omega Engrg., Inc., Stamford, Conn.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Ram Chems., Gardena, Calif.
Schenectady Chems., Schenectady, N.Y.
Sperex Corp., Los Angeles, Calif.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Westinghouse Elec., W. Mifflin, Pa.

Insulating Compounds, Epoxy

Columbia Tech., Woodside, N.Y.
Freed Transformer Co., Bklyn., N.Y.
Meloy Laboratories, Springfield, Va.
Ablestik Adhesive Div., Gardena, Calif.
Acme Chemical & Insulation Co., New Haven, Conn.
Allaco Prods., Braintree, Mass.
Amicon Corp., Lexington, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Armstrong Prods. Co., Warsaw, Ind.
Bacon Inds., Watertown, Mass.
Brand Dielectrics, Inc., N. Windham, Conn.
Conap, Inc., Allegany, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Epoxylite Corp., S. El Monte, Calif.
Fuller-O'Brien Corp., Menlo Park, Calif.
Furane Plastics, Los Angeles, Cal.
General Elec., Schenectady, N.Y.
Hardman Inc., Belleville, N.J.
Hysol Div., Olean, N.Y.
Isochem Resins Co., Lincoln, R.I.
MacDonald & Co., Glendale, Calif.
Mansol Ceramics Co., Inc., Belleville, N.J.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
National Beryllia Corp., Haskell, N.J.
Nitine, Inc., Clifton, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Packaged Resins Co., Braintree, Mass.
Ram Chems., Gardena, Calif.
Randolph Prods. Co., Carlstadt, N.J.
Resin Formulators Co., Culver City, Cal.
Rogers Corp., Rogers, Conn.
Schenectady Chems., Schenectady, N.Y.
Sterling, Sewickley, Pa.
Techform Labs., Inc., Venice, Cal.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Wakefield Engrg., Inc., Wakefield, Mass.
Westinghouse Elec., W. Mifflin, Pa.

Insulating Coumpounds, Lacquer

Columbia Tech., Woodside, N.Y.
GC Elctrns., Rockford, Ill.
Acme Chemical & Insulation Co., New Haven, Conn.
Chemical Prods. Corp., E. Providence, R.I.
Chemtronics, Inc., Brooklyn, N.Y.
Dennis Chem. Co., St. Louis, Mo.
Dolph, John C. Co., Monmouth Junction, N.J.
Dynaloy, Inc., Hanover, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Isochem Resins Co., Lincoln, R.I.
London Chemical Co., Bensenville, Ill.
Omega Engrg., Inc., Stamford, Conn.
Randolph Prods. Co., Carlstadt, N.J.
Sprayon Prods., Inc., Bedford Hgts., Ohio

Insulating Compounds, Silicone

Columbia Tech., Woodside, N.Y.
Abesto Corp., Bloomfield, N.J.
Allaco Prods., Braintree, Mass.
Bacon Inds., Watertown, Mass.
Borden Chemical Co., Norristown, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Dow Corning Corp., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Fuller-O'Brien Corp., Menlo Park, Calif.
General Elec. Co., Waterford, N.Y.
General Elec., Providence, R.I.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Isochem Resins Co., Lincoln, R.I.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
National Beryllia Corp., Haskell, N.J.
Omega Engrg., Inc., Stamford, Conn.
Packaged Resins Co., Braintree, Mass.
Pelmor Labs., Inc., Newtown, Pa.
Ram Chems., Gardena, Calif.
Resin Formulators Co., Culver City, Cal.
Sperex Corp., Los Angeles, Calif.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.
Union Carbide, Chemicals & Plastics, New York, N.Y.

Insulating Compounds, Varnish

Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Columbia Tech., Woodside, N.Y.
Datak Corp., Passaic, N.J.
GC Elctrns., Rockford, Ill.
Acme Chemical & Insulation Co., New Haven, Conn.
Borden Chemical Co., Norristown, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Chemtronics, Inc., Brooklyn, N.Y.
Conap, Inc., Allegany, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Corning Corp., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Epoxylite Corp., S. El Monte, Calif.
Fuller-O'Brien Corp., Menlo Park, Calif.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
Isochem Resins Co., Lincoln, R.I.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Ram Chems., Gardena, Calif.
Randolph Prods. Co., Carlstadt, N.J.
Reichhold Chemicals, Inc., White Plains, N.Y.
Richardson Co., Des Plaines, Ill.
Schenectady Chems., Schenectady, N.Y.
Sprayon Prods., Inc., Bedford Hgts., Ohio
Sterling, Sewickley, Pa.
3M Co., St. Paul, Minn.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.

Insulating Compounds, Wax

Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Applied Plastics Co., El Segundo, Cal.
Borden Chemical Co., Norristown, Pa.
Eastman Chem. Prods., Kingsport, Tenn.
Humble Oil & Refining Co., Houston, Tex.
Int'l Wax Refining Co., Valley Stream, N.Y.
Isochem Resins Co., Lincoln, R.I.
Resin Formulators Co., Culver City, Cal.
Stevenson-Bro & Co., Inc., Phila., Pa.
Universal Shellac & Supply Co., Inc., Hicksville, NY
Zophar Mills, Inc., Brooklyn, N.Y.

Insulation Materials, Adhesive

Perfection Mica Co., Bensenville, Ill.
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Ablestik Adhesive Div., Gardena, Calif.
Adhesive Prods. Corp., Bronx, N.Y.
Allaco Prods., Braintree, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Armstrong Cork Co., Lancaster, Pa.
Armstrong Prods. Co., Warsaw, Ind.
Automatic Die Cutting Mach. Co., New York, N.Y.
Bacon Inds., Watertown, Mass.
Borden Chemical Co., Norristown, Pa.
Brady, W.H. Co., Milwaukee, Wisc.
Brand Dielectrics, Inc., N. Windham, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
By-Buk Co., Los Angeles, Calif.
Chase & Sons, Inc., Randolph, Mass.
Chemplast, Inc., Wayne, N.J.
Chemtronics, Inc., Brooklyn, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Conap, Inc., Allegany, N.Y.
Corkpak Co., Inc., New Rochelle, N.Y.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Corning Corp., Midland, Mich.
Dynaloy, Inc., Hanover, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Epoxylite Corp., S. El Monte, Calif.
Furane Plastics, Los Angeles, Cal.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Hysol Div., Olean, N.Y.
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
Kenics Corp., Danvers, Mass.
Mansol Ceramics Co., Inc., Belleville, N.J.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Morgan Adhesives Co., Stow, Ohio
National Beryllia Corp., Haskell, N.J.
Packaged Resins Co., Braintree, Mass.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Permacel, New Brunswick, N.J.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Press-On Prods., Addison, Ill.
Resin Formulators Co., Culver City, Cal.
Sauereisen Cements Co., Pittsburgh, Pa.
Schjeldahl, G.T. Co., Northfield, Minn.
Semicon Assoc., Inc., Lexington, Ky.
Sterling, Sewickley, Pa.
Techform Labs., Inc., Venice, Cal.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.

Insulation Materials, Asbestos

Abesto Corp., Bloomfield, N.J.
American Smelting & Refining Co., New York, N.Y.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Chase & Sons, Inc., Randolph, Mass.
Fansteel Inc., N Chicago, Ill.
Fel-Pro Inc., Skokie, Ill.
Fiberite Corp., Winona, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
Hecht Rubber Corp., Jacksonville, Fla.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Richards Arklay S., Newton Highlands, Mass.
Rostone Corp., Lafayette, Ind.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.
Uniroyal, Inc., New York, N.Y.

Insulation Materials, Ceramic

American Lava Corp., Chattanooga, Tenn..... p 2810
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
General Elec., Richmond Hgts., Ohio p 2811
Radio Materials Co., Chicago, Ill. p 2435
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramic Magnetics, Inc., Fairfield, N.J.
Commander Labs., Inc., Escondido, Calif.
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Du-Co Ceramics Co., Saxonburg, Pa.
Duramic Prods., Inc., Palisades Park, N.J.
Dynaloy, Inc., Hanover, N.J.
Edo Western Corp., Salt Lake City, Utah
Electrical Refractories Co., E. Palestine, Ohio
Emerson & Cuming, Inc., Canton, Mass.
Fansteel Inc., N Chicago, Ill.
General Lab. Assocs., Norwich, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Maryland Lava Co., Bel Air, Md.
Materials Resch. Corp., Orangeburg, N.Y.
National Beryllia Corp., Haskell, N.J.
Norton Co., Worcester, Mass.
Permaluster, Inc., Burbank, Calif.
Physical Sciences, Arcadia,, Cal.
Porcelain Prods. Co., Carey, Ohio
Richards Arklay S., Newton Highlands, Mass.
Rosenthal China Corp., New York, N.Y.
Superior Steatite & Ceramic Corp., Englewood, N.J.
3M Co., St. Paul, Minn.
Trans-Tech, Gaithersburg, Md.
Union Carbide, San Diego, Cal.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.

Insulation Materials, Fabric

Carborundum Co., Niagara Falls, N.Y.
Automatic Die Cutting Mach. Co., New York, N.Y.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Chase & Sons, Inc., Randolph, Mass.
Corkpak Co., Inc., New Rochelle, N.Y.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fansteel Inc., N Chicago, Ill.
Fiberite Corp., Winona, Minn.
General Elec., Schenectady, N.Y.
Hecht Rubber Corp., Jacksonville, Fla.
Insulating Fabricators, E. Rutherford, N.J.
Johns-Manville Sls. Corp., New York, N.Y.
Kendall Co., Walpole, Mass.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Leico Inds., Inc., New York, N.Y.
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Permacel, New Brunswick, N.J.
Plymouth Rubber Co., Inc., Canton, Mass.
Port Plastics, Inc., Montebello, Cal.
Press-On Prods., Addison, Ill.
Royal Inds, El Segundo, Calif
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Syncor Prods. Co., Inc., Malden, Mass.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Felt—See Felt

Insulation Materials, Fiber

Carborundum Co., Niagara Falls, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Varflex Corp., Rome, N.Y. ..... p 2813
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Budd Co., Philadelphia, Pa.
Corkpak Co., Inc., New Rochelle, N.Y.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Fansteel Inc., N Chicago, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Fiberite Corp., Winona, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
Hercules, Inc., Wilmington, Dela.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Kendall Co., Walpole, Mass.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norton Co., Worcester, Mass.
Owens-Corning Fiberglas, Toledo, Ohio
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Precision Paper Tube Co., Wheeling, Ill.
Press-On Prods., Addison, Ill.
Resinite Corp. Div., Wheeling , Ill
Rogers Corp., Rogers, Conn.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Syncor Prods. Co., Inc., Malden, Mass.
Synthane Taylor Corp., Valley Forge, Pa.
3M Co., St. Paul, Minn.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Film

Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Arlin Mfg. Co., Inc., Lowell, Mass.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Celanese Plastics Co., Newark, N.J.
Chase & Sons, Inc., Randolph, Mass.
Chemplast, Inc., Wayne, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Dilectrix Corp., Farmingdale, N.Y.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Emerson & Cuming, Inc., Canton, Mass.
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Gore, W.L. & Assocs., Inc., Newark, Del.
Hercules, Inc., Wilmington, Dela.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Metallized Prods., Norwalk, Conn.
Morgan Adhesives Co., Stow, Ohio
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Permaluster, Inc., Burbank, Calif.
Plastic Assocs., Inc., Inwood, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Press-On Prods., Addison, Ill.
Resin Formulators Co., Culver City, Cal.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Schjeldahl, G.T. Co., Northfield, Minn.
Schweitzer, Peter J. Div., Lee, Mass.
Shamban, W.S. & Co., Los Angeles, Calif.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Foam

Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Ablestik Adhesive Div., Gardena, Calif.
Air-O-Plastik Corp., Carlstadt, N.J.
Allaco Prods., Braintree, Mass.
Armstrong Cork Co., Lancaster, Pa.
Auburn Mfg. Co., Middletown, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Conap, Inc., Allegany, N.Y.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Dow Chemical Co., Midland, Mich.
Emerson & Cuming, Inc., Canton, Mass.
Epoxylite Corp., S. El Monte, Calif.
Fansteel Inc., N Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Furane Plastics, Los Angeles, Cal.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hecht Rubber Corp., Jacksonville, Fla.
Insulating Shapes, Inc., Bronx, N.Y.
Press-On Prods., Addison, Ill.
Reichhold Chemicals, Inc., White Plains, N.Y.
Resin Formulators Co., Culver City, Cal.
Siemens Corp., Measuring Instrs. Div., Iselin, N.J.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.
Uniroyal, Inc., New York, N.Y.
United Mineral & Chem. Corp., New York, N.Y.

Insulation Materials, Glass Bonded Mica

Columbia Tech., Woodside, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Acim Paper Co., New Hyde Park, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Electro-Science Labs., Philadelphia, Pa.
General Elec., Schenectady, N.Y.
Haskon, Inc., Taunton, Mass.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Lundy Elctrns. & Sys., Inc., Glen Head, N.Y.
McMillan Radiation Labs, Inc., Ipswich, Mass.
Mica Fabricating Co., Rochelle Park, N.J.
Molecular Dielectrics, Inc., Ledgewood, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Quartz & Silice, Paris 8e, France
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Glass-Fiber Impregnated

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Varflex Corp., Rome, N.Y. ..... p 2813
Vector Elctrn. Co., Inc., Sylmar, Cal.
Acme Chemical & Insulation Co., New Haven, Conn.
Atlas Fibre Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Baer, N.S. Co., Hillside, N.J.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Chase & Sons, Inc., Randolph, Mass.
Connecticut Hard Rubber Co., New Haven, Conn.
Cottrell Paper Co., Inc., Fall River, Mass.
Custom Materials, Inc., Chelmsford, Mass.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Fansteel Inc., N Chicago, Ill.
Fiberite Corp., Winona, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
Glastic Corp., Cleveland, Ohio
Haysite Div., Erie, Pa.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Mica Corp., Culver City, Calif.
Natvar Corp., Rahway, N.J.
Norplex Div. UOP, LaCrosse, Wisc.
NVF Co., Yorklyn, Del.
Penn Fibre & Specialty, Phila., Pa.
Permacel, New Brunswick, N.J.
Plymouth Rubber Co., Inc., Canton, Mass.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Stevens Prods., Inc., E. Orange, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Mica (Natural & Synthetic)

Columbia Tech., Woodside, N.Y.
Perfection Mica Co., Bensenville, Ill. p 2764,2765
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Acim Paper Co., New Hyde Park, N.Y.
Asheville-Schoonmaker Mica, Newport News, Va.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Cleveland Mica Co., Lakewood, Ohio
Delbert Blinn. Co., Pomona, Calif.
Ford Radio & Mica Corp., Brooklyn, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Lundy Elctrns. & Sys., Inc., Glen Head, N.Y.
Mackay, A.D., Inc., New York, N.Y.
McMillan Radiation Labs, Inc., Ipswich, Mass.
Mica Fabricating Co., Rochelle Park, N.J.
Micacraft Prods., Newark, N.J.
Molecular Dielectrics, Inc., Ledgewood, N.J.
Morey Corp, Downers Grove, Ill.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Synthane Taylor Corp., Valley Forge, Pa.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Mylar

Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Cadilac Plastics & Chems., Detroit, Mich.
Celanese Plastics Co., Newark, N.J.
Chase & Sons, Inc., Randolph, Mass.
Comco Plastics, Inc., Richmond Hill, N.Y.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Gore, W.L. & Assocs., Inc., Newark, Del.
Inmanco, Inc., Chicago, Ill.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Metallized Prods., Norwalk, Conn.
Morgan Adhesives Co., Stow, Ohio
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Press-On Prods., Addison, Ill.
Resinite Corp. Div., Wheeling , Ill

Royal Inds, El Segundo, Calif
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Synthane Taylor Corp., Valley Forge, Pa.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Nylon

Bivar, Inc., Santa Ana, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Auburn Mfg. Co., Middletown, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Budd Co., Philadelphia, Pa.
Celanese Plastics Co., Newark, N.J.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Chemplast, Inc., Wayne, N.J.
Comco Plastics, Inc., Richmond Hill, N.Y.
Dura Plastics N.Y., Inc., Westport, Conn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Ico/Rally, Palo Alto, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norplex Div. UOP, LaCrosse, Wisc.
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Royal Inds, El Segundo, Calif
Schenectady Chems., Schenectady, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Paper

Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Acme Chemical & Insulation Co., New Haven, Conn.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Brown-Bridge Mills, Inc., Troy, Ohio
Buckeye Bobbin Div., Westlake, Ohio
Chase & Sons, Inc., Randolph, Mass.
Corkpak Co., Inc., New Rochelle, N.Y.
Cottrell Paper Co., Inc., Fall River, Mass.
Dennison Mfg., Framingham, Mass.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Metallized Prods., Norwalk, Conn.
Mosinee Paper Corp., Mosinee, Wisc.
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Rogers Corp., Rogers, Conn.
Schweitzer, Peter J. Div., Lee, Mass.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Phenolic

Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Atlas Fibre Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Baer, N.S. Co., Hillside, N.J.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Comco Plastics, Inc., Richmond Hill, N.Y.
Cottrell Paper Co., Inc., Fall River, Mass.
Edal Inds., Inc., E. Haven, Conn.
Electrical Insulation Co., Inc., Copiague, N.Y.
Epoxy Plastic Molders, Irvington, N J
Fansteel Inc., N Chicago, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Fiberite Corp., Winona, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Coshocton, Ohio
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Jodee Plastics, Inc., Brooklyn, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norplex Div. UOP, LaCrosse, Wisc.
NVF Co., Yorklyn, Del.
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Port Plastics, Inc., Montebello, Cal.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Precision Paper Tube Co., Wheeling, Ill.
Reichhold Chemicals, Inc., White Plains, N.Y.
Resinite Corp. Div., Wheeling , Ill
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Schenectady Chems., Schenectady, N.Y.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Vernay Labs., Yellow Springs, Ohio
Westinghouse Elec., W. Mifflin, Pa.

Insulation Materials, Plastic (Misc.)

Columbia Tech., Woodside, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Severna Operation, East Orange, N.J.
Varflex Corp., Rome, N.Y.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abesto Corp., Bloomfield, N.J.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Plastics Co Inc., Long Island City, N. Y.
Arlin Mfg. Co., Inc., Lowell, Mass.
Atlas Fibre Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Bacon Inds., Watertown, Mass.
Baer, N.S. Co., Hillside, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Boonton Molding Co., Inc., Boonton, N.J.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Budd Co., Philadelphia, Pa.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Celanese Plastics Co., Newark, N.J.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Chemical Prods. Corp., E. Providence, R.I.
Chemplast, Inc., Wayne, N.J.
Comco Plastics, Inc., Richmond Hill, N.Y.
Conap, Inc., Allegany, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Delbert Blinn. Co., Pomona, Calif.
Dielectric Materials Co., Chicago, Ill.
Dilectrix Corp., Farmingdale, N.Y.
Dow Chemical Co., Midland, Mich.
Dura Plastics N.Y., Inc., Westport, Conn.
Dynaloy, Inc., Hanover, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Epoxy Plastic Molders, Irvington, N J
Fansteel Inc., N Chicago, Ill.
Fiberite Corp., Winona, Minn.
Franklin Fibre-Lamitex, Wilmington, Del.
Furane Plastics, Los Angeles, Cal.
General Elec., Schenectady, N.Y.
General Elec., Coshocton, Ohio
General Elec. Co., Waterford, N.Y.
Glastic Corp., Cleveland, Ohio
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Gore, W.L. & Assocs., Inc., Newark, Del.
Hardman Inc., Belleville, N.J.
Haysite Div., Erie, Pa.
Hercules, Inc., Wilmington, Dela.
Hysol Div., Olean, N.Y.
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Isochem Resins Co., Lincoln, R.I.
Jodee Plastics, Inc., Brooklyn, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
Modern Ind'l. Plastics, Dayton, Ohio
National Beryllia Corp., Haskell, N.J.
Natvar Corp., Rahway, N.J.
Norplex Div. UOP, LaCrosse, Wisc.
Nyltite Corp. America, S. Plainfield, N.J.
Owens-Corning Fiberglas, Toledo, Ohio
Packaged Resins Co., Braintree, Mass.
Penn Fibre & Specialty, Phila., Pa.
Plasmadyne, Santa Ana, Calif.
Plastic Assocs., Inc., Inwood, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Press-On Prods., Addison, Ill.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Reichhold Chemicals, Inc., White Plains, N.Y.
Resdel Corp., Rio Grande, N.J.
Resin Formulators Co., Culver City, Cal.
Resinite Corp. Div., Wheeling , Ill
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Schjeldahl, G.T. Co., Northfield, Minn.
Schweitzer, Peter J. Div., Lee, Mass.
Shamban, W.S. & Co., Los Angeles, Calif.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Tra-Con, Inc., Medford, Mass.
Tri-Point Inds., Inc., Commack, N.Y.
Union Carbide, Chemicals & Plastics, New York, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Vernay Labs., Yellow Springs, Ohio
Western Coating Co., Royal Oak, Mich.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Polyethylene

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Smith, Herman H., Inc., Bklyn., N.Y.
Abesto Corp., Bloomfield, N.J.
Air-O-Plastik Corp., Carlstadt, N.J.
Anchor Plastics Co Inc., Long Island City, N. Y.
Arlin Mfg. Co., Inc., Lowell, Mass.
Auburn Mfg. Co., Middletown, Conn.
Boonton Molding Co., Inc., Boonton, N.J.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Burlington Opers. Div., Burlington, Mass.
Celanese Plastics Co., Newark, N.J.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Custom Materials, Inc., Chelmsford, Mass.
Dielectric Materials Co., Chicago, Ill.
Dow Chemical Co., Midland, Mich.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Emerson & Cuming, Inc., Canton, Mass.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hecht Rubber Corp., Jacksonville, Fla.
Hercules, Inc., Wilmington, Dela.
Ico/Rally, Palo Alto, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Isochem Resins Co., Lincoln, R.I.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Fibre & Specialty, Phila., Pa.
Plasmadyne, Santa Ana, Calif.
Plastic Assocs., Inc., Inwood, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Port Plastics, Inc., Montebello, Cal.
Press-On Prods., Addison, Ill.
Royal Inds, El Segundo, Calif
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Union Carbide, Chemicals & Plastics, New York, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials , Polystyrene

Anchor Plastics Co Inc., Long Island City, N. Y.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Brand-Rex Co., Willimantic, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Central Plastics Dists., Chicago, Ill.
Custom Materials, Inc., Chelmsford, Mass.
Dow Chemical Co., Midland, Mich.
Emerson & Cuming, Inc., Canton, Mass.
Franklin Fibre-Lamitex, Wilmington, Del.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Natvar Corp., Rahway, N.J.
Port Plastics, Inc., Montebello, Cal.
Richardson Co., Des Plaines, Ill.
Union Carbide, Chemicals & Plastics, New York, N.Y.

Insulation Materials, Powdered Metal Oxide

Carborundum Co., Niagara Falls, N.Y.
Jonard Inds. Corp., Bronx, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Brush Beryllium Co., Cleveland, Ohio
Ceramic Magnetics, Inc., Fairfield, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Electro-Science Labs., Philadelphia, Pa.
Fansteel Inc., N Chicago, Ill.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Michigan Chemical Corp., Chicago, Ill.
Norton Co., Worcester, Mass.

Plasmadyne, Santa Ana, Calif.
Quartzite Processing, Inc., Malden, Mass.
Reynolds Metals Co., Richmond, Va.
Steward, D.M. Mfg., Chattanooga, Tenn.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Zirconium Corp. of Amer., Solon, Ohio

Insulation Materials, Rubber (All Types)

EBY, Hugh H. Co., Phila., Pa.
Abesto Corp., Bloomfield, N.J.
Adhesive Prods. Corp., Bronx, N.Y.
Air-O-Plastik Corp., Carlstadt, N.J.
Auburn Mfg. Co., Middletown, Conn.
Bacon Inds., Watertown, Mass.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Budd Co., Philadelphia, Pa.
Chase & Sons, Inc., Randolph, Mass.
Connecticut Hard Rubber Co., New Haven, Conn.
Corkpak Co., Inc., New Rochelle, N.Y.
Darling, R.E. Co., Inc., Tucson, Ariz.
Dow Corning Corp., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
Fel-Pro Inc., Skokie, Ill.
General Elec., Schenectady, N.Y.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Hysol Div., Olean, N.Y.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Insulating Fabricators, E. Rutherford, N.J.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
National Beryllia Corp., Haskell, N.J.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Pelmor Labs., Inc., Newtown, Pa.
Plymouth Rubber Co., Inc., Canton, Mass.
Press-On Prods., Addison, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Uniroyal, Inc., New York, N.Y.

Insulation Materials, Steatite
—See Insulation Parts, Ceramic

Insulation Materials, TFE

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Markel, L. Frank & Sons, Norristown, Pa.
Severna Operation, East Orange, N.J.
Abesto Corp., Bloomfield, N.J.
Atlas Fibre Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Chemelec Prods., Inc., Cherry Hill, N.J.
Chemplast, Inc., Wayne, N.J.
Comco Plastics, Inc., Richmond Hill, N.Y.
Connecticut Hard Rubber Co., New Haven, Conn.
Crane Packing Co., Morton Grove, Ill.
Custom Materials, Inc., Chelmsford, Mass.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Emerson & Cuming, Inc., Canton, Mass.
Fluoro Plastics, Phila., Pa.
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
Gore, W.L. & Assocs., Inc., Newark, Del.
Hecht Rubber Corp., Jacksonville, Fla.
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Isochem Resins Co., Lincoln, R.I.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
Modern Ind'l. Plastics, Dayton, Ohio
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Fibre & Specialty, Phila., Pa.
Pennwalt Corp., Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Sparta Mfg. Co., Dover, Ohio
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Synthane Taylor Corp., Valley Forge, Pa.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Insulation Materials, Vinyl

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Varflex Corp., Rome, N.Y. ..... p 2813
Abesto Corp., Bloomfield, N.J.
Air-O-Plastik Corp., Carlstadt, N.J.
Anchor Plastics Co Inc., Long Island City, N. Y.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Chemical Prods. Corp., E. Providence, R.I.
Dielectric Materials Co., Chicago, Ill.
Electrical Insulation Co., Inc., Copiague, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Port Plastics, Inc., Montebello, Cal.
Press-On Prods., Addison, Ill.
Royal Inds, El Segundo, Calif
3M Co., St. Paul, Minn.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Uniroyal, Inc., New York, N.Y.
Whitaker Cable Corp., N. Kansas City, Mo.
Zippertubing Co., Los Angeles, Calif.

Insulation Parts, Ceramic

American Lava Corp., Chattanooga, Tenn. ..... p 2810
Carborundum Co., Niagara Falls, N.Y.
Centralab, Elctrns., Milwaukee, Wisc.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Erie Technological Prods. (EEM), Erie, Pa.
General Elec., Richmond Hgts., Ohio p 2811
Radio Materials Co., Chicago, Ill.
Smith, Herman H., Inc., Bklyn., N.Y.
Akron Porcelain Co., Akron, Ohio
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atlas Fibre Co., Chicago, Ill.
Basic Ceramics Inc., Hawthorne, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Brush Beryllium Co., Cleveland, Ohio
Ceram Corp., La Mesa, Calif.
Ceramic Magnetics, Inc., Fairfield, N.J.
Cermetron Corp., San Diego, Cal.
Commander Labs., Inc., Escondido, Calif.
Consolidated Ceramics & Metalizing, Flemington, N.J.
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Device Seals, Inc., Sun Valley, Calif.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Du-Co Ceramics Co., Saxonburg, Pa.
Duramic Prods., Inc., Palisades Park, N.J.
Dynaloy, Inc., Hanover, N.J.
E.B.L. Co, East Hartford, Conn.
Edo Western Corp., Salt Lake City, Utah
Eimac, San Carlos, Calif.
Elecpac Inc., Cary, Ill.
Electrical Refractories Co., E. Palestine, Ohio
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Fansteel Inc., N Chicago, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
General Elec., Baltimore, Md.
Haskon, Inc., Taunton, Mass.
Insaco, Inc., Quakertown, Pa.
Int'l. Elctrn. Resch., Burbank, Cal.
Isolantite Mfg. Corp., Stirling, N.J.
Jones, A.D. Optical Works, Burlington, Mass.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kirchberger, M & Co., Inc., Englewood, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Latronics Corp., Latrobe, Pa.
Maryland Lava Co., Bel Air, Md.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
National Beryllia Corp., Haskell, N.J.
Nat'l. Ceramic Co., Trenton, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norton Co., Worcester, Mass.
Omega Engrg., Inc., Stamford, Conn.
Palmer Elctrns., Inc., Garfield, N.J.
Pass & Seymour, Inc., Syracuse, N.Y.
Paul, F.H. & Stein Bros., New York, N.Y.
Porcelain Prods. Co., Carey, Ohio
Quartzite Processing, Inc., Malden, Mass.
Raytheon Co., Waltham, Mass.
Richards Arklay S., Newton Highlands, Mass.
Rosenthal China Corp., New York, N.Y.
Star Porcelain Co., Trenton, N.J.
Statham Instrs., Inc., Oxnard, Cal.
Stettner-Trush Inc., Cazenovia, N.Y.
Steward, D.M. Mfg., Chattanooga, Tenn.
Superior Steatite & Ceramic Corp., Englewood, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Thermal Amer. Fused Quartz, Montville, N.J.
Thermalloy Co., Dallas, Tex.
3M Co., St. Paul, Minn.
Trans-Tech, Gaithersburg, Md.
Union Carbide, Carbon Prods. Div., New York, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Veritron West, Inc., Chatsworth, Calif.
Western Gold & Platinum Co., Belmont, Cal.
Zirconium Corp. of Amer., Solon, Ohio

Insulation Parts, Glass

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
General Elec., Richmond Hgts., Ohio p 2811
Johnson E. F. Co., Waseca, Minn.
Atlantic Optical Moulding Co., Dudley, Mass.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Device Seals, Inc., Sun Valley, Calif.
Dynaloy, Inc., Hanover, N.J.
E.B.L. Co, East Hartford, Conn.
Elecpac Inc., Cary, Ill.
Electro-Science Labs., Philadelphia, Pa.
Esco Products, Oak Ridge, NJ
Fansteel Inc., N Chicago, Ill.
Garner Glass Co., Claremont, Calif.
Glass Beads Co., Latrobe, Pa.
Isotronics, Inc., New Bedford, Mass.
Jones, A.D. Optical Works, Burlington, Mass.
Kopp Glass, Inc., Pittsburgh, Pa.
Latronics Corp., Latrobe, Pa.
Richland Glass Co., Inc., Richland, N.J.
S & S Optical Co., Inc., Ft. Wayne, Ind.
Statham Instrs., Inc., Oxnard, Cal.
Syncor Prods. Co., Inc., Malden, Mass.
3M Co., St. Paul, Minn.
Veritron West, Inc., Chatsworth, Calif.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Insulation Parts, Glass Bonded Mica

Esco Products, Oak Ridge, NJ
Fansteel Inc., N Chicago, Ill.
Molecular Dielectrics, Inc., Ledgewood, N.J.
Quartz & Silice, Paris 8e, France
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Synthane Taylor Corp., Valley Forge, Pa.

Insulation Parts, Glass Fiber

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Atlas Fibre Co., Chicago, Ill.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Chem Aero, Inc., Wilmington, Cal.
Glastic Corp., Cleveland, Ohio
NVF Co., Yorklyn, Del.
Rostone Corp., Lafayette, Ind.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.

Insulation Parts, Insulating Sleeves
—See Tubing

Insulation Parts, Mica (Natural & Synthetic)

Columbia Tech., Woodside, N.Y.
Perfection Mica Co., Bensenville, Ill. p 2003,2764,2765
Abesto Corp., Bloomfield, N.J.
Acim Paper Co., New Hyde Park, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Asheville-Schoonmaker Mica, Newport News, Va.
Auburn Mfg. Co., Middletown, Conn.
Brand Dielectrics, Inc., N. Windham, Conn.
Bussco Engrg., El Segundo, Cal.
Cleveland Mica Co., Lakewood, Ohio
Delbert Blinn. Co., Pomona, Calif.
General Elec., Schenectady, N.Y.
Inmanco, Inc., Chicago, Ill.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Mica Fabricating Co., Rochelle Park, N.J.
Micacraft Prods., Newark, N.J.
Molecular Dielectrics, Inc., Ledgewood, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Seastrom Mfg. Co. Inc., Glendale, Cal.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.

Insulation Parts, Paper

Abesto Corp., Bloomfield, N.J.
Auburn Mfg. Co., Middletown, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Electrical Insulation Co., Inc., Copiague, N.Y.
Fel-Pro Inc., Skokie, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Inmanco, Inc., Chicago, Ill.

Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Mosinee Paper Corp., Mosinee, Wisc.
Natvar Corp., Rahway, N.J.
Penn Fibre & Specialty, Phila., Pa.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Seastrom Mfg. Co. Inc., Glendale, Cal.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Tapecon, Inc., Rochester, N.Y.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Westinghouse Elec., W. Mifflin, Pa.

Insulation Parts, Plastic

Berg Elctrns., Inc., New Cumberland, Pa.
Chicago Switch, Chicago, Ill.
Concord Elctrns., New York, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Grayhill, Inc., LaGrange, Ill. ..... p 1915
Jones Hiram Elctrns., No. Hollywood, Cal.
Markel, L. Frank & Sons, Norristown, Pa.
Severna Operation, East Orange, N.J.
Abesto Corp., Bloomfield, N.J.
Accurate Elctrns. Corp., Elyria, Ohio
Adhesive Prods. Corp., Bronx, N.Y.
Akron Porcelain Co., Akron, Ohio
Albany Int'l. Corp., Albany, NY
Anchor Plastics Co Inc., Long Island City, N. Y.
Arlin Mfg. Co., Inc., Lowell, Mass.
Atlas Fibre Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Baer, N.S. Co., Hillside, N.J.
Boonton Molding Co., Inc., Boonton, N.J.
Brandywine Fibre Prods. Co., Wilmington, Del.
Buckeye Bobbin Div., Westlake, Ohio
Budd Co., Philadelphia, Pa.
Celestial Comps., Inc., Covina, Cal.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Clover Inds. Div., Tonawanda, N.Y.
Comco Plastics, Inc., Richmond Hill, N.Y.
Conap, Inc., Allegany, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
D-Cemco, Inc., Burbank, Calif.
Delta Plastics Co., Bellmawr, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
Dynaloy, Inc., Hanover, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Emerson & Cuming, Inc., Canton, Mass.
Engineered Plastics, Inc., Gibsonville, N.C.
Epoxy Plastic Molders, Irvington, N J
Fluoro Plastics, Phila., Pa.
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Baltimore, Md.
Glastic Corp., Cleveland, Ohio
Grayhill Moldtronics, Inc., Downers Grove, Ill.
Gries Reproducer Co., New Rochelle, N.Y.
Haskon, Inc., Taunton, Mass.
Haysite Div., Erie, Pa.
Heyman Mfg. Co., Kenilworth, N.J.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Inmanco, Inc., Chicago, Ill.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Isochem Resins Co., Lincoln, R.I.
Jodee Plastics, Inc., Brooklyn, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Maryland Lava Co., Bel Air, Md.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norplex Div. UOP, LaCrosse, Wisc.
NY-Glass Plastics, Paramount, Calif.
Nylogrip Prods. Co., Waltham, Mass.
Nylomatic Corp., Morrisville, Pa.
Nyltite Corp. America, S. Plainfield, N.J.
Penn Fibre & Specialty, Phila., Pa.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Precision Paper Tube Co., Wheeling, Ill.
Pylon Co., Inc., Attleboro, Mass.
Red Seal Elec. Co., Cleveland, Ohio
Resdel Corp., Rio Grande, N.J.
Resinite Corp. Div., Wheeling , Ill
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Seastrom Mfg. Co. Inc., Glendale, Cal.
Shamban, W.S. & Co., Los Angeles, Calif.
Sparta Mfg. Co., Dover, Ohio
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Stevens Prods., Inc., E. Orange, N.J.
Tapecon, Inc., Rochester, N.Y.
Tekna Prods. Co., Rochester, N.Y.
Teledyne Mecca, Houston, Tex.
Thermalloy Co., Dallas, Tex.
Thiokol Chemical Div., Trenton, N.J.
Tri-Point Inds., Inc., Commack, N.Y.
Viz Mfg. Co., Philadelphia, Pa.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Parts, Quartz

General Elec., Richmond Hgts., Ohio p 2811
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Auburn Mfg. Co., Middletown, Conn.
Basic Ceramics Inc., Hawthorne, N.J.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Dell Optics Co., Inc., N. Bergen, N.J.
E.B.L. Co, East Hartford, Conn.
Eimac, San Carlos, Calif.
Emerson & Cuming, Inc., Canton, Mass.
Fansteel Inc., N Chicago, Ill.
Garner Glass Co., Claremont, Calif.
Insaco, Inc., Quakertown, Pa.
Jones, A.D. Optical Works, Burlington, Mass.
Quartz & Silice, Paris 8e, France
Quartzite Processing, Inc., Malden, Mass.
Richland Glass Co., Inc., Richland, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Thermal Amer. Fused Quartz, Montville, N.J.
Voltronics Corp., Hanover, N.J.
Wilmad Glass Co., Inc., Buena, N.J.

Insulation Parts, Sapphire

Alberox Corp., New Bedford, Mass.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramic Magnetics, Inc., Fairfield, N.J.
Dell Optics Co., Inc., N. Bergen, N.J.
Eimac, San Carlos, Calif.
Insaco, Inc., Quakertown, Pa.
Jones, A.D. Optical Works, Burlington, Mass.
Moser Jewel Co., Perth Amboy, N.J.
Quartzite Processing, Inc., Malden, Mass.
Syncor Prods. Co., Inc., Malden, Mass.
Union Carbide, San Diego, Cal.

Insulation Parts, Silicone Rubber

Markel, L. Frank & Sons, Norristown, Pa.
Rowe Inds., Div., Toledo, Ohio
Varflex Corp., Rome, N.Y.
Abesto Corp., Bloomfield, N.J.
Accurate Elctrns. Corp., Elyria, Ohio
Auburn Mfg. Co., Middletown, Conn.
Avionics, Inc., South Bend, Ind.
Bacon Inds., Watertown, Mass.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Brand Dielectrics, Inc., N. Windham, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Cam-Lok Div., Cincinnati, Ohio
Custom Materials, Inc., Chelmsford, Mass.
Darling, R.E. Co., Inc., Tucson, Ariz.
Dow Corning Corp., Midland, Mich.
Emerson & Cuming, Inc., Canton, Mass.
Fansteel Inc., N Chicago, Ill.
Fel-Pro Inc., Skokie, Ill.
General Elec. Co., Waterford, N.Y.
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hardman Inc., Belleville, N.J.
Haskon, Inc., Taunton, Mass.
Hecht Rubber Corp., Jacksonville, Fla.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Inmanco, Inc., Chicago, Ill.
Isochem Resins Co., Lincoln, R.I.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
Natvar Corp., Rahway, N.J.
Pelmor Labs., Inc., Newtown, Pa.
Press-On Prods., Addison, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Rogers Corp., Rogers, Conn.
Rosenthal China Corp., New York, N.Y.
Seastrom Mfg. Co. Inc., Glendale, Cal.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Stevens Prods., Inc., E. Orange, N.J.
Teledyne Mecca, Houston, Tex.
3M Co., St. Paul, Minn.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Insulation Parts, Steatite—

See Insulation Parts, Ceramic

Insulators—

See Insulation Parts; Insulators

Insulators, Antenna & Spring Assemblies

American Lava Corp., Chattanooga, Tenn.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Johnson E. F. Co., Waseca, Minn.
Saxton Prods., Congers, N.Y.
Severna Operation, East Orange, N.J.
Accurate Elctrns. Corp., Elyria, Ohio
Basic Ceramics Inc., Hawthorne, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Franklin Fibre-Lamitex, Wilmington, Del.
Isolantite Mfg. Corp., Stirling, N.J.
Jodee Plastics, Inc., Brooklyn, N.Y.
Kidco, Inc., Medford, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Maryland Lava Co., Bel Air, Md.
Modern Ind'l. Plastics, Dayton, Ohio
Nat'l. Ceramic Co., Trenton, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Phelps Dodge Comm., North Haven, Conn.
Porcelain Prods. Co., Carey, Ohio
Rohn Mfg. Co., Peoria, Ill.
S & A Elctrns., Inc., Toledo, Ohio

Insulators, Antenna Tower—

See Insulators, Antenna

Insulators, Bushing (Metallized)—

See Bushings —Vol 2

Insulators, Test & Battery Clip

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Mueller Elec. Co., Cleveland, Ohio p 2649
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Birnbach Co., Inc., Freeport, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Modern Ind'l. Plastics, Dayton, Ohio
Philmore Mfg. Co., Richmond Hill, N.Y.
Whitaker Cable Corp., N. Kansas City, Mo.

Integrated Circuit Packaging Systems—

See Vol 2

Integrated Circuits—

See Circuits, Integrated—Vol 2

Integrators, Electro-Mechanical—

See Vol 1

Integrators, Electronic—

See Vol 1

Integrators, Mechanical—

See Vol 1

Integrators, Optical—

See Vol 1

Intensifiers, Image—

See Vol 2

Intercommunication Systems (Industrial)—

See Vol 1

Interferometer Systems—

See Vol 1

Interlocks—

See Connectors, Interlock

Intermodulation Analyzers—

See Analyzers, Intermodulation—Vol 1

Interrogator Equipment—

See Receivers; Transmitters; etc. —Vol 1

Intervalometers—

See Timers —Vol 2

Inverters, D-C To A-C, D-C To D-C—

See Vol 1

Ion Traps—

See Vol 1

Ionization Chambers—

See Chambers, Ionization—Vol 1

Irons, Soldering—

See Soldering Irons

Isolators, D-C Signal—

See Vol 1

Isolators, Line—

See Vol 1

Isolators, Microwave (All Types)—

See Vol 2

Isotopes, Radioactive—

See Sources, Radioactive—Vol 1

Jack Adapters (All Types)

Bendix, Franklin, Ind.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
GC Elctrns., Rockford, Ill. ..... p 2629
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2654,2657-2660,2663,2667,2668,2671
Rye Inds., Inc., Mamaroneck, N.Y. p 2708
Sealectro Corp., Mamaroneck, N.Y. p 2709
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Trimm, Inc., Libertyville, Ill. ..... p 2718
Trompeter Elctrns., Chatsworth, Cal. p 2719
Vector Elctrn. Co., Inc., Sylmar, Cal. p 2722
Accurate Elctrns. Corp., Elyria, Ohio
Americon Corp., Waltham, Mass.
Astrolab Inc., Linden, N J
Barker Prods. Co., Saugus, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Cam-Lok Div., Cincinnati, Ohio
EV/Game, Inc., Freeport, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
MI-KRO Connector Div., Long Island City, N.Y.
Multi Media Engrg., Inc., Rockville, Md.
Philmore Mfg. Co., Richmond Hill, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Staffall, Inc., Providence, R.I.
Switchcraft, Inc., Chicago, Ill.
Tru-Connector Corp., Peabody, Mass.
Whistler Elctrns., Inc., Northridge, Cal.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Jack Covers

Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Virginia Panel Corp., Waynesboro, Va.
Astrolab Inc., Linden, N J.
Cam-Lok Div., Cincinnati, Ohio
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
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Cooke Engrg. Co., Alexandria, Va.
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Staffall, Inc., Providence, R.I.
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Daburn Elctrns. & Cable Corp., Bronx, N.Y.
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Norelcom Inds., Inc., Farmingdale, N.Y.
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Conap, Inc., Allegany, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Hardman Inc., Belleville, N.J.
Hysol Div., Olean, N.Y.
Isochem Resins Co., Lincoln, R.I.
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Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Hoffman Engrg. Co., Anoka, Minn.
Hollingsworth Solderless Terminal, Phoenixville, Pa.
Hughes Aircraft Co, Culver City, Cal.
Ico/Rally, Palo Alto, Cal.
Keystone Elctrns. Corp., New York, N.Y.
Magnum Elec. Corp., Erie, Mich.
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Vector Elctrn. Co., Inc., Sylmar, Cal.
A C Electronics Co., Santa Monica, Cal.
Allied Elctrns. Corp., Chicago, Ill.
ATV Research, Dakota City, Neb.
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Broadview Inds. Corp., Hempstead, N.Y.
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General Elctrn. Labs., Boston, Mass.
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Magnetics Sys. & Instrs., Worcester, Mass.
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Klein, Mathias & Sons, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
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Uber Grafic Instrs., Palo Alto, Calif.
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Best Mfg. Co., Kansas City, Mo.
Bishop Graphics, No. Hollywood, Cal.
Brady, W.H. Co., Milwaukee, Wisc.
By-Buk Co., Los Angeles, Calif.
Canrad Precision Inds., Inc., Pelham, N.Y.
Cryptographics, Inc., New York, N.Y.
Decalcraft, Hatfield, Pa.
Dennison Mfg., Framingham, Mass.

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Ever Ready Label Corp., Belleville, N.J.
GM Nameplate, Inc., Seattle, Wash.
Graphtex Inc., Lodi, NJ
Hermes Plastics, Inc., New York, N.Y.
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Manger Elec. Co., Inc., Stamford, Conn.
Master Tape Printers, Inc., Chicago, Ill.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Metalcraft, Inc., Mason City, Iowa
Metalphoto Corp., Cleveland, Ohio
Miller Dial, El Monte, Calif.
Monarch Marking Sys., Dayton, Ohio
N/P Co., Temple City, Calif.
Norgus Silk Screen Co., Inc., Clifton, N.J.
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Star Enterprises-Div., Lowell, Mass.
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American Nickeloid Co., Peru, Ill.
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Brand-Rex Co., Willimantic, Conn.
Budd Co., Philadelphia, Pa.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Custom Materials, Inc., Chelmsford, Mass.
Devco Engrg., W. Caldwell, N.J.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Eljay Corp., Columbia, Md.
Fansteel Inc., N Chicago, Ill.
Flexible Circuits, Inc., Warrington, Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Coshocton, Ohio
Improved Laminated Metal Co., Providence, R.I.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Kepro Cir. Sys., Inc., St. Louis, Mo.
Keystone Elctrns. Corp., New York, N.Y.
Laminair, Inc., Los Angeles, Calif.
Laminated Sheet Prods., Millbury, Mass.
Laminated Shim Co., Inc., Glenbrook, Conn.
Long, T.J., Inc., Carle Pl., N.Y.
Met-L-Wood Corp., Chicago, Ill.
Mica Corp., Culver City, Calif.
Molded Plastics Div., Cincinnati, Ohio
Morgan Adhesives Co., Stow, Ohio
Norplex Div. UOP, LaCrosse, Wisc.
NVF Co., Yorklyn, Del.
Penn Fibre & Specialty, Phila., Pa.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Sampson Elctrns. Prods. Div., Chicago, Ill.
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U.S. Polymeric,, Stamford, Conn.
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Baer, N.S. Co., Hillside, N.J.
Best Mfg. Co., Kansas City, Mo.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chase & Sons, Inc., Randolph, Mass.
Comco Plastics, Inc., Richmond Hill, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
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Eljay Corp., Columbia, Md.
Fansteel Inc., N Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Coshocton, Ohio
Glastic Corp., Cleveland, Ohio
Goodyear Aerospace Corp., Akron, Ohio
Haysite Div., Erie, Pa.
Insulating Fabricators, E. Rutherford, N.J.
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Isochem Resins Co., Lincoln, R.I.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
McMillan Radiation Labs, Inc., Ipswich, Mass.
Mica Corp., Culver City, Calif.
Molded Plastics Div., Cincinnati, Ohio
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norplex Div. UOP, LaCrosse, Wisc.
NVF Co., Yorklyn, Del.
Penn Fibre & Specialty, Phila., Pa.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plastic Assocs., Inc., Inwood, N.Y.
Port Plastics, Inc., Montebello, Cal.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Sillcocks-Miller Co., Maplewood, N.J.
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Synthane Taylor Corp., Valley Forge, Pa.
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Dentronics, Inc., Hackensack, N.J.
Hamilton Watch Co., Lancaster, Pa.
Micro Science Assocs., Mt. View, Cal.
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GTE Sylvania Inc., Danvers, Mass.
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Micro Science Assocs., Mt. View, Cal.
MSL Steel Co., Chicago, Ill.
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Tech-Etch, Inc., Hingham, Mass.
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Lectrodyne Sys. Corp., Philadelphia, Pa.
Lynn Elctrns. Corp., Philadelphia, Pa.
Morey Corp, Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Paraplegics Mfg., Bensenville, Ill.
Rowe L. L. Co., Boston, Mass.
Shigoto Inds., Ltd., New York, N.Y.
Varian Assocs., Beverly, Mass.
Varied Ind'l. Prods., Inc., Paterson, N.J.
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Instru-Lec Corp., Mt. Vernon, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
McNally Bros. Mach. & Gear, Mipls., Minn.
National Acme, Cleveland, Ohio
Perfect Gear & Instr. Corp., Northridge, Calif.
PIC Design Corp., Ridgefield,, Conn.
SECS, Inc., Long Island City, N.Y.
Square D Co., Park Ridge, Ill.
Sterling Instr., New Hyde Pk., NY
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Locators, Metal
Addison Div., Mountainside, N.J.
FRL, Inc., Belmont, Cal.
Gardiner Elctrns., Phoenix, Ariz.
General Dynamics, San Diego, Cal.
Indiana Gen'l.-Process Equip., Cudahy, Wisc.
Infinetics, Inc., Wilmington, Del.
Rank Precision Inds., W. Nyack, N.Y.
Sensor Corp., Greenwich, Conn.

Locators, Open-Short—See Vol 1

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GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Allaco Prods., Braintree, Mass.
Atomergic Chemetals, Carle Place, N.Y.
Bendix, Rochester, N.Y.
Borden Chemical Co., Norristown, Pa.
Caig Labs., Inc., Westbury, N.Y.
Cerac, Inc., Butler, Wisc.
Chemplast, Inc., Wayne, N.J.
Chemtronics, Inc., Brooklyn, N.Y.
DoAll Co., Des Plaines, Ill.
Dow Corning Corp., Midland, Mich.
DuBois Chems., Cincinnati, Ohio
Edwards High Vacuum, Grand Island, N.Y.
Elctrn. Chemical Corp., Jersey City, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fluoro Plastics, Phila., Pa.
General Elec. Co., Waterford, N.Y.
Houghton, E.F. & Co., Philadelphia, Pa.
Hughes Aircraft Co, Culver City, Cal.
Humble Oil & Refining Co., Houston, Tex.
Kano Labs., Inc., Nashville, Tenn.
Loctite Corp., Newington, Conn.
LPS Research Labs., Los Angeles, Cal.
MacDonald & Co., Glendale, Calif.
Miller, Harry Corp., Philadelphia, Pa.
Miller-Stephenson Chem. Co., Inc., Danbury, Conn.
Nye, William F., Inc., New Bedford, Mass.
Plasmadyne, Santa Ana, Calif.
Poxylube, Indianapolis, Ind.
Pro-Chem, Inc., Cleveland, Ohio
Ram Chems., Gardena, Calif.
Rawn Co., Inc., Spooner, Wisc.
Richardson Co., Des Plaines, Ill.
Royal Inds, El Segundo, Calif
Shannon Luminous Mat'ls., Hollywood, Cal.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Stevenson-Bro & Co., Inc., Phila., Pa.
Techni-Tool, Inc., Philadelphia, Pa.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

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Luminous Paints—See Paints, Luminous

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Machines, Cutting—See Vol 1

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Machines, Plating—See Vol 1

Machines, Polishing & Buffing
Hacker Instrs., Inc., W. Caldwell, N.J.
Hoffman, P.R. Co. Div., Carlisle, Pa.
Laser Technology, Inc., N. Hollywood, Calif.
LEA Mfg. Co., Waterbury, Conn
Techni-Tool, Inc., Philadelphia, Pa.

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Magnetic Core Testers—See Testers, Magnetic Core—Vol 1

Magnetic Disc Storage Systems—See Vol 1

Magnetic Field Indicators—See Indicators, Magnetic Field—Vol 1

Magnetic Foil—See Foil, Magnetic

Magnetic Iron Oxides
Astro-Science, S. El Monte, Cal.
Ceramic Magnetics, Inc., Fairfield, N.J.
Cities Service Co., New York, N.Y.
Pfizer-Minerals, New York, N.Y.

Magnetic Recording Tape—See Tapes, Recording, Magnetic—Vol 1

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Magnets, Electromagnetic
Ogallala Elctrns., Ogallala, Neb.
Systron-Donner Corp., Concord, Cal. p 565
Systron-Donner Alpha Div., Oakland, Cal. ..... p 565
Systron-Donner Concord Instr. Div., Concord, Cal. ..... p 565
Systron-Donner Kruse Elctrns. Sub., Mountain View, Cal. ..... p 565
Tohoku Metal Inds., Ltd., Tokyo, Japan
Advanced Kinetics, Costa Mesa, Calif.
Annis, R.B. Co., Indianapolis, Ind.
A.P.W. Co., Inc., Rockaway, N.J.
Barger Corp., Sunnyvale, Cal.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Electroid Co., Union, N.J.
High Voltage Engrg. Corp., Burlington, Mass.
Indiana Gen'l.-Process Equip., Cudahy, Wisc.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Permanent Magnet Co., Inc., Indianapolis, Ind.
Process & Instrs. Corp., Brooklyn, N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
Texas Instruments, Dallas, Tex.
Varian Assocs., Palo Alto, Cal.
Varian Assocs., Analytical Instr., Palo Alto, Cal.
Westinghouse Elec., Pittsburgh, Pa.

Magnets, Focusing—See Magnets, Permanent

Magnets (Lab Type)
ISC Magnetics Div., Huntington, N.Y.
RFL Inds., Instr. Div., Boonton, N.J. p 554
Systron-Donner Alpha Div., Oakland, Cal.
Coil Co. of Amer., Northvale, N.J.
Crucible Steel Corp., Pittsburgh, Pa.
Delta Elctrn. Control, Costa Mesa, Cal.
Dura Magnetics, Inc., Sylvania, Ohio
Ealing Corp., Cambridge, Mass.
General Hardware Mfg. Co., New York, N.Y.
High Voltage Engrg. Corp., Burlington, Mass.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Maryland Magnet Co., Randallstown, Md.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Varian Assocs., Palo Alto, Cal.
Varian Assocs., Analytical Instr., Palo Alto, Cal.

Magnets, Permanent
Allen-Bradley Co., Milwaukee, Wisc.
Arnold Engrg. Co., Marengo, Ill.p 2754,2755
Bell, F.W., Inc., Columbus, Ohio
Engelhard Minerals & Chem., Murray Hill, N.J.
Ferronics, Inc., Fairport, N.Y. ..... p 2757
General Elec. Co., Schenectady, N.Y. p 2758
Ogallala Elctrns., Ogallala, Neb. p 2754,2755
Tohoku Metal Inds., Ltd., Tokyo, Japan
Barger Corp., Sunnyvale, Cal.
Barker Elec. Sls., Ship Bottom, NJ
Bunting Magnetics Co., Franklin Park, Ill.
Ceramic Magnetics, Inc., Fairfield, N.J.
Commander Labs., Inc., Escondido, Calif.
Crucible Steel Corp., Pittsburgh, Pa.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Dura Magnetics, Inc., Sylvania, Ohio
Ealing Corp., Cambridge, Mass.
Edmund Scientific Co., Barrington, N.J.
General Hardware Mfg. Co., New York, N.Y.
General Sci. Equip., Phila., Pa.
Hamilton Watch Co., Lancaster, Pa.
Indiana Gen'l.-Process Equip., Cudahy, Wisc.
Magnetic Core Corp., Newburgh, N.Y.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Magno-Ceram Co., S. Plainfield, N.J.
Maryland Magnet Co., Randallstown, Md.
McClintock Matrixes, Inc., Woodbury, Conn.
Moody Machine Prods. Co., Inc., Providence, R.I.
Mullard, Inc., Farmingdale, N.Y.
National Moldite, Newark, N.J.
Permag Corp., Jamaica, N.Y.
Permanent Magnet Co., Inc., Indianapolis, Ind.
Plessey Elctrns. Corp., Farmingdale, N.Y.
R-Columbia Prods., Inc., Highland Park, Ill.
Reed Switch Dev., Greenwich, Conn.
Sel-Rex Corp., Nutley, N.J.
Shigoto Inds., Ltd., New York, N.Y.
Stackpole Carbon Co., Magnet Div., Kane, Pa.
Steward, D.M. Mfg., Chattanooga, Tenn.
TDK Elctrns. Corp., Long Island City, N.Y.
Thomas & Skinner, Inc., Indianapolis, Ind.
3M Co., St. Paul, Minn.
3M Co., Cincinnati, Ohio
Trico Fuse Mfg. Co., Milwaukee, Wisc.
Varian Assocs., Palo Alto, Cal.

Magnets, Superconducting
Advanced Kinetics, Costa Mesa, Calif.
American Magnetics, Oak Ridge, Tenn.
Andonian Assocs., Inc., Waltham, Mass.
Barger Corp., Sunnyvale, Cal.
Crucible Steel Corp., Pittsburgh, Pa.
Gardner Cryogenics Corp., Bethlehem, Pa.
General Elec. Co., W. Lynn, Mass.
Magnetic Sys. & Instrs., Worcester, Mass.
Magnetics Sys. & Instrs., Worcester, Mass.
Oxford Instr. Corp., Annapolis, Md.
Rol-a-chart Div., Somerset, Cal.
Varian Assocs., Palo Alto, Cal.
Westinghouse Elec., Pittsburgh, Pa.

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Materials, Acoustic, Sound-Absorbing
Acoustone Corp., Brooklyn, N.Y.
Air-O-Plastik Corp., Carlstadt, N.J.
AMBAC Inds., Garden City, N.Y.
American Smelting & Refining Co., New York, N.Y.
Barry Controls, Watertown, Mass.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Division Lead Co., Summit, Ill.
GAF Corp., New York, N.Y.
Hardman Inc., Belleville, N.J.
Hartley Prods. Corp., Hohokus, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Johns-Manville Sls. Corp., New York, N.Y.
Lord Mfg. Co., Erie, Pa.
Owens-Corning Fiberglas, Toledo, Ohio
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Ray Proof Corp., Norwalk, Conn.
3M Co., St. Paul, Minn.
Whittaker Corp., Los Angeles, Cal.

Materials, Conductive Plastic
Computer Instrs., Hempstead, N.Y.
New England Instr., Natick, Mass.
Amicon Corp., Lexington, Mass.
Applied Plastics Co., El Segundo, Cal.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Bacon Inds., Watertown, Mass.
Burlington Opers. Div., Burlington, Mass.
Chase & Sons, Inc., Randolph, Mass.
Chomerics, Inc., Woburn, Mass.
Conap, Inc., Allegany, N.Y.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Franklin Fibre-Lamitex, Wilmington, Del.
Hardman Inc., Belleville, N.J.
Isochem Resins Co., Lincoln, R.I.
Metex Corp., Edison, N.J.
National Beryllia Corp., Haskell, N.J.
Packaged Resins Co., Braintree, Mass.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Zippertubing Co., Los Angeles, Calif.

Materials, Electromagnetic Wave Absorbing - Also See Coatings
Perfection Mica Co., Bensenville, Ill. p 2764
Blocksom & Co., Michigan City, Ind.
Core-Tronics, Inc., Orange, N.J.
Electronautics, Littleton, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
McMillan Radiation Labs, Inc., Ipswich, Mass.
Zippertubing Co., Los Angeles, Calif.

Materials, Ferrite - Also See Ferrite Parts
Allen-Bradley Co., Milwaukee, Wisc.
Electro-Mechanics Co., Austin, Tex.
Ferronics, Inc., Fairport, N.Y. ..... p 2757
Seacor, Inc., Norwood, N.J.
Tohoku Metal Inds., Ltd., Tokyo, Japan
Ampex Corp., Redwood City, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Bell & Howell Co., Pasadena, Calif.
Ceramic Magnetics, Inc., Fairfield, N.J.
Cities Service Co., New York, N.Y.
Commander Labs., Inc., Escondido, Calif.
Countis Inds., San Luis Obispo, Cal.
Crucible Steel Corp., Pittsburgh, Pa.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Ferroxcube Corp., Saugerties, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Magnetics, Inc., Butler, Pa.
Magno-Ceram Co., S. Plainfield, N.J.
Materials Resch. Corp., Orangeburg, N.Y.
Mullard, Inc., Farmingdale, N.Y.
National Moldite, Newark, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Permag Corp., Jamaica, N.Y.
Pfizer-Minerals, New York, N.Y.
Quartzite Processing, Inc., Malden, Mass.
Siemens Corp., Comps. Div., Iselin, N.J.
Stackpole Carbon Co., Elctrn. Comps. Ferrites, St. Marys, Pa.
Steward, D.M. Mfg., Chattanooga, Tenn.
TDK Elctrns. Corp., Long Island City, N.Y.
Trans-Tech, Gaithersburg, Md.
Union Carbide, San Diego, Cal.

Materials, Garnet - Also See Garnet Parts
Tohoku Metal Inds., Ltd., Tokyo, Japan
Barton Mines Corp., North Creek, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramic Magnetics, Inc., Fairfield, N.J.
Countis Inds., San Luis Obispo, Cal.
Quartzite Processing, Inc., Malden, Mass.
Trans-Tech, Gaithersburg, Md.

Materials, Graphite
Acheson Colloids Co., Port Huron, Mich.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Emerson & Cuming, Inc., Canton, Mass.
Exotic Materials, Inc., Costa Mesa, Cal.
Fansteel Inc., N Chicago, Ill.
Pfizer-Minerals, New York, N.Y.
Pure Carbon Co., Inc., St. Marys, Pa.

Materials, Self-Lubricating
Carborundum Co., Niagara Falls, N.Y.
Acheson Colloids Co., Port Huron, Mich.
Basic Ceramics Inc., Hawthorne, N.J.
Carbone Corp., Boonton, N.J.
Cerac, Inc., Butler, Wisc.
Chemplast, Inc., Wayne, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fansteel Inc., N Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
GAF Corp., New York, N.Y.
Isochem Resins Co., Lincoln, R.I.
Materials Resch. Corp., Orangeburg, N.Y.
Modern Ind'l. Plastics, Dayton, Ohio
Ohio Carbon Co., Cleveland, Ohio
Polymer Corp., Reading, Pa.
Pure Carbon Co., Inc., St. Marys, Pa.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Thiokol Chemical Div., Trenton, N.J.
Union Carbide, Carbon Prods. Div., New York, N.Y.

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Memory Planes, Plated Wire—See Vol 1

Memory Planes, Thin-Film, Planar—See Vol 1

Memory Stacks, Core—See Vol 1

Memory Stacks, Plated Wire—See Vol 1

Memory Systems, Delay Line—See Vol 1

Memory Systems, Core—See Vol 1

Memory Systems, Disc—See Vol 1

Memory Systems, Drum—See Vol 1

Memory Systems, Tape—See Vol 1

Memory Systems, Thin-Film, Planar—See Vol 1

Memory Systems, Thin-Film, Plated Wire—See Vol 1

Memory Systems, Integrated Circuit—See Vol 1

Metal Compounds, Foils, Powders, Sheet, Stock

Consolidated Reactive Metals, Mamaroneck, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cleveland Refractory Metals Div., Solon, Ohio
Crucible Steel Corp., Pittsburgh, Pa.
Division Lead Co., Summit, Ill.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
Glidden-Durkee Div., Cleveland, Ohio
Hamilton Watch Co., Lancaster, Pa.
Handy & Harman, New York, N.Y.
Indium Corp. America, Utica, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Mackay, A.D., Inc., New York, N.Y.
Magnetics, Inc., Butler, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Materials Technology, Inc., Somerset, N.J.
Matthey Bishop Inc., Malvern, Pa.
Pfizer-Minerals, New York, N.Y.
Plasmadyne, Santa Ana, Calif.
Republic Steel Corp, Cleveland, Ohio
Research Chem., Phoenix, Ariz.
Reynolds Metals Co., Richmond, Va.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec., Blairsville, Pa.
Whittaker Corp., Los Angeles, Cal.

Metal Oxides

Engelhard Minerals & Chem., Murray Hill, N.J.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Metal Climax, Inc., New York, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Baker, J.T. Chemical Co., Phillipsburg, N.J.
Brush Beryllium Co., Cleveland, Ohio
Chemical Commerce, Newark, N.J.
City Chemical Corp., New York, N.Y.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Dow Chemical Co., Midland, Mich.
Elctrn. Space Prods., Los Angeles, Cal.
Glidden-Durkee Div., Cleveland, Ohio
Grace, W.R. & Co., Chattanooga, Tenn.
GTE Sylvania, Inc., Towanda, Pa.
Handy & Harman, New York, N.Y.
Harmon Lichtenstein & Co., New York, N.Y.
Harshaw Chem. Co., Cleveland, Ohio
Indium Corp. America, Utica, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Kerr-McGee Chem. Corp., Oklahoma City, Okla.
Leico Inds., Inc., New York, N.Y.
M & T Chemicals Inc., Rahway, N.J.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Michigan Chemical Corp., Chicago, Ill.
Michigan Chem. Corp., Chicago, Ill.
Norton Co., Worcester, Mass.
Pfizer-Minerals, New York, N.Y.
Plasmadyne, Santa Ana, Calif.
Research Chem., Phoenix, Ariz.
Union Carbide, San Diego, Cal.
United American Metals Div., Brooklyn, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Metal Parts, Cast

Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Barger Corp., Sunnyvale, Cal.
Bram Metallurgical-Chem., Phila., Pa.
Cabot Corp., Kokomo, Ind.
Cerro Corp., New York, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Division Lead Co., Summit, Ill.
Dixon Sintaloy, Inc., Stamford, Conn.
Fansteel Inc., N Chicago, Ill.
Gries Reproducer Co., New Rochelle, N.Y.
Hadlock & Temte, Inc., Chicago, Ill.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Janney Cylinder Co, Philadelphia, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Misco Div., Muskegon, Mich.
Mueller Brass Co., Port Huron, Mich.
Norelcom Inds., Inc., Farmingdale, N.Y.
Research Chem., Phoenix, Ariz.
Rode, Inc., Woburn, Mass.
Ronson Metals Corp., Newark, N.J.
Sanders Assocs., Nashua, N.H.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Shigoto Inds., Ltd., New York, N.Y.
Spring City Elec. Mfg. Co., Spring City, Pa.
Tickle, Arthur Engrg. Works, Inc., Brooklyn, N.Y.
United American Metals Div., Brooklyn, N.Y.
Whittaker Corp., Los Angeles, Cal.

Metal Parts, Chemically Milled

Arnold Engrg. Co., Marengo, Ill. p 2754,2755
Ogallala Elctrns., Ogallala, Neb.. p 2755
Alloys Unlimited, Inc., Encino, Calif.
Bendix, Utica, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Buckbee-Mears Co., St. Paul, Minn.
Bussco Engrg., El Segundo, Cal.
Cabot Corp., Kokomo, Ind.
Centerline Specialties, Boulder, Colo.
Chem Aero, Inc., Wilmington, Cal.
Chemical Micro Milling Co, Camden, N.J.
Composite Microcircuits, Waltham, Mass.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Etchit, Inc., S. Hopkins, Minn.
Fansteel Inc., N Chicago, Ill.
GTE Sylvania, Inc., Towanda, Pa.
Hamilton Watch Co., Lancaster, Pa.
Komak, Inc., Phila., Pa.
Magnetics, Inc., Butler, Pa.
Micro Science Assocs., Mt. View, Cal.
Mid-West Metal Prods., Kansas City, Kans.
Tech-Etch, Inc., Hingham, Mass.
Techinques, Inc., Englewood, N.J.

Metal Parts, Deep Drawn

Engelhard Minerals & Chem., Murray Hill, N.J.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Acme Model Engrg. Co., Ridgefield, N.J.
Algo, S. Hackensack, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
American Aluminum Co., Mountainside, N.J.
Anaconda American Brass Co., Waterbury, Conn.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Baumker Mfg. Co., Toledo, Ohio
Blickman, S., Inc., Weehawken, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Brooks & Perkins, Inc., Livonia, Mich.
Buckeye Stamping Co., Columbus, Ohio
Clover Inds. Div., Tonawanda, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eimac, San Carlos, Calif.
Etamco, Industries, Belleville, N.J.
Fansteel Inc., N Chicago, Ill.
Fastex Div., Des Plaines, Ill.
Gibson Elec., Delmont, Pa.
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
GTE Sylvania Inc., Warren, Pa.
Haydu Prods., Inc., Opa Locka, Fla.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
IE Mfg. Co., Chicago, Ill.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Johnson & Hoffman Mfg. Co., Carle Place, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Keystone Micro Scan., Boston, Mass.
Kidde, Walter & Co., Belleville, N.J.
King Laboratories, Inc., Syracuse, N.Y.
Kling Metal Spinning & Stamping, New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Mirro Aluminum Co., Manitowoc, Wisc.
Mueller Brass Co., Port Huron, Mich.
O'Hara Metal Prods. Co., San Francisco, Calif.
Plastiglide Mfg. Corp., Santa Monica, Cal.
R. I. Metpro, Inc., Warwick, R.I.
Romac Elctrns., L. I. City, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Sexton Can Co., Inc., Everett, Mass.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Staver Co., Inc., Bay Shore, N.Y.
Straza Inds., El Cajon, Calif.
TACO Div., Sherburne, N.Y.
Tekform Prods. Co., Anaheim, Cal.
Vernitron, Norwalk, Conn.
Volkert Stampings, Inc., Queens Village, N.Y.
Wire Cloth Mfrs., Parsippany, N.J.
Zero Mfg. Co., Burbank, Cal.

Metal Parts, Laminated

Engelhard Minerals & Chem., Murray Hill, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
American Silver Co. Div., Flushing, N.Y.
Barger Corp., Sunnyvale, Cal.
Baumker Mfg. Co., Toledo, Ohio
Bossert Mfg. Corp., Utica, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Buckbee-Mears Co., St. Paul, Minn.
Chem Aero, Inc., Wilmington, Cal.
Dentronics, Inc., Hackensack, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eldre Comps., Inc., Rochester, N.Y.
Eljay Corp., Columbia, Md.
Fansteel Inc., N Chicago, Ill.
Gould, Inc., Cleveland, Ohio
Improved Laminated Metal Co., Providence, R.I.
Laminated Shim Co., Inc., Glenbrook, Conn.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
O'Hara Metal Prods. Co., San Francisco, Calif.
Semi Alloys, Inc., Mt. Vernon, N.Y.
SKG Assocs., Inc., Boston, Mass.
Stop Components, Inc., Freeport, N.Y.
Tech-Etch, Inc., Hingham, Mass.
Tempel Steel Co., Chicago, Ill.
Whittaker Corp., Los Angeles, Cal.
Zero Mfg. Co., Burbank, Cal.

Metal Parts, Machined

Astro-Space Labs., Huntsville, Ala
Electronic Hardware, Jamaica, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
Engelhard Minerals & Chem., Murray Hill, N.J.
Erie Technological Prods. (EEM), Erie, Pa.
Jonard Inds. Corp., Bronx, N.Y.
Jones Hiram Elctrns., No. Hollywood, Cal.
Kessler-Ellis Prods., Atlantic Highlands, N.J.
Positronic Inds., Springfield, Mo.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Adjustable Bushing Corp., N Hollywood, Calif.
Advance Gear & Mach., Los Angeles, Cal.
Aero Vac Corp., Troy, N.Y.
Algo, S. Hackensack, N.J.
All Star Prods., Inc., Defiance, Ohio
Alloys Unlimited, Inc., Encino, Calif.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Associated Mfg. Co., Chicago, Ill.
Auto-Swage Products, Inc., Shelton, Conn.
Barger Corp., Sunnyvale, Cal.
Baumker Mfg. Co., Toledo, Ohio
Bell Fasteners Corp., Paramus, N.J.
Bendix, Utica, N.Y.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Blickman, S., Inc., Weehawken, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Cabot Corp., Kokomo, Ind.
Century Fastener Corp., Brooklyn, N.Y.
Cerro Corp., New York, N.Y.
Cole Instr., Costa Mesa, Cal.
Delbert Blinn. Co., Pomona, Calif.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Division Lead Co., Summit, Ill.
Dow Chemical Co., Midland, Mich.
Duramic Prods., Inc., Palisades Park, N.J.
Eljay Corp., Columbia, Md.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Essex Cryogenics Inds., St. Louis, Mo.
Eugene Engrg. Co., Inc., Rockland, Mass.
Extrudonics Co., New Brunswick, N.J.
Fansteel Inc., N Chicago, Ill.
Federal Mach. Co., Inc., Jersey City, N.J.
Federal Screw Prods., Inc., Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
GAF Corp., New York, N.Y.
General Mfg. Co., Glendale, Calif.
Golding Mfg. Co., N. Arlington, N.J.
GTE Sylvania, Inc., Towanda, Pa.
Gyrotronics, Inc., Asbury Park, N.J.
Haydu Prods., Inc., Opa Locka, Fla.
Helitronics Corp., Newark, N.J.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
IE Mfg. Co., Chicago, Ill.
Ind'l. Tools, Ojai, Cal.
Inland Mfg. Co., Omaha, Neb.
Instru-Lec Corp., Mt. Vernon, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Janney Cylinder Co, Philadelphia, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Keystone Micro Scan., Boston, Mass.
Kidde, Walter & Co., Belleville, N.J.
Laser Technology, Inc., N. Hollywood, Calif.
Lear Siegler, Inc., Santa Monica, Calif.
Litton Inds., Van Nuys, Calif.

Lochart Inds., Inc., Paramount, Cal.
M-T Elctrns. Co., San Leandro, Calif.
Maryland Lava Co., Bel Air, Md.
Master Engraving, East Paterson, N.J.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
McNally Bros. Mach. & Gear, Mipls., Minn.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Morris, J.I. Co., Southbridge, Mass.
Mueller Brass Co., Port Huron, Mich.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Omega Labs., Inc., Rowley, Mass.
Ostby & Barton Co., Providence, R.I.
Pabst Engineering Equipment Co., Inc., Elizabeth, N.J.
Petty Geophysical Engrg., San Antonio, Tex.
Philips Metalonics, Mt. Vernon, N.Y.
PIC Design Corp., Ridgefield,, Conn.
Projects Unlimited, Inc., Dayton, Ohio
Ragen Precision Inds., Inc., N. Arlington, N.J.
Red Devil Mfg. Co., Inc., Chicago, Ill.
Research Chem., Phoenix, Ariz.
Robinson-Nugent, New Albany, Ind.
Romac Elctrns., L. I. City, N.Y.
Schoeffel Instr. Corp., Westwood, N.J.
SECS, Inc., Long Island City, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Semicon Assoc., Inc., Lexington, Ky.
SKG Assocs., Inc., Boston, Mass.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Stock Drive Prods., New Hyde Pk., N.Y.
Stop Components, Inc., Freeport, N.Y.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.
Straza Inds., El Cajon, Calif.
Systems Resch. Labs., Dayton, Ohio
TACO Div., Sherburne, N.Y.
Templet Ind., Inc., Plainview, N.Y.
Textool Prods., Inc., Irving, Tex.
Tickle, Arthur Engrg. Works, Inc., Brooklyn, N.Y.
Torrington Co., Torrington, Conn.
Upson Tools, Inc., Rochester, N.Y.
Whittaker Corp., Los Angeles, Cal.
Wood, C.N. Mfg. Co., Newtown, Pa.
Youngwood Elctrn. Metals, Inc., Youngwood, Pa.

Metal Parts, Powdered

Engelhard Minerals & Chem., Murray Hill, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Barden Corp., Danbury, Conn.
Bram Metallurgical-Chem., Phila., Pa.
Cabot Corp., Kokomo, Ind.
Cleveland Refractory Metals Div., Solon, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dixon Sintaloy, Inc., Stamford, Conn.
Eljay Corp., Columbia, Md.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
General Elec., Detroit, Mich.
Gibson Elec., Delmont, Pa.
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
Kennametal Inc., Latrobe, Pa.
Kwikset Powdered Metal Prods., Anaheim, Cal.
Leico Inds., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
National Moldite, Newark, N.J.
Philips Metalonics, Mt. Vernon, N.Y.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Semicon Assoc., Inc., Lexington, Ky.
St. Marys Carbon Co., St. Marys, Pa.

Metal Parts, Screw Machine

Concord Elctrns., New York, N.Y. p 2611
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dow-Key, Santa Barbara, Cal.
Electronic Hardware, Jamaica, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
Engelhard Minerals & Chem., Murray Hill, N.J.
Erie Technological Prods. (EEM), Erie, Pa.
Jonard Inds. Corp., Bronx, N.Y.
Jones Hiram Elctrns., No. Hollywood, Cal.
Positronic Inds., Springfield, Mo.
Precision Metal Prods. Co., Stoneham, Mass. ..... p 2705
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Abbott Prods., Inc., College Point, N.Y.
ABSCOA Inds., Inglewood, Calif.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Adjustable Bushing Corp., N Hollywood, Calif.
All Star Prods., Inc., Defiance, Ohio
Alloys Unlimited, Inc., Encino, Calif.
Aluminum Co. America, Pittsburgh, Pa.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Metal Climax, Inc., New York, N.Y.
Associated Mfg. Co., Chicago, Ill.
Auto-Swage Products, Inc., Shelton, Conn.
Baumker Mfg. Co., Toledo, Ohio
Bell Fasteners Corp., Paramus, N.J.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Celestial Comps., Inc., Covina, Cal.
Century Fastener Corp., Brooklyn, N.Y.
Cerro Corp., New York, N.Y.
D-Cemco, Inc., Burbank, Calif.
Davis & Hemphill, Inc., Elkridge, Md.
Delbert Blinn. Co., Pomona, Calif.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Specialty Co., Philadelphia, Pa.
Eljay Corp., Columbia, Md.
Engineered Plastics, Inc., Gibsonville, N.C.
Federal Screw Prods., Inc., Chicago, Ill.
Fischer Special Mfg. Co., Cincinnati, Ohio
General Mfg. Co., Glendale, Calif.
Gray Resch. & Dev. Co., E. Hartford, Conn.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Haydu Prods., Inc., Opa Locka, Fla.
Helitronics Corp., Newark, N.J.
Inland Mfg. Co., Omaha, Neb.
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Int'l. Elctrn. Resch., Burbank, Cal.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
K-W Engrg. Works, Menomonee Falls, Wisc.
Keystone Elctrns. Corp., New York, N.Y.
Keystone Micro Scan., Boston, Mass.
Kidde, Walter & Co., Belleville, N.J.
Larsen Importing Co., New York, N.Y.
Laser Technology, Inc., N. Hollywood, Calif.
Litton Inds., Van Nuys, Calif.
Maryland Lava Co., Bel Air, Md.
MI-KRO Connector Div., Long Island City, N.Y.
Morris, J.I. Co., Southbridge, Mass.
Mueller Brass Co., Port Huron, Mich.
Ney, J.M. Co., Bloomfield, Conn.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nutmeg Screw Mach. Prods., Waterbury, Conn.
Omega Labs., Inc., Rowley, Mass.
Ostby & Barton Co., Providence, R.I.
Red Devil Mfg. Co., Inc., Chicago, Ill.
Robinson-Nugent, New Albany, Ind.
SECS, Inc., Long Island City, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Standard Screw Co., Bellwood, Ill.
Stanley Ind'l. Comps. Div., Forestville, Conn.
Star Stainless Screw Co., Totowa, N.J.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Stop Components, Inc., Freeport, N.Y.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.
Thermalloy Co., Dallas, Tex.
Torrington Co., Torrington, Conn.
Upson Tools, Inc., Rochester, N.Y.
U.S. Terminals, Inc., Cincinnati, Ohio
Viz Mfg. Co., Philadelphia, Pa.

Metal Parts, Spun

Acme Model Engrg. Co., Ridgefield, N.J.
Ainslie Corp., S. Braintree, Mass.
American Aluminum Co., Mountainside, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Blickman, S., Inc., Weehawken, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Fansteel Inc., N Chicago, Ill.
Haydu Prods., Inc., Opa Locka, Fla.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Kling Metal Spinning & Stamping, New York, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Romac Elctrns., L. I. City, N.Y.

Metal Parts, Stamped

Art Wire & Stamping Co., Cedar Knolls, N.J. ..... p 2815
Augat Inc., Attleboro, Mass.
Berg Elctrns., Inc., New Cumberland, Pa.
Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Drake Mfg., Harwood Hgts., Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Erie Technological Prods. (EEM), Erie, Pa.
Jonard Inds. Corp., Bronx, N.Y.
Positronic Inds., Springfield, Mo.
UID Elctrns. Corp., Hollywood, Fla.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Acme Model Engrg. Co., Ridgefield, N.J.
Admiral Tool & Mfg. Co., Chicago, Ill.
Algo, S. Hackensack, N.J.
All Star Prods., Inc., Defiance, Ohio
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Aluminum Co., Mountainside, N.J.
American Silver Co. Div., Flushing, N.Y.
Anaconda American Brass Co., Waterbury, Conn.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Auburn Mfg. Co., Middletown, Conn.
Auto-Swage Products, Inc., Shelton, Conn.
Barden Corp., Danbury, Conn.
Barger Corp., Sunnyvale, Cal.
Barnes Engrg. Co., Santa Ana, Calif.
Baumker Mfg. Co., Toledo, Ohio
Bell Fasteners Corp., Paramus, N.J.
Blickman, S., Inc., Weehawken, N.J.
Bossert Mfg. Corp., Utica, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Buckeye Stamping Co., Columbus, Ohio
Bud Radio, Inc., Willoughby, Ohio
Bussco Engrg., El Segundo, Cal.
Chronomatic Div., Burbank, Cal.
Clover Inds. Div., Tonawanda, N.Y.
Connor Spring & Mfg. Co., San Jose, Cal.
Delbert Blinn. Co., Pomona, Calif.
Dentronics, Inc., Hackensack, N.J.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Division Lead Co., Summit, Ill.
Dolin Metal Prods., Inc., Brooklyn, N.Y.
Dudek & Bock Spring Mfg. Co., Chicago, Ill.
Eastern Co., North Branch, N.J.
Eastern Specialty Co., Philadelphia, Pa.
Electro Chemical Engraving Co., Bronx, N.Y.
Eljay Corp., Columbia, Md.
Eltee, Inc., W. Caldwell, N.J.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Etamco, Industries, Belleville, N.J.
Etchit, Inc., S. Hopkins, Minn.
Eugene Engrg. Co., Inc., Rockland, Mass.
Excel Specialty Corp., Chicago, Ill.
Extrudonics Co., New Brunswick, N.J.
Falstrom Co., Passaic, N.J.
Fansteel Inc., N Chicago, Ill.
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Federal Stampings, Minneapolis, Minn.
Feiner, P. & Sons, Inc., New York, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
GAF Corp., New York, N.Y.
General Elec. Co., Cleveland, Ohio
General Metals, Greensboro, N. C.
Gibson Elec., Delmont, Pa.
Golding Mfg. Co., N. Arlington, N.J.
Gould Mfg. Canada, Ltd., St. Thomas, Ont., Canada
Green Elec. Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Warren, Pa.
Gyrotronics, Inc., Asbury Park, N.J.
Haydu Prods., Inc., Opa Locka, Fla.
Helitronics Corp., Newark, N.J.
H.K. Metalcraft Mfg. Co., Lodi, N.J.
Hobson Bros., Inc., Chicago, Ill.
Holmberg, Inc., Melville, N.Y.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Hunter Spring, Hatfield, Pa.
IE Mfg. Co., Chicago, Ill.
Industrial Elctrn. Hardware, New York, N.Y.
Int'l. Elctrn. Resch., Burbank, Cal.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Johnson & Hoffman Mfg. Co., Carle Place, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Keystone Elctrns. Corp., New York, N.Y.
Keystone Micro Scan., Boston, Mass.
Kinetron Corp., Asbury Park, N.J.
King Laboratories, Inc., Syracuse, N.Y.
Kling Metal Spinning & Stamping, New York, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Laminated Shim Co., Inc., Glenbrook, Conn.
Lear Siegler, Inc., Santa Monica, Calif.
Litton Inds., Van Nuys, Calif.
M-T Elctrns. Co., San Leandro, Calif.
Magnetics, Inc., Butler, Pa.
Malco Mfg. Co., Chicago, Ill.
Matthey Bishop Inc., Malvern, Pa.
Merco Prods. Co., Inc., Eugene, Ore.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Miller Dial, El Monte, Calif.
Mirro Aluminum Co., Manitowoc, Wisc.
Mobil Elctrns., Inc., Anderson, Ind.
Molex Prods. Co., Downers Grove, Ill.
Morris, J.I. Co., Southbridge, Mass.
Muckle Mfg. Co., Owatonna, Minn.
Mueller Brass Co., Port Huron, Mich.
Network Inds., Inc., Bayonne, N.J.
Ney, J.M. Co., Bloomfield, Conn.
O'Hara Metal Prods. Co., San Francisco, Calif.
Pabst Engineering Equipment Co., Inc., Elizabeth, N.J.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Romac Elctrns., L. I. City, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
SKG Assocs., Inc., Boston, Mass.
South Shore Metal Prods., Inc., Farmingdale, N.Y.
Stanley Ind'l. Comps. Div., Forestville, Conn.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Staver Co., Inc., Bay Shore, N.Y.
Straza Inds., El Cajon, Calif.
TACO Div., Sherburne, N.Y.
Tekform Prods. Co., Anaheim, Cal.
Tempel Steel Co., Chicago, Ill.
Templet Ind., Inc., Plainview, N.Y.
Titchener, E.H. & Co., Binghamton, N.Y.
Torrington Co., Torrington, Conn.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Upson Tools, Inc., Rochester, N.Y.
Vernitron, Norwalk, Conn.
Viz Mfg. Co., Philadelphia, Pa.

Volkert Stampings, Inc., Queens Village, N.Y.
Wabash Metal Prods., Wabash, Ind.
Wilkinson Co., Westlake Village, Cal.
Winzeler Mfg. & Tool Co., Chicago, Ill.
Wire Cloth Mfrs., Parsippany, N.J.
W.L.S. Stamping Co., Cleveland, Ohio
Worcester Pressed Steel Co., Worcester, Mass.
Wrought Washer Mfg. Co., Milwaukee, Wisc.
Youngwood Elctrn. Metals, Inc., Youngwood, Pa.
Zero Mfg. Co., Burbank, Cal.
Zims Mfg. Co., Irvington, N.J.

Metals, Clad

Consolidated Reactive Metals, Mamaroneck, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J. ..... p 2817
Engelhard Minerals & Chemicals Corp., Union, N.J. ..... p 2817
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Silver Co. Div., Flushing, N.Y.
Auto-Swage Products, Inc., Shelton, Conn.
Driver, Wilbur B. Co., Newark, N.J.
Fansteel Inc., N Chicago, Ill.
Gould, Inc., Cleveland, Ohio
Handy & Harman, New York, N.Y.
Improved Laminated Metal Co., Providence, R.I.
Materials Technology, Inc., Somerset, N.J.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Montgomery Co, Windsor Locks, Conn
Republic Steel Corp, Cleveland, Ohio
Revere Copper & Brass, Inc., New York, N.Y.
Reynolds Metals Co., Richmond, Va.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Synthane Taylor Corp., Valley Forge, Pa.
Westinghouse Elec., Blairsville, Pa.

Metals, High Purity

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Engelhard Minerals & Chem., Murray Hill, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Aluminum Co. America, Pittsburgh, Pa.
American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Brush Beryllium Co., Cleveland, Ohio
California Fine Wire, Grover City, Cal.
Cerac, Inc., Butler, Wisc.
Cleveland Refractory Metals Div., Solon, Ohio
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Crucible Steel Corp., Pittsburgh, Pa.
Driver, Wilbur B. Co., Newark, N.J.
Eagle-Picher Inds., Inc., Joplin, Mo.
Elctrn. Space Prods., Los Angeles, Cal.
Fairmount Chem. Co., Inc., Newark, N.J.
Glidden-Durkee Div., Cleveland, Ohio
Handy & Harman, New York, N.Y.
Indium Corp. America, Utica, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Kester Solder Co, Chicago, Ill.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Magnetics, Inc., Butler, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Norton Co., Newton, Mass.
Nucleonic Prods., Canoga Pk, Cal.
Pfizer-Minerals, New York, N.Y.
Republic Steel Corp, Cleveland, Ohio
Research Chem., Phoenix, Ariz.
Semi Alloys, Inc., Mt. Vernon, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Whittaker Corp., Los Angeles, Cal.

Metals, Precious-Also See Powders, Precious Metal

Consolidated Reactive Metals, Mamaroneck, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J. ..... p 2817
Engelhard Minerals & Chemicals Corp., Union, N.J. ..... p 2817
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Auto-Swage Products, Inc., Shelton, Conn.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
Cerac, Inc., Butler, Wisc.
Cerro Corp., New York, N.Y.
Chemical Commerce, Newark, N.J.
City Chemical Corp., New York, N.Y.
Cleveland Refractory Metals Div., Solon, Ohio
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Elctrn. Space Prods., Los Angeles, Cal.
Fairmount Chem. Co., Inc., Newark, N.J.
Handy & Harman, New York, N.Y.
Improved Laminated Metal Co., Providence, R.I.
Indium Corp. America, Utica, N.Y.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Ney, J.M. Co., Bloomfield, Conn.
Pyco, Inc., Penndel, Pa.
Sel-Rex Corp., Nutley, N.J.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Technic, Inc., Providence, R.I.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Western Gold & Platinum Co., Belmont, Cal.
Whittaker Corp., Los Angeles, Cal.
Wilkinson Co., Westlake Village, Cal.
Williams Precious Metal Div., Buffalo, N.Y.
Wire Cloth Mfrs., Parsippany, N.J.

Metals, Rare

Allied Chemical Corp., Morristown, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cerac, Inc., Butler, Wisc.
Chemical Commerce, Newark, N.J.
City Chemical Corp., New York, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Harmon Lichtenstein & Co., New York, N.Y.
Indium Corp. America, Utica, N.Y.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kerr-McGee Chem. Corp., Oklahoma City, Okla.
King Laboratories, Inc., Syracuse, N.Y.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Michigan Chemical Corp., Chicago, Ill.
Michigan Chem. Corp., Chicago, Ill.
Research Chem., Phoenix, Ariz.
Ronson Metals Corp., Newark, N.J.
Sel-Rex Corp., Nutley, N.J.
Technic, Inc., Providence, R.I.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Metals, Refractory

American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cerac, Inc., Butler, Wisc.
City Chemical Corp., New York, N.Y.
Cleveland Refractory Metals Div., Solon, Ohio
Cross, H. Co., Weehawken, N.J.
Crucible Steel Corp., Pittsburgh, Pa.
Duramic Prods., Inc., Palisades Park, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Mallory Metallurgical, Indianapolis, Ind.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Norton Co., Worcester, Mass.
Norton Co., Newton, Mass.
Philips Elmet Corp., Lewiston, Me.
Philips Metalonics, Mt. Vernon, N.Y.
Plasmadyne, Santa Ana, Calif.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Semicon Assoc., Inc., Lexington, Ky.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Whittaker Corp., Los Angeles, Cal.

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Meters, Air Permeability—See Vol 1

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Meters, Ampere, R-F—See Vol 1

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Meters, Q—See Vol 1

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Western Reserve Elctrns., Twinsburg, Ohio

COM-IV, Bloomfield, Conn.
Information Handling Svc., Englewood, Colo.
Memorex Corp., Santa Clara, Cal.
Ragen Precision Inds., Inc., N. Arlington, N.J.
3M Co., St. Paul, Minn.
Traid Corp., Glendale, Cal.
Varian Assocs., Palo Alto, Cal.

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Microphones, Lavalier—See Vol 1

Microphones, LIP—See Vol 1

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Aeroflex Labs., Plainview, N.Y.
Atlantic India Rubber Co., Chicago, Ill.
Backer-Loring Corp., Peabody, Mass.
Barry Controls, Watertown, Mass.
Collins Radio Co., Cedar Rapids, Iowa
Ealing Corp., Cambridge, Mass.
Electrovert, Inc., Mt. Vernon, N.Y.
Felters Co., Millbury, Mass.
GAF Corp., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Grant Pulley & Hardware Co., W. Nyack, N.Y.
Hecht Rubber Corp., Jacksonville, Fla.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Jodee Plastics, Inc., Brooklyn, N.Y.
Lord Mfg. Co., Erie, Pa.
MB Elctrns/Textron Co., New Haven, Conn.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Shur-Lok Corp., Santa Ana, Calif.
Stock Drive Prods., New Hyde Pk., N.Y.
3M Co., St. Paul, Minn.
Uniroyal, Inc., New York, N.Y.

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Acromark Co., Berkeley Hts, N.J.
Anodyne Inc., N. Miami Beach, Fla.
Avery Prods. Graphics Div., Santa Ana, Calif
Bell Co., Inc., Trussville, Ala.
Best Mfg. Co., Kansas City, Mo.
Brady, W.H. Co., Milwaukee, Wisc.
Canrad Precision Inds., Inc., Pelham, N.Y.
Central Plastics Dists., Chicago, Ill.
Cryptographics, Inc., New York, N.Y.
Dennison Mfg., Framingham, Mass.
Devco Engrg., W. Caldwell, N.J.
Duramark, Inc., Port Washington, N.Y.
E.C.P. Corp., Cleveland, Ohio
Electro Chemical Engraving Co., Bronx, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Ever Ready Label Corp., Belleville, N.J.
Franklin Fibre-Lamitex, Wilmington, Del.
GM Nameplate, Inc., Seattle, Wash.
Graphtex Inc., Lodi, NJ
Hermes Plastics, Inc., New York, N.Y.
Industrial Commerce, Forest Hills, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Master Engraving, East Paterson, N.J.
Master Tape Printers, Inc., Chicago, Ill.
Matthews, Jas & Co., Pittsburgh, Pa.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Metalcraft, Inc., Mason City, Iowa
Metalphoto Corp., Cleveland, Ohio
Miller Dial, El Monte, Calif.
N/P Co., Temple City, Calif.
New Hermes Engraving Mach. Corp., New York, N.Y.
Norgus Silk Screen Co., Inc., Clifton, N.J.
Oklahoma Aerotronics, Hartshorne, Okla.
Pantographic Reproduction, Newington, Conn.
Photo Chemical Prods. Cal., Santa Monica, Cal.
PIC Design Corp., Ridgefield,, Conn.
Romar Plastics, Inc., St. Charles, Ill.
Seton Name Plate Corp., New Haven, Conn.
Star Enterprises-Div., Lowell, Mass.
Sterling Instr., New Hyde Pk., NY
Tech-Etch, Inc., Hingham, Mass.
3M Co., St. Paul, Minn.
Topflight Corp., York, Pa.
Waldom Elctrns., Inc., Chicago, Ill.

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Black Light Eastern, Westbury, N.Y.
Black Light Prods., Chicago, Ill.
Canrad Precision Inds., Inc., Pelham, N.Y.
Edmund Scientific Co., Barrington, N.J.
Shannon Luminous Mat'ls., Hollywood, Cal.
Stroblite Co., Inc., New York, N.Y.
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Ultra-Violet Prods., Inc., San Gabriel, Cal.

Paints, Metallic

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Micro-Circuits Co., New Buffalo, Mich. p 2480
Acheson Colloids Co., Port Huron, Mich.
Chomerics, Inc., Woburn, Mass.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro-Science Labs., Philadelphia, Pa.
Fuller-O'Brien Corp., Menlo Park, Calif.
Isochem Resins Co., Lincoln, R.I.
LPS Research Labs., Los Angeles, Cal.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Randolph Prods. Co., Carlstadt, N.J.
Whittaker Corp., Los Angeles, Cal.

Paints, Radioactive—See Coatings, Radioactive

Paints, Reflective

Fuller-O'Brien Corp., Menlo Park, Calif.
Hughes Aircraft Co, Culver City, Cal.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Randolph Prods. Co., Carlstadt, N.J.
3M Co., St. Paul, Minn.

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Acheson Colloids Co., Port Huron, Mich.
Alloys Unlimited, Inc., Encino, Calif.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Electro-Science Labs., Philadelphia, Pa.
Emerson & Cuming, Inc., Canton, Mass.
Etchomatic, Inc., Waltham, Mass.
Fansteel Inc., N Chicago, Ill.
Fuller-O'Brien Corp., Menlo Park, Calif.
Furane Plastics, Los Angeles, Cal.
General Elec., Schenectady, N.Y.
Podgor, Joseph Co., Pennsauken, N.J.
Randolph Prods. Co., Carlstadt, N.J.
Royal Inds, El Segundo, Calif
Sauereisen Cements Co., Pittsburgh, Pa.
Sprayon Prods., Inc., Bedford Hgts., Ohio
3M Co., St. Paul, Minn.
Topper Mfg. Co., Inc., Great Neck, N.Y.

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Virginia Panel Corp., Waynesboro, Va.
Accurate Elctrns. Corp., Elyria, Ohio
Acro Prods. Corp., Chicago, Ill.
Alcor, Inc., Ithaca, N.Y.
Altec, Anaheim, Calif.
Anchor Specialty Mfg., Teterboro, N.J.
Anritsu Electric Co., Ltd., Tokyo, Japan
Apahouser Corp. of N.E., Boston, Mass.
Artisan Elctrns. Corp., Parsippany, N.J.
Audio Accessories, Inc., Gilsum, N.H.
Ava Elctrns., Upper Darby, Pa.
Best Mfg. Co., Kansas City, Mo.
Birnbach Co., Inc., Freeport, N.Y.
Bud Radio, Inc., Willoughby, Ohio
Cam-Lok Div., Cincinnati, Ohio
Carter Precision Elec. Co., Skokie, Ill.
Control Prods. Corp., Chicago, Ill.
Cooke Engrg. Co., Alexandria, Va.
Eby Sls. Co., Jamaica, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
GM Nameplate, Inc., Seattle, Wash.
Golding Mfg. Co., N. Arlington, N.J.
Graphtex Inc., Lodi, NJ
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Heeger, Inc., Los Angeles, Calif.
Honeywell, Ft. Washington, Pa.
Industrial Elctrn. Hardware, New York, N.Y.
Info-Lite Corp., Ft. Lee, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
Lynn Elctrns. Corp., Philadelphia, Pa.
Marlin Mfg. Corp., Cleveland, Ohio
Mechanical Engraving Co., Inc., Bronx, N.Y.
Methode Elctrns., Inc., Chicago, Ill.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Norelcom Inds., Inc., Farmingdale, N.Y.
Omega Engrg., Inc., Stamford, Conn.
Paraplegics Mfg., Bensenville, Ill.
Philips Elctrns. Inds., Ltd., Toronto 17, Can.
Pyco, Inc., Penndel, Pa.
RCA Corp., Camden, N.J.
Singer - Tele-Signal, Woodbury, N.Y.
Switchcraft, Inc., Chicago, Ill.
Technical Mat'l., Mamaroneck, N.Y.
Trepac Corp. America, Englewood, N.J.
Whistler Elctrns., Inc., Northridge, Cal.

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Anchor Specialty Mfg., Teterboro, N.J.
Artisan Elctrns. Corp., Parsippany, N.J.
Best Mfg. Co., Kansas City, Mo.
Bud Radio, Inc., Willoughby, Ohio
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Eugene Engrg. Co., Inc., Rockland, Mass.
Feiner, P. & Sons, Inc., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Graphtex Inc., Lodi, NJ
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hartman Electrical Mfg., Mansfield, Ohio
Heeger, Inc., Los Angeles, Calif.
Hoffman Engrg. Co., Anoka, Minn.
Honeywell, Ft. Washington, Pa.
Ingersoll Prods., Chicago, Ill.
Kinetron Corp., Asbury Park, N.J.
Metal Works, Inc., Hermann, Mo.
Metalphoto Corp., Cleveland, Ohio
Mid-West Metal Prods., Kansas City, Kans.
Miller Dial, El Monte, Calif.
Mobil Elctrns., Inc., Anderson, Ind.
N/P Co., Temple City, Calif.
Par-Metal Prods. Div., Brooklyn, N.Y.
Paraplegics Mfg., Bensenville, Ill.
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.

Wood, C.N. Mfg. Co., Newtown, Pa.

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Pin Straighteners, Connector

GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Air-O-Tronics Prods., Morrisville, N.Y.
Haydu Prods., Inc., Opa Locka, Fla.
Instru-Lec Corp., Mt. Vernon, N.Y.
Methode Elctrns., Inc., Chicago, Ill.

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Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Cam-Lok Div., Cincinnati, Ohio
Chem Aero, Inc., Wilmington, Cal.
Device Seals, Inc., Sun Valley, Calif.
Eby Sls. Co., Jamaica, N.Y.
GTE Sylvania Inc., Warren, Pa.
Larsen Importing Co., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Malco Mfg. Co., Chicago, Ill.
MI-KRO Connector Div., Long Island City, N.Y.
Moser Jewel Co., Perth Amboy, N.J.
Pylon Co., Inc., Attleboro, Mass.
Robinson-Nugent, New Albany, Ind.
Veritron West, Inc., Chatsworth, Calif.
Viking Inds., Inc., Chatsworth, Calif.
Waldom Elctrns., Inc., Chicago, Ill.

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Anti-Corrosive Metal Prods. Co., Inc., Albany, N.Y.
Associated Mfg. Co., Chicago, Ill.
Auto-Swage Products, Inc., Shelton, Conn.
Avdel, Inc., Burbank, Calif.
Bell Fasteners Corp., Paramus, N.J.
Bland Co., Bloomfield, Conn.
C.E.M. Co., Inc., Danielson, Conn.
Century Fastener Corp., Brooklyn, N.Y.
Deutsch Fastener Corp., Los Angeles, Cal.
Elastic Stop Nut Div., Union, N.J.
Gillen, John Co., Cicero, Ill.
Groov-Pin Corp., Ridgefield, N.J.
Helitronics Corp., Newark, N.J.
Keene Corp., Muskegon, Mich.
Keystone Elctrns. Corp., New York, N.Y.
Luke Line Fasteners, Beverly, N.J.
Moser Jewel Co., Perth Amboy, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
PIC Design Corp., Ridgefield,, Conn.
SECS, Inc., Long Island City, N.Y.
Shur-Lok Corp., Santa Ana, Calif.
Standard Screw Co., Bellwood, Ill.
Star Stainless Screw Co., Totowa, N.J.
Sterling Instr., New Hyde Pk., NY
Stop Components, Inc., Freeport, N.Y.
Torrington Co., Torrington, Conn.
TRG Prods., E. Boston, Mass.
Tridair Inds., Torrance, Calif.

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Plastic Films, Rods, Sheets, etc.

Severna Operation, East Orange, N.J.
Transcon Mfg. Co., Dallas, Tex.
Adam Spence Corp., Edison, N.J.
Anchor Plastics Co Inc., Long Island City, N. Y.
Atlas Fibre Co., Chicago, Ill.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Cadilac Plastics & Chems., Detroit, Mich.
Canrad Precision Inds., Inc., Pelham, N.Y.
Celanese Plastics Co., Newark, N.J.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Conap, Inc., Allegany, N.Y.
Crane Packing Co., Morton Grove, Ill.
Dilectrix Corp., Farmingdale, N.Y.
Dow Chemical Co., Midland, Mich.
Eastman Chem. Prods., Kingsport, Tenn.
Emerson & Cuming, Inc., Canton, Mass.
Engineered Plastics, Inc., Gibsonville, N.C.
Fluorocarbon Co., Anaheim, Cal.
General Elec., Pittsfield, Mass.
Goodrich B. F. Chem. Co., Cleveland, Ohio
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hercules, Inc., Wilmington, Dela.
Hysol Div., Olean, N.Y.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Laminated Fabricators, San Bruno, Calif.
Natvar Corp., Rahway, N.J.
Plastic Assocs., Inc., Inwood, N.Y.
Port Plastics, Inc., Montebello, Cal.
Reynolds Metals Co., Richmond, Va.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Schweitzer, Peter J. Div., Lee, Mass.
Shamban, W.S. & Co., Los Angeles, Calif.
Synthane Corp, Oaks, Pa.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.
Zippertubing Co., Los Angeles, Calif.

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Acme Resin Co., Forest Pk., Ill.
Adhesive Prods. Corp., Bronx, N.Y.
Allaco Prods., Braintree, Mass.
Amoco Chemicals Corp., Chicago, Ill
Applied Plastics Co., El Segundo, Cal.
Automatic Die Cutting Mach. Co., New York, N.Y.
Bacon Inds., Watertown, Mass.
Belding Chem. Inds., New York, N.Y.
Bodnar Prods. Corp., New Rochelle, N.Y.
Borden Chem., New York, N.Y.
Celanese Plastics Co., Newark, N.J.
Chemical Prods. Corp., E. Providence, R.I.
City Chemical Corp., New York, N.Y.
Conap, Inc., Allegany, N.Y.
Cosmic Plastics, San Fernando, Calif.
Dennis Chem. Co., St. Louis, Mo.
Dolph, John C. Co., Monmouth Junction, N.J.
Dow Chemical Co., Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dura Plastics N.Y., Inc., Westport, Conn.
Durez Plastics Div., N. Tonawanda, N.Y.
Dynaloy, Inc., Hanover, N.J.
Eastman Chem. Prods., Kingsport, Tenn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Emerson & Cuming, Inc., Canton, Mass.
Fiberite Corp., Winona, Minn.
FMC Corp., New York, N.Y.
Furane Plastics, Los Angeles, Cal.
GAF Corp., New York, N.Y.
General Elec., Pittsfield, Mass.
General Elec., Selkirk, N.Y.
General Elec. Co., Waterford, N.Y.
Goodrich B. F. Chem. Co., Cleveland, Ohio
Hardman Inc., Belleville, N.J.
Hercules, Inc., Wilmington, Dela.
Hightemp Resins, Inc., Stamford, Conn.
Hysol Div., Olean, N.Y.
Icore, Inc., Santa Clara, Cal.
Isochem Resins Co., Lincoln, R.I.
Mansol Ceramics Co., Inc., Belleville, N.J.
Merix Chem. Co., Chicago, Ill.
Mobay Chem. Co., Pittsburgh, Pa.
Morton Chemical Co., Chicago, Ill.
Owens-Corning Fiberglas, Toledo, Ohio
Packaged Resins Co., Braintree, Mass.
Pennsylvania Ind'l. Chem. Corp., Clairton, Pa.
Pennwalt Corp., Phila., Pa.
Plasmadyne, Santa Ana, Calif.
Plastic Wire & Cable Corp., Jewett City, Conn.
Polymer Corp., Reading, Pa.
Ram Chems., Gardena, Calif.
Rawn Co., Inc., Spooner, Wisc.
Reichhold Chemicals, Inc., White Plains, N.Y.
Resin Formulators Co., Culver City, Cal.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Rosenberg Bros. & Co., Smithtown, N.Y.
Royal Inds, El Segundo, Calif
Schenectady Chems., Schenectady, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Smooth-On, Inc., Gillette, N.J.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Tra-Con, Inc., Medford, Mass.
Union Carbide, Chemicals & Plastics, New York, N.Y.
Uniroyal, Inc., New York, N.Y.
U.S. Polymeric,, Stamford, Conn.
Westinghouse Elec., W. Mifflin, Pa.
Whittaker Corp., Los Angeles, Cal.

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Cole Instr., Costa Mesa, Cal.

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General Elec., Providence, R.I.
Golding Mfg. Co., N. Arlington, N.J.
Javex Elctrns., Cherry Valley, Calif.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Seton Name Plate Corp., New Haven, Conn.
Sierra Elec., Gardena, Calif.
Templet Ind., Inc., Plainview, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.

Plating Solutions

Engelhard Minerals & Chem., Murray Hill, N.J.
Allied Chemical Corp., Morristown, N.J.
Cohn, Sigmund, Mt. Vernon, N.Y.
Conversion Chem. Corp., Rockville, Conn.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fidelity Chem. Prods. Corp., Newark, N.J.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
LEA Mfg. Co., Waterbury, Conn
M & T Chemicals Inc., Rahway, N.J.
Mac Dermid, Inc., Waterbury, Conn.
Materials Development, Los Angeles, Cal.
Matthey Bishop Inc., Malvern, Pa.
Metaplast Electrochemicals, Bronx, N.Y.
Nitine, Inc., Clifton, N.J.
Richardson Co., Des Plaines, Ill.
Sel-Rex Corp., Nutley, N.J.
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DoAll Co., Des Plaines, Ill.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
E.T.M. Corp., Monrovia, Calif.
Eyelet Tool Co., Inc., Cambridge, Mass.
Hammel, Riglander & Co., New York, N.Y.
Hunter Tools, El Monte, Calif
Janel, Inc., Stirling, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Klein, Mathias & Sons, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
Milbar, Chagrin Falls, Ohio
Philmore Mfg. Co., Richmond Hill, N.Y.
Proto Tool Co, Los Angeles, Calif.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Utica Tool Co., Inc., Orangeburg, S.C.
Vigor Tool Co., New York, N.Y.
Waldes Kohinoor, Inc., Long Island City, N.Y.
Williams J.H. & Co., Buffalo, N.Y.
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Accurate Elctrns. Corp., Elyria, Ohio
Air-O-Tronics Prods., Morrisville, N.Y.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Americon Corp., Waltham, Mass.
APM Hexseal Corp., Englewood, N.J.
Barker Prods. Co., Saugus, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Cable Elec. Prods., Inc., Providence, R.I.
Cam-Lok Div., Cincinnati, Ohio
DonMar Prods., Inc., Denver, Colo.
EV/Game, Inc., Freeport, N.Y.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
General Radio Co., Concord, Mass.
Javex Elctrns., Cherry Valley, Calif.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Loranger Mfg. Corp., Warren, Pa.
Marlin Mfg. Corp., Cleveland, Ohio
Methode Elctrns., Inc., Chicago, Ill.
Microdot Inc., S. Pasadena, Calif.
Noel Mfg. Co. Inc., Bronx, N.Y.
Phelps Dodge Comm., North Haven, Conn.
Philmore Mfg. Co., Richmond Hill, N.Y.
Roberts Div., Los Angeles, Cal.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Staffall, Inc., Providence, R.I.
Superior Elec., Bristol, Conn.
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Connector Corp., Chicago, Ill.
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National Tel-Tronics Corp., Great Neck, N.Y.
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Birnbach Co., Inc., Freeport, N.Y.
Cam-Lok Div., Cincinnati, Ohio
Carter Precision Elec. Co., Skokie, Ill.
Cinch Mfg. Co., Elk Grove Village, Ill.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
EV/Game, Inc., Freeport, N.Y.
Eby Sls. Co., Jamaica, N.Y.
General Radio Co., Concord, Mass.
Honeywell, Ft. Washington, Pa.
Hypertronics Corp., Watertown, Mass.
Javex Elctrns., Cherry Valley, Calif.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Magnavolt Inc., Yonkers, N.Y.
Mallory Controls, Frankfort, Ind.
Marlin Mfg. Corp., Cleveland, Ohio
Methode Elctrns., Inc., Chicago, Ill.
Molex Prods. Co., Downers Grove, Ill.
Paraplegics Mfg., Bensenville, Ill.
Permonite Mfg. Co., Chicago, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Pyco, Inc., Penndel, Pa.
Robinson-Nugent, New Albany, Ind.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Shigoto Inds., Ltd., New York, N.Y.
Sierra Elec., Gardena, Calif.
Standard Elec. Time Corp., Springfield, Mass.
Superior Elec., Bristol, Conn.
Switchcraft, Inc., Chicago, Ill.
Telephone Comps., Inc., Northport, N.Y.
Telex Comm. Div., Minneapolis, Minn.
Tru-Connector Corp., Peabody, Mass.
Viz Mfg. Co., Philadelphia, Pa.
Wald Sound, Sun Valley, Calif.
Whistler Elctrns., Inc., Northridge, Cal.

Plug Caps & Shells

ADC Prods., Minneapolis, Minn.
Amphenol Ind'l. Div., Chicago, Ill.
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2655-2657,2662
Rye Inds., Inc., Mamaroneck, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y.
Trompeter Elctrns., Chatsworth, Cal.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vernitron Elec. Comps., Laconia, N.H. p 2720
Alloys Unlimited, Inc., Encino, Calif.
Cam-Lok Div., Cincinnati, Ohio
Caton Inds., Inc., Clark, N.J.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Epoxy Plastic Molders, Irvington, N J
Javex Elctrns., Cherry Valley, Calif.
Kings Elctrns., Tuckahoe, N.Y.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Maryland Lava Co., Bel Air, Md.
Molex Prods. Co., Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Pacific Electricord, Gardena, Cal.
Pass & Seymour, Inc., Syracuse, N.Y.
R. I. Metpro, Inc., Warwick, R.I.
Royal Inds, El Segundo, Calif
Staver Co., Inc., Bay Shore, N.Y.
Tower Mfg. Corp., Providence, R.I.
Tru-Connector Corp., Peabody, Mass.
Viz Mfg. Co., Philadelphia, Pa.

Plug-In Module Enclosures

California Elctrn. Mfg. Co., Alamo, Calif.
Digital Equip. Corp., Maynard, Mass.
Elctrn. Molding Corp., Woonsocket, R.I.
Electrospace Corp., Westbury
(NES) Nationwide Elctrn. Sys., Itasca, Ill.
Pinlites, Fairfield, N.J.
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2674-2687
RO Assocs., Menlo Pk., Cal.
Scanbe Mfg. Corp., El Monte, Cal.
Smith, Herman H., Inc., Bklyn., N.Y.
Trompeter Elctrns., Chatsworth, Cal.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Burr-Brown Resch. Corp., Tucson, Ariz.
Caton Inds., Inc., Clark, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electro Oceanics, Inc., Compton, Calif.
Keystone Elctrns. Corp., New York, N.Y.
Maryland Lava Co., Bel Air, Md.
Petersen Radio, Council Bluffs, Iowa
Spec Plastics, No. Hollywood, Cal.
3M Co., St. Paul, Minn.

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ADC Prods., Minneapolis, Minn... p 2513
Airborn, Inc., Dallas, Tex.
Amphenol Connector Div., Broadview, Ill.
Amphenol Ind'l. Div., Chicago, Ill. p 2538,2541
Amphenol Sales Div., Broadview, Ill. p 2538,2541
Connector Corp., Chicago, Ill. .... p 2612
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
EBY, Hugh H. Co., Phila., Pa. ..... p 2620
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I. p 2626
GC Elctrns., Rockford, Ill. ..... p 2629
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Millen, James Mfg., Malden, Mass.
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2652-2654,2658,2660,2661,2667,2669
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Rye Inds., Inc., Mamaroneck, N.Y. p 2708
Schrack Elec. Sls., New York, N.Y.
Sealectro Corp., Mamaroneck, N.Y.
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan p 2715
Smith, Herman H., Inc., Bklyn., N.Y. p 2716
Trimm, Inc., Libertyville, Ill..... p 2718
Trompeter Elctrns., Chatsworth, Cal. p 2719
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vernitron Elec. Comps., Laconia, N.H.
Wiremold Co., W. Hartford, Conn.
Accurate Elctrns. Corp., Elyria, Ohio
APM Hexseal Corp., Englewood, N.J.
Audio Accessories, Inc., Gilsum, N.H.
Auto-Swage Products, Inc., Shelton, Conn.
Barker Prods. Co., Saugus, Mass.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Cable Elec. Prods., Inc., Providence, R.I.
Cam-Lok Div., Cincinnati, Ohio
Carter Precision Elec. Co., Skokie, Ill.
Caton Inds., Inc., Clark, N.J.
Cinch Mfg. Co., Elk Grove Village, Ill.
Consolidated Resistance Sls., Yonkers, N.Y.
Cooke Engrg. Co., Alexandria, Va.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
General Elec., Providence, R.I.
General Radio Co., Concord, Mass.
Hypertronics Corp., Watertown, Mass.
Javex Elctrns., Cherry Valley, Calif.
Joy Mfg. Co., New Phila., Ohio
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Lynn Elctrns. Corp., Philadelphia, Pa.
Molex Prods. Co., Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Pacific Electricord, Gardena, Cal.
Permonite Mfg. Co., Chicago, Ill.
Phelps Dodge Comm., North Haven, Conn.
Philmore Mfg. Co., Richmond Hill, N.Y.
Rex Rheostat & Co., Roosevelt, N.Y.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Shigoto Inds., Ltd., New York, N.Y.
Sierra Elec., Gardena, Calif.
Superior Elec., Bristol, Conn.
Switchcraft, Inc., Chicago, Ill.
Thomas & Betts Co., Elizabeth, N.J.
Tru-Connector Corp., Peabody, Mass.
Veritron West, Inc., Chatsworth, Calif.
Waber Elctrns., Inc., Philadelphia, Pa.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.

Plugs, Fused

Cam-Lok Div., Cincinnati, Ohio
Deutsch Co., Banning, Calif.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Joy Mfg. Co., New Phila., Ohio
Molex Prods. Co., Downers Grove, Ill.
Waber Elctrns., Inc., Philadelphia, Pa.

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Rye Inds., Inc., Mamaroneck, N.Y. p 2708

Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan p 2715
Smith, Herman H., Inc., Bklyn., N.Y. p 2716
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Air-O-Tronics Prods., Morrisville, N.Y.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Auto-Swage Products, Inc., Shelton, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Cambridge Thermionic, Cambridge, Mass
Eastern Specialty Co., Philadelphia, Pa.
Eby Sls. Co., Jamaica, N.Y.
Ercona Corp., Bellmore, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
General Radio Co., Concord, Mass.
Hallmark Standards, Inc., Mt. Vernon, N.Y.
Industrial Elctrn. Hardware, New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Malco Mfg. Co., Chicago, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Permonite Mfg. Co., Chicago, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Shigoto Inds., Ltd., New York, N.Y.
Staffall, Inc., Providence, R.I.
States Co., Hartford, Conn.
Superior Elec., Bristol, Conn.
Tru-Connector Corp., Peabody, Mass.
U.S. Terminals, Inc., Cincinnati, Ohio
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Posts, Harness Board

Grayhill, Inc., LaGrange, Ill.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abbott Prods., Inc., College Point, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Ico/Rally, Palo Alto, Cal.

Posts, Spring Binding

EBY, Hugh H. Co., Phila., Pa.
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I.
Electrospace Corp., Westbury
GC Elctrns., Rockford, Ill.
Graphite Metallizing Corp., Yonkers, N.Y.
Grayhill, Inc., LaGrange, Ill.
National Tel-Tronics Corp., Great Neck, N.Y.
Pomona Elctrns. Co., Inc., Pomona, Cal.
Rye Inds., Inc., Mamaroneck, N.Y.
Smith, Herman H., Inc., Bklyn., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Abbott Prods., Inc., College Point, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Auto-Swage Products, Inc., Shelton, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Eby Sls. Co., Jamaica, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
U.S. Terminals, Inc., Cincinnati, Ohio
Waldom Elctrns., Inc., Chicago, Ill.

Potentiometers, Carbon Ceramic

CTS Corp, Elkhart, Ind.
Bourns, Inc., Riverside, Cal.
Shigoto Inds., Ltd., New York, N.Y.

Potentiometers, Carbon Film

Carter Mfg. Corp., Hudson, Mass.
Centralab, Elctrns., Milwaukee, Wisc.
Computer Instrs., Hempstead, N.Y.
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb. p 2917
Wilbrecht Inc., St. Paul, Minn
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Bourns, Inc., Riverside, Cal.
Edison Elctrns. Div., Manchester, N.H.
Ferranti Ltd., Hollinwood, Lancs., England
Keltron Corp., Waltham, Mass.
Litton Inds., Mt. Vernon, N.Y.
Mallory Controls, Frankfort, Ind.
Model Rectifier, Edison, N.J.
Neptune Elctrns. Co., New York, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Weston Instruments, Inc., Newark, N.J.

Potentiometers, Ceramic-Metal (Cermet)

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Centralab, Elctrns., Milwaukee, Wisc.
Computer Instrs., Hempstead, N.Y.
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb. p 2917
Spectrol Elctrns., City of Industry, Cal. p 2924,2925
Alloys Unlimited, Inc., Encino, Calif.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Electra/Midland Corp., San Diego, Cal.
Electro-Science Labs., Philadelphia, Pa.
Mark Micro-Elctrns. Mfg., Bayonne,, NJ
Samarius, Inc., Derby, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Weston Comps. Div., Archbald, Pa.

Potentiometers, Composition, Carbon

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Centralab, Elctrns., Milwaukee, Wisc. p 2918
CTS Corp, Elkhart, Ind. p 2911
Ohmite Mfg. Co., Skokie, Ill.
Seacor, Inc., Norwood, N.J.
Stackpole Comps. Co., Raleigh, N.C.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Clarostat Mfg. Co., Inc., Dover, N.H.
Mallory Controls, Frankfort, Ind.
Neptune Elctrns. Co., New York, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Potentiometers, Conductive Plastic

Amphenol Controls Div., Janesville, Wisc. p 2907
Amphenol Sales Div., Broadview, Ill. p 2907
Bowmar Instr. Corp., Ft. Wayne, Ind.
Carter Mfg. Corp., Hudson, Mass. p 2912,2913
Centralab, Elctrns., Milwaukee, Wisc.
Computer Instrs., Hempstead, N.Y. p 2914,2915
New England Instr., Natick, Mass. p 2920,2921
Spectrol Elctrns., City of Industry, Cal. p 2924,2925
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Bowmar/TIC, Inc., Newbury Park, Calif.
Duncan Elctrns., Inc., Costa Mesa, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keltron Corp., Waltham, Mass.
Litton Inds., Mt. Vernon, N.Y.
Markite Corp., New York, N.Y.
PIC Design Corp., Ridgefield,, Conn.
Samarius, Inc., Derby, Conn.
Subminiature Instrs. Corp., Riverside, Calif.
Waters Mfg., Inc., Wayland, Mass.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Potentiometers, Hot Molded

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Amphenol Controls Div., Janesville, Wisc.
Centralab, Elctrns., Milwaukee, Wisc. p 2918
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla.
Clarostat Mfg. Co., Inc., Dover, N.H.
Keltron Corp., Waltham, Mass.
Subminiature Instrs. Corp., Riverside, Calif.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Potentiometers, Lab Type—See Vol 1

Potentiometers, Metal Film

Amphenol Controls Div., Janesville, Wisc. p 2904,2905
Amphenol Sales Div., Broadview, Ill. p 2904,2905
CTS Corp, Elkhart, Ind.
Nippon Electric/NEC America, N.Y., N.Y.
Bourns, Inc., Riverside, Cal.
Miniature Elctrn. Comps. Corp., Holbrook, Mass.
Samarius, Inc., Derby, Conn.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Potentiometers, Metal, Glazed—See Potentiometers, Ceramic-Metal

Potentiometers, Motorized—See Potentiometers, Servo Mount

Potentiometers, Non-Linear—See Potentiometers (As Modified)

Potentiometers, Rectilinear

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Amphenol Controls Div., Janesville, Wisc. p 2902,2903,2907
Amphenol Sales Div., Broadview, Ill. p 2902,2903,2907
Carter Mfg. Corp., Hudson, Mass.p 2913
Computer Instrs., Hempstead, N.Y. p 2914,2915
CTS Corp, Elkhart, Ind. p 2910
Dale Elctrns., Inc., Columbus, Neb. p 2916,2917
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla. p 2931
New England Instr., Natick, Mass. p 2920,2921
Spectrol Elctrns., City of Industry, Cal. p 2924,2925
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Calif.
Bourns, Inc., Riverside, Cal.
Clarostat Mfg. Co., Inc., Dover, N.H.
Duncan Elctrns., Inc., Costa Mesa, Cal.
Electra/Midland Corp., San Diego, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Humphrey, Inc., San Diego, Calif.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keltron Corp., Waltham, Mass.
Markite Corp., New York, N.Y.
Samarius, Inc., Derby, Conn.
Subminiature Instrs. Corp., Riverside, Calif.
Weston Comps. Div., Archbald, Pa.

Potentiometers, Rheostat—See Rheostats

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Potentiometers, Trimmer, Carbon Ceramic

CTS Corp, Elkhart, Ind. p 2911
Bourns, Inc., Riverside, Cal.
Shigoto Inds., Ltd., New York, N.Y.

Potentiometers, Trimmer, Carbon Composition

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Centralab, Elctrns., Milwaukee, Wisc. p 2918
CTS Corp, Elkhart, Ind. p 2910
Ohmite Mfg. Co., Skokie, Ill.
Seacor, Inc., Norwood, N.J.
Bourns, Inc., Riverside, Cal.
Mallory Controls, Frankfort, Ind.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.

Potentiometers, Trimmer, Carbon Film

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2818
CTS Corp, Elkhart, Ind.
Wilbrecht Inc., St. Paul, Minn
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Bourns, Inc., Riverside, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.

Potentiometers, Trimmer, Ceramic-Metal (Cermet)

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Amphenol Controls Div., Janesville, Wisc. p 2904,2905
Amphenol Sales Div., Broadview, Ill. p 2904,2905
Bowmar Instr. Corp., Ft. Wayne, Ind.
CTS Corp, Elkhart, Ind. p 2910,2911
Dale Elctrns., Inc., Columbus, Neb. p 2917
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla. p 2928-2930
Spectrol Elctrns., City of Industry, Cal.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Mark Micro-Elctrns. Mfg., Bayonne,, NJ
Samarius, Inc., Derby, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Weston Comps. Div., Archbald, Pa.

Potentiometers, Trimmer, Conductive Plastic

Carter Mfg. Corp., Hudson, Mass.p 2913
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Samarius, Inc., Derby, Conn.
Subminiature Instrs. Corp., Riverside, Calif.
Waters Mfg., Inc., Wayland, Mass.

Potentiometers, Trimmer, Metal Film

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2818
Amphenol Controls Div., Janesville, Wisc. p 2904,2905
Amphenol Sales Div., Broadview, Ill. p 2904,2905
Centralab, Elctrns., Milwaukee, Wisc.
Computer Instrs., Hempstead, N.Y.
CTS Corp, Elkhart, Ind.
Fluke, John Mfg. Co., Inc., Seattle, Wash.
Ohmite Mfg. Co., Skokie, Ill.
Techno-Comps. Corp., Van Nuys, Cal. p 2926,2927
Vishay Resistor Prod. Div., Malvern, Pa. p 2932
Bourns, Inc., Riverside, Cal.
Carter Precision Elec. Co., Skokie, Ill.
Miniature Elctrn. Comps. Corp., Holbrook, Mass.
Samarius, Inc., Derby, Conn.
Waters Mfg., Inc., Wayland, Mass.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Weston Instruments, Inc., Newark, N.J.

Potentiometers, Trimmer, Wirewound

Amphenol Controls Div., Janesville, Wisc. p 2902,2903
Amphenol Sales Div., Broadview, Ill. p 2902,2903
Bowmar Instr. Corp., Ft. Wayne, Ind.
Carter Mfg. Corp., Hudson, Mass.p 2913
Continental-Wirt Elctrns. Corp., Warminster, Pa.
CTS Corp, Elkhart, Ind. p 2910,2911
Dale Elctrns., Inc., Columbus, Neb. p 2916
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla. p 2928-2931
Ohmite Mfg. Co., Skokie, Ill.
Spectrol Elctrns., City of Industry, Cal. p 2924,2925
Techno-Comps. Corp., Van Nuys, Cal. p 2926,2927
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Bourns, Inc., Riverside, Cal.
Consolidated Resistance Sls., Yonkers, N.Y.
Diplohmatic Div., Seattle, Wash.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tanger Elctrns., Hawthorne, Cal.

Waters Mfg., Inc., Wayland, Mass.
Weston Comps. Div., Archbald, Pa.

Potentiometers, Wirewound

Amphenol Controls Div., Janesville, Wisc. p 2907
Amphenol Sales Div., Broadview, Ill. p 2907
Bowmar Instr. Corp., Ft. Wayne, Ind.
Carter Mfg. Corp., Hudson, Mass. p 2912,2913
Centralab, Elctrns., Milwaukee, Wisc. p 2918
Continental-Wirt Elctrns. Corp., Warminster, Pa. p 1895
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb. p 2916
Electro Sci. Inds., Portland, Ore. p 2919
Fluke, John Mfg. Co., Inc., Seattle, Wash.
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla.
LTV Electrosystems, Huntington, Ind.
New England Instr., Natick, Mass. p 2920,2921
Ohmite Mfg. Co., Skokie, Ill.
Perkin-Elmer Corp., Wilton, Conn.
Spectrol Elctrns., City of Industry, Cal. p 2924,2925
Techno-Comps. Corp., Van Nuys, Cal. p 2926,2927
Ace Elctrn. Assocs., Inc., Somerville, Mass.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Bowmar/TIC, Inc., Newbury Park, Calif.
Carter Precision Elec. Co., Skokie, Ill.
Clarostat Mfg. Co., Inc., Dover, N.H.
Conrac Corp., New York, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Duncan Elctrns., Inc., Costa Mesa, Cal.
Edison Elctrns. Div., Manchester, N.H.
Ferranti Ltd., Hollinwood, Lancs., England
Humphrey, Inc., San Diego, Calif.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Javex Elctrns., Cherry Valley, Calif.
Link Div., Binghamton, N.Y.
Litton Inds., Mt. Vernon, N.Y.
Mallory Controls, Frankfort, Ind.
Mel-Rain Corp., Indianapolis, Ind.
Miniature Elctrn. Comps. Corp., Holbrook, Mass.
Model Rectifier, Edison, N.J.
Neptune Elctrns. Co., New York, N.Y.
Rex Rheostat & Co., Roosevelt, N.Y.
Samarius, Inc., Derby, Conn.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tanger Elctrns., Hawthorne, Cal.
Teledyne Kinetics, Solana Beach, Cal.
Voak Engrg. Co., Inc., Upland, Calif.
Voltronics, Inc., Chicago, Ill.
Ward Leonard, Mt. Vernon, N.Y.
Waters Mfg., Inc., Wayland, Mass.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Weston Comps. Div., Archbald, Pa.
Weston Instruments, Inc., Newark, N.J.

Powders, Precious Metal

Engelhard Minerals & Chem., Murray Hill, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
American Metal Climax, Inc., New York, N.Y.
American Silver Co. Div., Flushing, N.Y.
Cerac, Inc., Butler, Wisc.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Sel-Rex Corp., Nutley, N.J.
Semi Alloys, Inc., Mt. Vernon, N.Y.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Western Gold & Platinum Co., Belmont, Cal.
Whittaker Corp., Los Angeles, Cal.
Wilkinson Co., Westlake Village, Cal.
Williams Precious Metal Div., Buffalo, N. Y.

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Alpha Metals, Inc., Jersey City, N.J.
American Silver Co. Div., Flushing, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Handy & Harman, New York, N.Y.
Kester Solder Co, Chicago, Ill.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Tech-Etch, Inc., Hingham, Mass.
Western Gold & Platinum Co., Belmont, Cal.
Wilkinson Co., Westlake Village, Cal.

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Amco Engrg. Co., Chicago, Ill.
Andrew Corp., Orland Pk., Ill.
Bendix Corp., Davenport, Iowa
Eastern Inds. Div., Hamden, Conn.
Hotpack Corp., Phila., Pa.
Kahn & Co., Inc., Wethersfield, Conn.
Kidde, Walter & Co., Belleville, N.J.
Lear Siegler, Inc., Elyria, Ohio
Superior Continental Corp., Hickory, N.C.
Tem-Pres Research Div., State College, Pa.

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Applied Plastics Co., El Segundo, Cal.
Conap, Inc., Allegany, N.Y.
Emerson & Cuming, Inc., Canton, Mass.
Fuller-O'Brien Corp., Menlo Park, Calif.
General Elec. Co., Waterford, N.Y.
Isochem Resins Co., Lincoln, R.I.
Union Carbide, Chemicals & Plastics, New York, N.Y.

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Cinch-Graphik, City of Industry, Cal.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Allied Chemical Corp., Morristown, N.J.
Alpha Metals, Inc., Jersey City, N.J.
Conversion Chem. Corp., Rockville, Conn.
Dow Chemical Co., Midland, Mich.
Hunt, Philip A. Chemical Corp., Palisades Pk., N.J.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Lea-Ronal, Inc., Freeport, N.Y.
Mac Dermid, Inc., Waterbury, Conn.
Nitine, Inc., Clifton, N.J.

Podgor, Joseph E. Co., Inc., Phila., Pa.
Russell Inds., Inc., Lynbrook, N.Y.
Techinques, Inc., Englewood, N.J.
Union Carbide, Chemicals & Plastics, New York, N.Y.

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Bivar, Inc., Santa Ana, Cal.
Jonard Inds. Corp., Bronx, N.Y.
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Monitor Sys., Inc., Ft. Washington, Pa.
Titchener, E.H. & Co., Binghamton, N.Y.
Triad Distributor Div., Huntington, Ind.
UNGAR, Compton, Calif.
Zorak Co., Watertown, Mass.

Pullers, Fuse

GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Ideal Industries, Inc., Sycamore, Ill.
Techni-Tool, Inc., Philadelphia, Pa.
Thomas & Betts Co., Elizabeth, N.J.
Trico Fuse Mfg. Co., Milwaukee, Wisc.

Pullers, Lamp

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International Electro Exchange Corp., Minneapolis, Minn. ..... p 1925
Jonard Inds. Corp., Bronx, N.Y.
Atocon Co., Lakeview, Ohio

Pullers, Tube

GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Ercona Corp., Bellmore, N.Y.
Foster & Allen, Inc., Chatham, N.J.
Hunter Tools, El Monte, Calif

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Opad Elec. Co., Inc., New York, N.Y.
Aerotronic Assocs., Inc., Contoocook, N.H.
Amco Engrg. Co., Chicago, Ill.
Anchor Specialty Mfg., Teterboro, N.J.
Applied Control Co., Fairfield, N.J.
BFC-Bernard Franklin Co., Phila., Pa.
Delta Design, La Mesa, Cal
FRL, Marin Controls Co., Belmont, Cal.
Lehighton Elctrns., Inc., Lehighton, Pa.
Lyon Metal Prod., Inc., Aurora, Ill.
Micro Instr., Hawthorne, Cal.
Mid-West Metal Prods., Kansas City, Kans.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Textool Prods., Inc., Irving, Tex.
Zero Mfg. Co., Burbank, Cal.

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Abalon Precision Mfg. Corp., Bronx, N.Y.
Abtronics, Inc., Livermore, Calif.
Acro Prods. Corp., Chicago, Ill.
Amco Engrg. Co., Chicago, Ill.
Anchor Specialty Mfg., Teterboro, N.J.
Bay Prods., Phila., Pa.
BFC-Bernard Franklin Co., Phila., Pa.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Collins Radio Co., Dallas, Tex.
Craig Sys. Corp., Lawrence, Mass.
Danco Metal Products, Inc., Westlake, Ohio
Donnelly Mfg. Co., Waltham, Mass.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Falstrom Co., Passaic, N.J.
Fansteel Inc., N Chicago, Ill.
Feiner, P. & Sons, Inc., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Granite State Machine Co., Inc., Manchester, N.H.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Holbrook-Merrill Co., Sunnyvale, Cal.
Ingersoll Prods., Chicago, Ill.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Lyon Metal Prod., Inc., Aurora, Ill.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Neumade Prods. Corp., Scarsdale, N.Y.
Newcomb Audio Prods. Co., Sylmar, Calif.
Pabst Engineering Equipment Co., Inc., Elizabeth, N.J.
Par-Metal Prods. Div., Brooklyn, N.Y.
Republic Steel Corp, Cleveland, Ohio
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Tyco Precision Fabricators Div., Garden City Park, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Waber Elctrns., Inc., Philadelphia, Pa.
Watson Mfg. Co., Inc., Jamestown, N.Y.
Zero Mfg. Co., Burbank, Cal.

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Accessory Controls & Equip., Windsor, Conn.
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Amco Engrg. Co., Chicago, Ill.
Anchor Specialty Mfg., Teterboro, N.J.
Binary Elctrns. of Cal., Anaheim, Calif.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Craig Sys. Corp., Lawrence, Mass.
Danco Metal Products, Inc., Westlake, Ohio
Donnelly Mfg. Co., Waltham, Mass.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Falstrom Co., Passaic, N.J.
Feiner, P. & Sons, Inc., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Honeywell, Ft. Washington, Pa.
Ingersoll Prods., Chicago, Ill.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Lyon Metal Prod., Inc., Aurora, Ill.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Neumade Prods. Corp., Scarsdale, N.Y.
Par-Metal Prods. Div., Brooklyn, N.Y.
Riester & Thesmacher Co., Cleveland, Ohio
Scientific-Atlanta, Inc., Atlanta, Ga.
Technical Mat'l., Mamaroneck, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Waber Elctrns., Inc., Philadelphia, Pa.
Zero Mfg. Co., Burbank, Cal.

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Amco Engrg. Co., Chicago, Ill.
Avco Corp., Cincinnati, Ohio
BFC-Bernard Franklin Co., Phila., Pa.
Birtcher Corp., Monterey Park, Cal.
Buckeye Stamping Co., Columbus, Ohio
Bud Radio, Inc., Willoughby, Ohio
Calabro Unitrack, Upper Darby, Pa.
Cambridge Thermionic, Cambridge, Mass
Control Logic, Natick, Mass.
Donnelly Mfg. Co., Waltham, Mass.
Elctrn. Modules Corp., Timonium, Md.
Fansteel Inc., N Chicago, Ill.

Golding Mfg. Co., N. Arlington, N.J.
Granite State Machine Co., Inc., Manchester, N.H.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HMW Enterprises, Inc., Steelton, Pa.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
Malco Mfg. Co., Chicago, Ill.
Matrix Engineering Corp., Gardena, Calif.
Metropolitan Wire Goods, Wilkes-Barre, Pa.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Modular Devices, Inc., Gardena, Calif.
Monitor Sys., Inc., Ft. Washington, Pa.
Panel Controls Corp., Detroit, Mich.
Robinson-Nugent, New Albany, Ind.
Spec Plastics, No. Hollywood, Cal.
Stanford Applied Engrg., Santa Clara, Cal.
Thermalloy Co., Dallas, Tex.
Titchener, E.H. & Co., Binghamton, N.Y.
Zero Mfg. Co., Burbank, Cal.
Zorak Co., Watertown, Mass.

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Bivar, Inc., Santa Ana, Cal.
California Elctrn. Mfg. Co., Alamo, Calif.
Digital Equip. Corp., Maynard, Mass.
Elco, Willow Grove, Pa.
Honeywell, Inc., Wabash, Ind.
Kepco, Inc., Flushing, N.Y.
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Bud Radio, Inc., Willoughby, Ohio
Control Logic, Natick, Mass.
Elctrn. Modules Corp., Timonium, Md.
Eugene Engrg. Co., Inc., Rockland, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Int'l. Elctrn. Resch., Burbank, Cal.
Mobil Elctrns., Inc., Anderson, Ind.
Stanford Applied Engrg., Santa Clara, Cal.
Textool Prods., Inc., Irving, Tex.
Viking Modules, Waltham, Mass.
Zero Mfg. Co., Burbank, Cal.

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Amco Engrg. Co., Chicago, Ill.
Bridges Frank Assocs., Inc., Cherry Hill, N.J.
Bud Radio, Inc., Willoughby, Ohio
Craig Sys. Corp., Lawrence, Mass.
Donnelly Mfg. Co., Waltham, Mass.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Enclosure Corp., Pennsauken, N.J.
Erie Artisan Corp, Cleveland, Ohio
Eugene Engrg. Co., Inc., Rockland, Mass.
Falstrom Co., Passaic, N.J.
Feiner, P. & Sons, Inc., New York, N.Y.
Golding Mfg. Co., N. Arlington, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Holbrook-Merrill Co., Sunnyvale, Cal.
Honeywell, Ft. Washington, Pa.
Ingersoll Prods., Chicago, Ill.
Lockheed Aircraft Svc., Ont., Cal.
Metal Works, Inc., Hermann, Mo.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
Par-Metal Prods. Div., Brooklyn, N.Y.
Scientific-Atlanta, Inc., Atlanta, Ga.
Vent-Rak, Inc., Indianapolis, Ind.
Watson Mfg. Co., Inc., Jamestown, N.Y.
Zero Mfg. Co., Burbank, Cal.

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Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
NWL Transformers, Trenton, N.J.
Unitron, Garland, Tex.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Central Transformer Co., Chicago, Ill.
Energy Systems, Palo Alto, Cal.
Johnson Elec. Coil Co., Elmhurst, Ill.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Peerless Elec. Prods., Anaheim, Cal.
Peschel Instrs., Cape Coral, Fla.
Polyphase Instr. Co., Bridgeport, Pa.
Pulse Engrg., Inc., San Diego, Cal.
Robicon Corp., Pittsburgh, Pa
TDC Div., Littleton, Mass.
Tresco an Aydin Co., Phila., Pa.

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ADC Prods., Minneapolis, Minn.
Arnold Magneiics, Culver City, Cal.
Austron, Inc., Austin, Tex.
Coast Coil Co., Los Angeles, Calif.
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Hipotronics, Inc., Brewster, N.Y.
Hisonic, Inc., Olathe, Kans.
Microtran Co., Valley Stream, N.Y.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torotel, Inc., Grandview, Mo.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bicron Elctrns. Co., Canaan, Conn.
Bullock Magnetics Corp., Pomona, Calif.
Cal-Power Corp., El Segundo, Calif.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Electrical Windings, Inc., Chicago, Ill.
Electronic Devices, Cleve., Ohio
Elgin Elctrns., Waterford, Pa.
Energy Systems, Palo Alto, Cal.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Green Rectifier Corp., Fair Lawn, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Permavolt Transformers, Inc., S. Bend, Ind.
Peschel Instrs., Cape Coral, Fla.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Renco Elctrns., Inc., Hicksville, N.Y.
Sartron, Inc., Newberg, Ore.
SKG Assocs., Inc., Boston, Mass.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Torelco Inc., Irvington, N.J.
Transformer Design, Milwaukee, Wisc.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Reactors, Loading

ADC Prods., Minneapolis, Minn.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
NWL Transformers, Trenton, N.J.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Polyphase Instr. Co., Bridgeport, Pa.
Pulse Engrg., Inc., San Diego, Cal.
Queensboro Transformer & Mach., College Pt., N.Y.
TDC Div., Littleton, Mass.

Reactors, Saturable

ADC Prods., Minneapolis, Minn.
Artronic Instr. Co., Silver Spring, Md.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y. p 680
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Hipotronics, Inc., Brewster, N.Y. p 2955
Microtran Co., Valley Stream, N.Y.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
Transmagnetics Inc., Farmingdale, N.Y.
Unitron, Garland, Tex.
Vari-L Co., Inc., Denver, Colo.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
Allis-Chalmers, Milwaukee, Wisc.
American Magnetics Corp., Carterville, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bicron Elctrns. Co., Canaan, Conn.
Bullock Magnetics Corp., Pomona, Calif.
Cal-Power Corp., El Segundo, Calif.
Carson Mfg. Co., Indianapolis, Ind.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Constant Voltage Co., Chicago, Ill.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electronic Devices, Cleve., Ohio
Elgin Elctrns., Waterford, Pa.
EMP Elctrns., Inc., Phoenix, Ariz.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetics, Inc., Butler, Pa.
Magnetics, Sandy Lake, Pa.
Osborne Transformer Corp., Detroit, Mich.
Permavolt Transformers, Inc., S. Bend, Ind.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Queensboro Transformer & Mach., College Pt., N.Y.
Renco Elctrns., Inc., Hicksville, N.Y.
Sartron, Inc., Newberg, Ore.
Singer-General Precision, Inc., Little Falls, N.J.
SKG Assocs., Inc., Boston, Mass.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Torelco Inc., Irvington, N.J.
Transformer Design, Milwaukee, Wisc.
Tresco an Aydin Co., Phila., Pa.
Triad-Utrad, Huntington, Ind.

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Receptacles, Antenna Tapping
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Jerrold Elctrns. Corp., Philadelphia, Pa.

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Recorders, Sound Level—See Vol 1

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Electrospace Corp., Westbury..... p 323
Aero-Motive Mfg. Co., Kalamazoo, Mich.
Boonton Molding Co., Inc., Boonton, N.J.
Franklin Fibre-Lamitex, Wilmington, Del.
Hunter Spring, Hatfield, Pa.
Hykon Mfg. Co., Alliance, Ohio
Ind'l. Elec. Reels, Omaha, Neb.
Morey Corp, Downers Grove, Ill.
Olympic Instrs., Inc., Vashon, Wash.
Waber Elctrns., Inc., Philadelphia, Pa.

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Reference Books—See Technical Books

References, D-C Voltage—See Vol 1

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Refrigerants, Spray
Union Carbide, Chemicals & Plastics, New York, N.Y.

Refrigerated Cooling Equipment—See Air Conditioners

Regulators, Current—See Vol 1

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Relays, Meter—See Vol 2

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Relays, Overload—See Vol 2

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Relays, Over-Frequency & Under-Frequency—See Vol 2

Relays, Over-Voltage & Under-Voltage—See Vol 2

Relays, Phase-Sensing—See Vol 2

Relays, Photoelectric—See Vol 2

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Relays, Plunger—See Vol 2

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Resistor Networks—See Networks, Resistance—Vol 2

Resistors, Adjustable-Also See Potentiometers

Allen-Bradley Co., Milwaukee, Wisc. p 2908,2909
Amphenol Controls Div., Janesville, Wisc.
Carter Mfg. Corp., Hudson, Mass.
Centralab, Elctrns., Milwaukee, Wisc.
Computer Instrs., Hempstead, N.Y.
CTS Corp, Elkhart, Ind. p 2829
Dale Elctrns., Inc., Columbus, Neb. p 2845
Electro Sci. Inds., Portland, Ore.
Fluke, John Mfg. Co., Inc., Seattle, Wash.
General Elec. Co., Schenectady, N.Y.
IRC St. Peterburg Div. of TRW Inc., St. Petersburg, Fla.
Lectrohm, Inc., Chicago, Ill. p 2855
LTV Electrosystems, Huntington, Ind. p 2857
Milwaukee Resistor, Milwaukee, Wisc. p 2859
Multitech Microelctrns., Monterey Pk., Cal.
New England Instr., Natick, Mass.
Ohmite Mfg. Co., Skokie, Ill. p 2869
Resistors, Inc., Chicago, Ill. p 2876
Techno-Comps. Corp., Van Nuys, Cal.
Beckman Instrs., Helipot Div., Fullerton, Cal.
Bourns, Inc., Riverside, Cal.
Consolidated Resistance Amer., Yonkers, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Diplohmatic Div., Seattle, Wash.
Edison Elctrns. Div., Manchester, N.H.
General Radio Co., Concord, Mass.
Guildline Instrs., Inc., Larchmont, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keltron Corp., Waltham, Mass.
Litton Inds., Mt. Vernon, N.Y.
Mallory Controls, Frankfort, Ind.
Mark Micro-Elctrns. Mfg., Bayonne,, NJ
Model Rectifier, Edison, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Rotohmeters, Inc., Yonkers, N.Y.
Samarius, Inc., Derby, Conn.
Shigoto Inds., Ltd., New York, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Vacco Electronics, S. El Monte, Calif.
Ward Leonard, Mt. Vernon, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Weston Comps. Div., Archbald, Pa.

Resistors, Ballast Tube—See Tubes, Ballast—Vol 2

Resistors, Barretter

Dale Elctrns., Inc., Columbus, Neb.
Gamble, Charles T. Inds., Riverside, N.J.
Milwaukee Resistor, Milwaukee, Wisc.
Tel Labs., Manchester, N.H.
Weinschel Engrg. Co., Gaithersburg, Md.
Anritsu Electric Co., Ltd., Tokyo, Japan
Constanta Co. of Can., Montreal, Can.
Filmohm Div., Long Island City, N.Y.
Narda Microwave Corp., Plainview, N.Y.
PRD Elctrns., Inc., Westbury, N.Y.

Resistors, Beryllia Core—See Resistors, Integral Heat Dissapator

Resistors, Carbon Film

Amperex Elctrn. Corp., Hauppauge, N.Y. p 2819
Centralab, Elctrns., Milwaukee, Wisc.
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb. p 2847
IRC Burlington Div. of TRW INC., Burlington, Iowa p 2885
Mepco, Inc., Morristown, N.J. p 2864
Resistance Prods., Harrisburg, Pa. p 2874,2875
Victoreen Instr., Cleveland, Ohio
Welwyn Int'l., Inc., Westlake, Ohio p 2900
Aeg-Telefunken Corp., Englewood Cliffs, N.J.
Beman Mfg., Inc., New Cumberland, Pa.
Consolidated Resistance Amer., Yonkers, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Constanta Co. of Can., Montreal, Can.
Filmohm Div., Long Island City, N.Y.
Kidco, Inc., Medford, N.J.
Litton Inds., Mt. Vernon, N.Y.
Micro-Ohm Corp., El Monte, Cal.
Nucleonic Prods., Canoga Pk, Cal.
Penn Resistor Corp., Lansdale, Pa.
Pyrofilm Corp., Whippany, N.J.
Shigoto Inds., Ltd., New York, N.Y.
Stettner-Trush Inc., Cazenovia, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Texas Instruments, Dallas, Tex.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Resistors, Ceramic

Caddock Elctrns., Riverside, Cal.
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. p 2830,2831
Cal-R, Inc., Capacitor Div., Santa Monica, Cal. p 2830,2831
Cal-R, Inc., Thermonetics Div., Santa Monica, Cal. p 2830,2831
Carborundum Co., Niagara Falls, N.Y. p 2834
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb.
Gamble, Charles T. Inds., Riverside, N.J.
General Elec. Co., Schenectady, N.Y.
LTV Electrosystems, Huntington, Ind.
Mepco, Inc., Morristown, N.J.
Multitech Microelctrns., Monterey Pk., Cal.
RCL Elctrns., Inc., Irvington, N.J. p 2872
Southern Elctrns., Burbank, Cal.
Tel Labs., Manchester, N.H. p 2883
Welwyn Int'l., Inc., Westlake, Ohio
Alloys Unlimited, Inc., Encino, Calif.
AMBAC Inds., Garden City, N.Y.
Beltone Electronics Corp., Chicago, Ill.
Bradohm, Inc., Salamanca, N.Y.
C-F Electronics, Inc., Van Nuys, Calif.
Carbone Corp., Boonton, N.J.
Constanta Co. of Can., Montreal, Can.
Electrical Refractories Co., E. Palestine, Ohio
Electro-Science Labs., Philadelphia, Pa.
Elctrn. Precision Comps., Mt. Vernon, N.Y.
EMC Technology Inc, Philadelphia, Pa.
Ferro Corp., E. Liverpool, Ohio
Film Microelectronics, Inc., Burlington, Mass
Filmohm Div., Long Island City, N.Y.
Kelvin, Van Nuys, Cal.
Marstan Resistor, Orange, N.J.
Maryland Lava Co., Bel Air, Md.
Micro-Ohm Corp., El Monte, Cal.
National Beryllia Corp., Haskell, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Samarius, Inc., Derby, Conn.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
3M Co., St. Paul, Minn.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Resistors, Chip (For Microcircuits)

Caddock Elctrns., Riverside, Cal.
Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal. p 1537
Cal-R, Inc., Capacitor Div., Santa Monica, Cal. p 1537
Cal-R, Inc., Thermonetics Div., Santa Monica, Cal. p 1537
CTS Corp, Elkhart, Ind. p 2829
Dale Elctrns., Inc., Columbus, Neb. p 1539
IRC Philadelphia Div. of TRW INC., Philadelphia, Pa.
Mepco, Inc., Morristown, N.J. p 2864
Multitech Microelctrns., Monterey Pk., Cal.
Southern Elctrns., Burbank, Cal. p 1549
AMBAC Inds., Garden City, N.Y.
American Comps., Inc., Conshohocken, Pa.
Computer Components Int'l, Palm Beach Gardens, Fla.
Dickson Elctrns. Corp., Scottsdale, Ariz
Electra/Midland Corp., San Diego, Cal.
Halex, Inc., Torrance, Cal.
HyComp Inc., Maynard, Mass.
Megadyne Inds., Inc., Rochester, N.Y.
Micro Networks, Worcester, Mass.
Sloan Technology Corp., Santa Barbara, Calif.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.

Resistors, Composition, Carbon

Allen-Bradley Co., Milwaukee, Wisc. p 2822,2823
Carborundum Co., Niagara Falls, N.Y. p 2834
Centralab, Elctrns., Milwaukee, Wisc.
CTS Corp, Elkhart, Ind.
Erie Technological Prods. (EEM), Erie, Pa.
GC Elctrns., Rockford, Ill.
IRC Philadelphia Div. of TRW INC., Philadelphia, Pa. p 2896
Ohmite Mfg. Co., Skokie, Ill.
Stackpole Carbon Co., Elctrn. Comps. - Resistors, Kane, Pa. p 2877
Airco Singapore (Pte.) Ltd., Singapore 22,
Airco Speer Elctrns, Bradford, Pa.
Components Specialties, Inc., Freeport, N.Y.
Nucleonic Prods., Canoga Pk, Cal.
Ohio Carbon Co., Cleveland, Ohio
Sampson Elctrns. Prods. Div., Chicago, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Thor Elctrns. Corp., Elizabeth, N.J.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.

Resistors, Decade

Beckman Instrs., Cedar Grove, N.J.
Chronetics, Inc., Mt. Vernon, N.Y.
Dale Elctrns., Inc., Columbus, Neb.
Electro Sci. Inds., Portland, Ore. p 2919
Fluke, John Mfg. Co., Inc., Seattle, Wash.
Gamble, Charles T. Inds., Riverside, N.J.
General Resistance, Mt. Vernon, N.Y.
Julie Research Lab., New York, N.Y. p 2853
Mepco, Inc., Morristown, N.J.
Ohmite Mfg. Co., Skokie, Ill. p 2869
PPM, Inc., Bedford, Ohio
RCL Elctrns., Inc., Irvington, N.J.
Resistance Prods., Harrisburg, Pa.
Shallcross, Selma, N.C.
Tech Labs., Inc., Palisades Pk., N.J.
A.O.I.P., 75/Paris 12eme, France
C-F Electronics, Inc., Van Nuys, Calif.
Clarostat Mfg. Co., Inc., Dover, N.H.
Consolidated Resistance Amer., Yonkers, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Edison Elctrns. Div., Manchester, N.H.
Elctrn. Precision Comps., Mt. Vernon, N.Y.

General Radio Co., Concord, Mass.
Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Levell Electronics Ltd., High Barnet, Herts,, England
Marstan Resistor, Orange, N.J.
Meditor Instr. Co., Seattle, Wash.
Midg-Line Instr. Co., Miami, Fla.
Muirhead, Inc., Mountainside, N.J.
Rho Engrg. Co., Los Angeles, Calif
Rohde & Schwarz Sls., Passaic, N.J.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.

Resistors, Disc-Also See Resistors By Material Type

Dale Elctrns., Inc., Columbus, Neb.
IRC Boone Div. of TRW Inc., Boone, N.C.
Bradohm, Inc., Salamanca, N.Y.
Constanta Co. of Can., Montreal, Can.
Filmohm Div., Long Island City, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Ohio Carbon Co., Cleveland, Ohio
Pyrofilm Corp., Whippany, N.J.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Ward Leonard, Mt. Vernon, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

Resistors, Film, Metal

Caddock Elctrns., Riverside, Cal. p 2824-2828
Continental-Wirt Elctrns. Corp., Warminster, Pa. p 1895
Corning Glass Works, Elctrn. Prods. Div., Corning, N.Y.
CTS Corp, Elkhart, Ind.
Dale Elctrns., Inc., Columbus, Neb. p 2839,2847-2849
Engelhard Minerals & Chem., Murray Hill, N.J.
IRC Burlington Div. of TRW INC., Burlington, Iowa p 2885-2887
Mepco, Inc., Morristown, N.J. p 2864
Ohmite Mfg. Co., Skokie, Ill.
Sensor Tech., Van Nuys, Cal.
Sprague Elec. Co., No. Adams, Mass.
Victoreen Instr., Cleveland, Ohio p 2897
Vishay Resistor Prod. Div., Malvern, Pa. p 2898
Welwyn Int'l., Inc., Westlake, Ohio p 2900
Alloys Unlimited, Inc., Encino, Calif.
AMBAC Inds., Garden City, N.Y.
American Comps., Inc., Conshohocken, Pa.
Consolidated Resistance Amer., Yonkers, N.Y.
Constanta Co. of Can., Montreal, Can.
Electra/Midland Corp., Mineral Wells, Tex.
EMC Technology Inc, Philadelphia, Pa.
Film Microelectronics, Inc., Burlington, Mass
Filmohm Div., Long Island City, N.Y.
Halex, Inc., Torrance, Cal.
HyComp Inc., Maynard, Mass.
Kidco, Inc., Medford, N.J.
Megadyne Inds., Inc., Rochester, N.Y.
M.I.A.L. U.S.A., Inc., Nutley, N.J.
Micro Networks, Worcester, Mass.
Micro-Ohm Corp., El Monte, Cal.
Micro-Strain, Inc., Spring City, Pa.
Pyrofilm Corp., Whippany, N.J.
Stettner-Trush Inc., Cazenovia, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Texas Instruments, Dallas, Tex.
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ISC Magnetics Div., Huntington, N.Y.
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Syncor Prods. Co., Inc., Malden, Mass.
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United Mineral & Chem. Corp., New York, N.Y.
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EMC Technology Inc, Philadelphia, Pa.
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General Radio Co., Concord, Mass.
Jordan Electric Co., Van Nuys, Calif.
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Megadyne Inds., Inc., Rochester, N.Y.
Micro-Ohm Corp., El Monte, Cal.
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Tanger Elctrns., Hawthorne, Cal.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
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Rex Rheostat & Co., Roosevelt, N.Y.
States Co., Hartford, Conn.
Syncor Prods. Co., Inc., Malden, Mass.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
Ultronix, Inc., Grand Junction, Colo.
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Constanta Co. of Can., Montreal, Can.
Edison Elctrns. Div., Manchester, N.H.
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Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Micro-Ohm Corp., El Monte, Cal.
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Tanger Elctrns., Hawthorne, Cal.

Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
Ultronix, Inc., Grand Junction, Colo.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
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Consolidated Resistance Amer., Yonkers, N.Y.
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Constanta Co. of Can., Montreal, Can.
Edison Elctrns. Div., Manchester, N.H.
Electra/Midland Corp., Mineral Wells, Tex.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Elctrn. Precision Comps., Mt. Vernon, N.Y.
EMC Technology Inc, Philadelphia, Pa.
Filmohm Div., Long Island City, N.Y.
Guildline Instrs., Inc., Larchmont, N.Y.
Hamilton Hall Resistor Corp., Milwaukee, Wisc.
Instrument Resistors, Brick Town, N.J.
Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Marstan Resistor, Orange, N.J.
Megadyne Inds., Inc., Rochester, N.Y.
Micro-Ohm Corp., El Monte, Cal.
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Miller Electro-Resch. Labs., New Berlin, Wisc.
Precision Inc., Minneapolis, Minn
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Pyrofilm Corp., Whippany, N.J.
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Stettner-Trush Inc., Cazenovia, N.Y.
Syncor Prods. Co., Inc., Malden, Mass.
Tanger Elctrns., Hawthorne, Cal.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
Ultronix, Inc., Grand Junction, Colo.
United Mineral & Chem. Corp., New York, N.Y.
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Astrolab Inc., Linden, N J
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EMC Technology Inc, Philadelphia, Pa.
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Microwave Labs. America, Brooklyn, N.Y.
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Struthers Elctrns. Corp., Mamaroneck, N.Y.
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Miller Electro-Resch. Labs., New Berlin, Wisc.
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Pyrofilm Corp., Whippany, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Rho Engrg. Co., Los Angeles, Calif
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States Co., Hartford, Conn.
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Gamble, Charles T. Inds., Riverside, N.J.
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Jordan Electric Co., Van Nuys, Calif.

Kelvin, Van Nuys, Cal.
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Colber Corp., Irvington, N.J.
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Edison Elctrns. Div., Manchester, N.H.
Elctrn. Precision Comps., Mt. Vernon, N.Y.
EMC Technology Inc, Philadelphia, Pa.
Euclid Elec. & Mfg. Div., Madison, Ohio
Hamilton Hall Resistor Corp., Milwaukee, Wisc.
Instrument Resistors, Brick Town, N.J.
Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Kidco, Inc., Medford, N.J.
Mallory Controls, Frankfort, Ind.
Micro-Ohm Corp., El Monte, Cal.
Model Rectifier, Edison, N.J.
Penn Resistor Corp., Lansdale, Pa.
Precision Resistor Co., Hillside, N.J.
Pyrofilm Corp., Whippany, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Samarius, Inc., Derby, Conn.
Shigoto Inds., Ltd., New York, N.Y.
Square D Co., Park Ridge, Ill.
Tech-Ohm Elctrns., Inc., Long Island City, N.Y.
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United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
Ward Leonard, Mt. Vernon, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Westinghouse Elec. Corp., Pittsburgh, Pa.
Wiegand, Edwin L. Co., Pittsburgh, Pa.

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Bourns, Inc., Riverside, Calif.
Carbone Corp., Boonton, N.J.
Diplohmatic Div., Seattle, Wash.
EMC Technology Inc, Philadelphia, Pa.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
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EMC Technology Inc, Philadelphia, Pa.
Filmohm Div., Long Island City, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Model Rectifier, Edison, N.J.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Vac-Ohm Elctrns. Co., Haddonfield, N.J.
Ward Leonard, Mt. Vernon, N.Y.
Wiegand, Edwin L. Co., Pittsburgh, Pa.

Resistors, Suppressor

Carborundum Co., Niagara Falls, N.Y.
Continental-Wirt Elctrns. Corp., Warminster, Pa.
Dale Elctrns., Inc., Columbus, Neb.
IRC Boone Div. of TRW Inc., Boone, N.C.
Estes Engrg. Co., Gardena, Calif.
Ohio Carbon Co., Cleveland, Ohio
United Mineral & Chem. Corp., New York, N.Y.

Resistors, Surge

Carborundum Co., Niagara Falls, N.Y.
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Centralab, Elctrns., Milwaukee, Wisc.
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General Elec. Co., Schenectady, N.Y.
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C-F Electronics, Inc., Van Nuys, Calif.
Clarostat Mfg. Co., Inc., Dover, N.H.
Consolidated Resistance Amer., Yonkers, N.Y.
Constanta Co. of Can., Montreal, Can.
Edison Elctrns. Div., Manchester, N.H.
Elctrn. Precision Comps., Mt. Vernon, N.Y.
Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Mallory Controls, Frankfort, Ind.
Marstan Resistor, Orange, N.J.
Micro-Ohm Corp., El Monte, Cal.
Rho Engrg. Co., Los Angeles, Calif
Samarius, Inc., Derby, Conn.
Tanger Elctrns., Hawthorne, Cal.
Ward Leonard, Mt. Vernon, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England

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Bradohm, Inc., Salamanca, N.Y.
C-F Electronics, Inc., Van Nuys, Calif.
Canadian Research Institute, Don Mills, Ont., Canada
Clarostat Mfg. Co., Inc., Dover, N.H.
Colber Corp., Irvington, N.J.
Consolidated Resistance Amer., Yonkers, N.Y.
Consolidated Resistance Sls., Yonkers, N.Y.
Diplohmatic Div., Seattle, Wash.
Edison Elctrns. Div., Manchester, N.H.
Elctrn. Coils, Springfield, Mass.
Elctrn. Precision Comps., Mt. Vernon, N.Y.
Euclid Elec. & Mfg. Div., Madison, Ohio
Hamilton Hall Resistor Corp., Milwaukee, Wisc.
Indak Mfg. Corp., Northbrook, Ill.
Instrument Resistors, Brick Town, N.J.
Jordan Electric Co., Van Nuys, Calif.
Kelvin, Van Nuys, Cal.
Litton Inds., Mt. Vernon, N.Y.
Mallory Controls, Frankfort, Ind.
Marstan Resistor, Orange, N.J.
Maryland Lava Co., Bel Air, Md.
Mel-Rain Corp., Indianapolis, Ind.
Micro-Ohm Corp., El Monte, Cal.
Miller Electro-Resch. Labs., New Berlin, Wisc.
Model Rectifier, Edison, N.J.
Penn Resistor Corp., Lansdale, Pa.
Precision Inc., Minneapolis, Minn
Precision Resistor Co., Hillside, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Rho Engrg. Co., Los Angeles, Calif
Samarius, Inc., Derby, Conn.
Shigoto Inds., Ltd., New York, N.Y.
Square D Co., Park Ridge, Ill.
Stettner-Trush Inc., Cazenovia, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Tanger Elctrns., Hawthorne, Cal.
Ultronix, Inc., Grand Junction, Colo.
United Mineral & Chem. Corp., New York, N.Y.
Voltronics, Inc., Chicago, Ill.
Ward Leonard, Mt. Vernon, N.Y.
Welwyn Elec., Ltd., Bedlington, Northumberland, England
Westinghouse Elec., Buffalo, N. Y.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Resistors, Wire Woven

Cal-R, Inc., Cal. Resistor Div., Santa Monica, Cal.
Dale Elctrns., Inc., Columbus, Neb.
General Resistance, Mt. Vernon, N.Y.
Sage Elctrns., Rochester, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
States Co., Hartford, Conn.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
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Acme Model Engrg. Co., Ridgefield, N.J.
Anchor Plastics Co Inc., Long Island City, N. Y.
Keystone Elctrns. Corp., New York, N.Y.

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Carter Precision Elec. Co., Skokie, Ill.
Central Scientific Co., Chicago, Ill.
Clarostat Mfg. Co., Inc., Dover, N.H.
Device Seals, Inc., Sun Valley, Calif.
Edison Elctrns. Div., Manchester, N.H.
Keltron Corp., Waltham, Mass.
Litton Inds., Mt. Vernon, N.Y.
Mallory Controls, Frankfort, Ind.
Mel-Rain Corp., Indianapolis, Ind.
Model Rectifier, Edison, N.J.
Rex Rheostat & Co., Roosevelt, N.Y.
Samarius, Inc., Derby, Conn.
Shigoto Inds., Ltd., New York, N.Y.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Buffalo, N. Y.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Weston Comps. Div., Archbald, Pa.

Rings, Brazing

Engelhard Minerals & Chem., Murray Hill, N.J.
Atlantic India Rubber Co., Chicago, Ill.
Handy & Harman, New York, N.Y.
Kester Solder Co, Chicago, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Royal Inds, El Segundo, Calif
Semi Alloys, Inc., Mt. Vernon, N.Y.
Wilkinson Co., Westlake Village, Cal.

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GC Elctrns., Rockford, Ill.
Vaco Prods. Co., Chicago, Ill.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
Atlantic India Rubber Co., Chicago, Ill.
Century Fastener Corp., Brooklyn, N.Y.
Fastex Div., Des Plaines, Ill.
Federal Screw Prods., Inc., Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Helitronics Corp., Newark, N.J.
Industrial Retaining Ring, Irvington, N.J.
Johns-Manville Sls. Corp., New York, N.Y.
O'Hara Metal Prods. Co., San Francisco, Calif.
PIC Design Corp., Ridgefield,, Conn.
Reliance Div., Massillon, Ohio
Rotor Clip Co., Bronx, N.Y.
Royal Inds, El Segundo, Calif
Semi Alloys, Inc., Mt. Vernon, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Sterling Instr., New Hyde Pk., NY
Stop Components, Inc., Freeport, N.Y.
Superior Carbon Prods., Inc., Cleveland, Ohio
Templeman, D.R. Co., Plainville, Conn.
Tinnerman Div., Cleveland, Ohio
Tridair Inds., Torrance, Calif.
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Avdel, Inc., Burbank, Calif.
Bell Fasteners Corp., Paramus, N.J.
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Chase Metal Service Div., Cleveland, Ohio
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Chicago Rivet & Mach. Co., Bellwood, Ill.
Deutsch Fastener Corp., Los Angeles, Cal.
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Federal Screw Prods., Inc., Chicago, Ill.
Gibson Elec., Delmont, Pa.
Gries Reproducer Co., New Rochelle, N.Y.
Harper, H.M. Co., Morton Grove, Ill.
Helitronics Corp., Newark, N.J.
Luke Line Fasteners, Beverly, N.J.
Milford Rivet & Mach., Milford, Conn.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nylomatic Corp., Morrisville, Pa.
Olympic Fastening Sys., Downey, Cal.
Pylon Co., Inc., Attleboro, Mass.
Republic Steel Corp, Cleveland, Ohio
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Star Stainless Screw Co., Totowa, N.J.
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Teale Machine Co., Rochester, N.Y.
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Custom Materials, Inc., Chelmsford, Mass.
Electro-Science Labs., Philadelphia, Pa.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Metex Corp., Edison, N.J.
Minisink Rubber Co., Inc., Unionville, N.Y.
Multi-Flex Seals, Inc., Bronx, N.Y.
Pelmor Labs., Inc., Newtown, Pa.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Technical Wire Prods., Inc., Cranford, NJ
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Auburn Mfg. Co., Middletown, Conn.
Bacon Inds., Watertown, Mass.
Budd Co., Philadelphia, Pa.
Dow Corning Corp., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Emerson & Cuming, Inc., Canton, Mass.
Fel-Pro Inc., Skokie, Ill.
General Elec. Co., Waterford, N.Y.
General Elec., Providence, R.I.
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Kirkhill Rubber Co., Brea, Calif.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minnesota Rubber Co., Minneapolis, Minn.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
National Beryllia Corp., Haskell, N.J.
Noble & Westbrook, E. Hartford, Conn.
Ram Chems., Gardena, Calif.
Rehau Plastiks, Inc., Woodside, N.Y.
Stauffer-Wacker Silicone Corp., Adrian, Mich.
Tra-Con, Inc., Medford, Mass.
Vernay Labs., Yellow Springs, Ohio

Sapphire Parts

Alberox Corp., New Bedford, Mass.
Basic Ceramics Inc., Hawthorne, N.J.
Bird, Richard H. & Co., Inc., Waltham, Mass.
Ceramic Magnetics, Inc., Fairfield, N.J.
Crystal Optics Resch., Inc., Ann Arbor, Mich.
Dell Optics Co., Inc., N. Bergen, N.J.
Dixie Diamond Tool, Miami, Fla.
Eimac, San Carlos, Calif.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
Insaco, Inc., Quakertown, Pa.
Jones, A.D. Optical Works, Burlington, Mass.
Keller, Hugo P., Inc., New York, N.Y.
Larsen Importing Co., New York, N.Y.
Moser Jewel Co., Perth Amboy, N.J.
Nucleonic Prods., Canoga Pk, Cal.
S & S Optical Co., Inc., Ft. Wayne, Ind.
Stettner-Trush Inc., Cazenovia, N.Y.
Swiss Jewel Co., Philadelphia, Pa.
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DoAll Co., Des Plaines, Ill.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Foredom Elec. Co., Bethel, Conn.
Gardner-Denver Co., Quincy, Ill.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Helitronics Corp., Newark, N.J.
Hunter Tools, El Monte, Calif
Janel, Inc., Stirling, N.J.
Kedman Co., Salt Lake City, Utah
Keystone Elctrns. Corp., New York, N.Y.
Klein, Mathias & Sons, Chicago, Ill.
Larsen Importing Co., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Marathon Instrs. Div., Pico Rivera, Calif.
Moody Machine Prods. Co., Inc., Providence, R.I.
Philmore Mfg. Co., Richmond Hill, N.Y.
Portable Elec. Tools, Div., Geneva, Ill.
Proto Tool Co, Los Angeles, Calif.
Rosenberg Bros. & Co., Smithtown, N.Y.
Shakeproof Div., Elgin, Ill.
Snap-On Tools Corp., Kenosha, Wisc.
Stanley Tools, New Britain, Conn.
Starrett, L.S. Co., Athol, Mass.
Techni-Tool, Inc., Philadelphia, Pa.
Universal-Automatic Corp., Des Plaines, Ill.
Upson Tools, Inc., Rochester, N.Y.
Vigor Tool Co., New York, N.Y.
Williams J.H. & Co., Buffalo, N.Y.
Xcelite, Inc., Orchard Park, N.Y.
Zephyr Mfg. Co., Inglewood, Calif.

Screws, Lead, Feed & Translatory—See Drives & Drive Mechanisms—Vol 2

Screws—See Fasteners

Scribers, Wafer-Also See Machines & Accessories, Semiconductor Manufacturing—See Vol 1

Sealers—See Coatings

Sealing Kits, Cable End—See Kits, Cable-End Sealing

Sealing Service, Hermetic—See Services, Hermetic Sealing

Seals & Feedthrust, Environmental-See Feedthrust & Seals, Environmental

Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Deutsch Co., Banning, Calif.
Elecpac Inc., Cary, Ill.
Ferranti Ltd., Hollinwood, Lancs., England
Glasseal Prods. Co., Linden, N.J.
Granville-Phillips Co., Boulder, Colo.
Isotronics, Inc., New Bedford, Mass.
KDI Sealtron Corp., Cincinnati, Ohio
Leybold-Heraeus, Monroeville, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Parker Seal Co., Culver City, Calif.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Statham Instrs., Inc., Oxnard, Cal.
Ultek Div., Palo Alto, Calif.
Vacuum Equip. Div., Newton, Mass.
Varian Assocs., Palo Alto, Cal.
Vernay Labs., Yellow Springs, Ohio

Seals, Carbon

General Elec. Co., Schenectady, N.Y.
Graphite Metallizing Corp., Yonkers, N.Y.
Carbone Corp., Boonton, N.J.
Helwig Carbon Prods., Inc., Milwaukee, Wisc.
Ohio Carbon Co., Cleveland, Ohio
Poco Graphite, Inc., Decatur, Tex.
Pure Carbon Co., Inc., St. Marys, Pa.
Sealol, Inc., Providence, R.I.
St. Marys Carbon Co., St. Marys, Pa.
Stackpole Carbon Co., Carbon Div., St. Marys, Pa.
Textool Prods., Inc., Irving, Tex.
Union Carbide, Carbon Prods. Div., New York, N.Y.

Seals, Ceramic To Metal

Airpax Elctrns., Inc., Cambridge, Md.
American Lava Corp., Chattanooga, Tenn. ..... **p 2810**
Bendix, Franklin, Ind. ..... **p 2756**
Glass Tech., Newport Bch., Cal. p 2632
Victoreen Instr., Cleveland, Ohio
Weed Instr. Co., Elgin, Tex.
Accratronics Seals Corp., Burbank, Calif.
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Basic Ceramics Inc., Hawthorne, N.J.
Brush Beryllium Co., Cleveland, Ohio
Ceramaseal, Inc., New Lebanon Center, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Consolidated Ceramics & Metalizing, Flemington, N.J.
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Device Seals, Inc., Sun Valley, Calif.
Division Lead Co., Summit, Ill.
Eimac, San Carlos, Calif.
Elecpac Inc., Cary, Ill.
Electron Technology, Inc., Kearny, N.J.
Fansteel Inc., N Chicago, Ill.
Ferranti Ltd., Hollinwood, Lancs., England
General Elec. Co., Waterford, N.Y.
Glass Beads Co., Latrobe, Pa.
Glasseal Prods. Co., Linden, N.J.
ILC, Inc., Sunnyvale, Calif.
Isochem Resins Co., Lincoln, R.I.
Kidco, Inc., Medford, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Latronics Corp., Latrobe, Pa.
Materials for Elctrns., Inc., Jamaica, N.Y.
Metaplast Electrochemicals, Bronx, N.Y.
National Beryllia Corp., Haskell, N.J.
Networks Elctrn. Corp., Chatsworth, Calif.
Pfizer-Minerals, New York, N.Y.
Physical Sciences, Arcadia,, Cal.
Power Engrg. & Equip. Co., Inc., Torrance, Cal.
Rosenthal China Corp., New York, N.Y.
Sperry Elctrn. Tube, Gainesville, Fla.
Statham Instrs., Inc., Oxnard, Cal.
Tekform Prods. Co., Anaheim, Cal.
3M Co., St. Paul, Minn.
Torr Labs., Los Angeles, Cal.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Varian Assocs., Palo Alto, Cal.
Veritron West, Inc., Chatsworth, Calif.
Vernitron, Norwalk, Conn.

Seals, Glass To Metal

Airpax Elctrns., Inc., Cambridge, Md.
Bendix, Franklin, Ind. ..... **p 2756**
Glass Tech., Newport Bch., Cal. p 2632
Accratronics Seals Corp., Burbank, Calif.
Alloys Unlimited, Inc., Encino, Calif.
Anchor Alloys, Inc., Brooklyn, N.Y.
Armstrong Cork Co., Lancaster, Pa.
Astro Seal, S. El Monte, Cal.
Atlas/Uni-Seal, Valley Forge, Pa.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Cerro Corp., New York, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Connector Inds. Amer., Cincinnati, Ohio
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Device Seals, Inc., Sun Valley, Calif.
Division Lead Co., Summit, Ill.
Dolinko & Wilkens, Inc., Union City, N.J.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Electron Technology, Inc., Kearny, N.J.
Elctrn. Seals, Van Nuys, Cal.
General Elec. Co., Waterford, N.Y.
Glasseal Prods. Co., Linden, N.J.
Granville-Phillips Co., Boulder, Colo.
High Voltage Engrg. Corp., Burlington, Mass.
Improved Laminated Metal Co., Providence, R.I.
Indium Corp. America, Utica, N.Y.
Isochem Resins Co., Lincoln, R.I.
Isotronics, Inc., New Bedford, Mass.
Jenaer Glaswerk Schott & Gen. Inc., New York, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
KDI Sealtron Corp., Cincinnati, Ohio
Latronics Corp., Latrobe, Pa.
Mansol Ceramics Co., Inc., Belleville, N.J.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Metaplast Electrochemicals, Bronx, N.Y.
Microdot Inc., S. Pasadena, Calif.
Microwave Assocs., Inc., Burlington, Mass.
National Beryllia Corp., Haskell, N.J.
Networks Elctrn. Corp., Chatsworth, Calif.
Owens-Illinois, Consumer & Tech. Prods., Toledo, Ohio
Pfizer-Minerals, New York, N.Y.
Physical Sciences, Arcadia,, Cal.
Richland Glass Co., Inc., Richland, N.J.
Sperry Elctrn. Tube, Gainesville, Fla.
Statham Instrs., Inc., Oxnard, Cal.
Stettner-Trush Inc., Cazenovia, N.Y.
Syncor Prods. Co., Inc., Malden, Mass.
Tekform Prods. Co., Anaheim, Cal.
Thermal Amer. Fused Quartz, Montville, N.J.
Torr Labs., Los Angeles, Cal.
United American Metals Div., Brooklyn, N.Y.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Veritron West, Inc., Chatsworth, Calif.
Warren Comps. Corp., Warren, Pa.

Seals, Hermetic-Also See Services, Hermetic Sealing

Bendix, Franklin, Ind. ..... **p 2756**
Glass Tech., Newport Bch., Cal. p 2632
ABSCOA Inds., Inglewood, Calif.
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
APM Hexseal Corp., Englewood, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Connector Inds. Amer., Cincinnati, Ohio
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Denton Vacuum, Inc., Cherry Hill, N.J.
Deutsch Co., Banning, Calif.
Device Seals, Inc., Sun Valley, Calif.
Eimac, San Carlos, Calif.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Elctrn. Seals, Van Nuys, Cal.
Fansteel Inc., N Chicago, Ill.
Glasseal Prods. Co., Linden, N.J.
Granville-Phillips Co., Boulder, Colo.
Isotronics, Inc., New Bedford, Mass.
Jenaer Glaswerk Schott & Gen. Inc., New York, N.Y.
KDI Sealtron Corp., Cincinnati, Ohio
Kidco, Inc., Medford, N.J.
Latronics Corp., Latrobe, Pa.
Mansol Ceramics Co., Inc., Belleville, N.J.
Metal Bellows Corp., Sharon, Mass.
National Beryllia Corp., Haskell, N.J.
Networks Elctrn. Corp., Chatsworth, Calif.
Nyltite Corp. America, S. Plainfield, N.J.
Parker Seal Co., Culver City, Calif.
Physical Sciences, Arcadia,, Cal.
Shamban, W.S. & Co., Los Angeles, Calif.
Silicone Seals, Chicago, Ill.
Singer-General Precision, Inc., Little Falls, N.J.
Sperry Elctrn. Tube, Gainesville, Fla.
Tekform Prods. Co., Anaheim, Cal.
Varadyne Packaging & Mat'ls., Santa Monica, Cal.
Veritron West, Inc., Chatsworth, Calif.
Warren Comps. Corp., Warren, Pa.
Zippertubing Co., Los Angeles, Calif.

Seals, Metal To Metal

Alloys Unlimited, Inc., Encino, Calif.
ARC Prods. Div., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Associate General Labs., Inc., Brookfield, Ill.
Belfab, Daytona Beach, Fla.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Clarkson Labs., Inc., Camden, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Denton Vacuum, Inc., Cherry Hill, N.J.
Division Lead Co., Summit, Ill.
Fansteel Inc., N Chicago, Ill.
Fel-Pro Inc., Skokie, Ill.
General Elec., Detroit, Mich.
General Elec. Co., Waterford, N.Y.
Gould, Inc., Cleveland, Ohio
Granville-Phillips Co., Boulder, Colo.
High Voltage Engrg. Corp., Burlington, Mass.
H.K. Metalcraft Mfg. Co., Lodi, N.J.
Indium Corp. America, Utica, N.Y.
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
Latronics Corp., Latrobe, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Metallo Gasket Co., New Brunswick, N.J.
Omega Engrg., Inc., Stamford, Conn.
Parker Seal Co., Culver City, Calif.
Power Engrg. & Equip. Co., Inc., Torrance, Cal.
Royal Inds, El Segundo, Calif
Sealol, Inc., Providence, R.I.
Semicon Assoc., Inc., Lexington, Ky.
Templet Ind., Inc., Plainview, N.Y.
Ultek Div., Palo Alto, Calif.
Vernitron, Norwalk, Conn.

Seals, Microwave—See Gaskets, Shielding, R-F; Seals, Waveguide

Seals, Oil

Abesto Corp., Bloomfield, N.J.
ABSCOA Inds., Inglewood, Calif.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Aeroquip Corp., Jackson, Mich.
APM Hexseal Corp., Englewood, N.J.
Armstrong Cork Co., Lancaster, Pa.
Auburn Mfg. Co., Middletown, Conn.
Bacon Inds., Watertown, Mass.
Cottrell Paper Co., Inc., Fall River, Mass.
Crane Packing Co., Morton Grove, Ill.
Fel-Pro Inc., Skokie, Ill.
GAF Corp., New York, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hecht Rubber Corp., Jacksonville, Fla.
Houghton, E.F. & Co., Philadelphia, Pa.
Insulating Shapes, Inc., Bronx, N.Y.
Johns-Manville Sls. Corp., New York, N.Y.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minnesota Rubber Co., Minneapolis, Minn.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Parker Seal Co., Culver City, Calif.
Pelmor Labs., Inc., Newtown, Pa.
Penn Fibre & Specialty, Phila., Pa.
Polymer Corp., Reading, Pa.
Royal Inds, El Segundo, Calif
Sealol, Inc., Providence, R.I.
Shamban, W.S. & Co., Los Angeles, Calif.
Star Stainless Screw Co., Totowa, N.J.
Vernay Labs., Yellow Springs, Ohio

Seals, Plastic

Acme Mfg. & Gasket Co., Philadelphia, Pa.
Aeroquip Corp., Jackson, Mich.
Albany Int'l. Corp., Albany, NY
Alloys Unlimited, Inc., Encino, Calif.
Auburn Mfg. Co., Middletown, Conn.
Chemplast, Inc., Wayne, N.J.
Circle Seal Corp., Anaheim, Cal.
Crane Packing Co., Morton Grove, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Oceanics, Inc., Compton, Calif.
Fluoro Plastics, Phila., Pa.
Fluorocarbon Co., Anaheim, Cal.
Lundey Assocs., Inc., Waltham, Mass.
Nylogrip Prods. Co., Waltham, Mass.
Nyltite Corp. America, S. Plainfield, N.J.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Rogers Corp., Rogers, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Tri-Point Inds., Inc., Commack, N.Y.
Zippertubing Co., Los Angeles, Calif.

Seals, Rubber

Abesto Corp., Bloomfield, N.J.
ABSCOA Inds., Inglewood, Calif.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Adhesive Prods. Corp., Bronx, N.Y.
Aeroquip Corp., Jackson, Mich.
APM Hexseal Corp., Englewood, N.J.
Armstrong Cork Co., Lancaster, Pa.
Atlantic India Rubber Co., Chicago, Ill.
Auburn Mfg. Co., Middletown, Conn.
Bacon Inds., Watertown, Mass.
Bellofram Corp., Burlington, Mass.
Cam-Lok Div., Cincinnati, Ohio
Chomerics, Inc., Woburn, Mass.
Circle Seal Corp., Anaheim, Cal.
Continental Rubber Works, Erie, Pa.
Edwards High Vacuum, Oakville, Ont., Can.
Electro Oceanics, Inc., Compton, Calif.
Fel-Pro Inc., Skokie, Ill.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Houghton, E.F. & Co., Philadelphia, Pa.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Johns-Manville Sls. Corp., New York, N.Y.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Kirkhill Rubber Co., Brea, Calif.
Lundey Assocs., Inc., Waltham, Mass.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minnesota Rubber Co., Minneapolis, Minn.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Parker Seal Co., Culver City, Calif.
Paul, F.H. & Stein Bros., New York, N.Y.
Pelmor Labs., Inc., Newtown, Pa.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Press-On Prods., Addison, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Shamban, W.S. & Co., Los Angeles, Calif.
Uniroyal, Inc., New York, N.Y.
Vernay Labs., Yellow Springs, Ohio

Seals, Rubber To Metal

Adhesive Prods. Corp., Bronx, N.Y.
Aeroquip Corp., Jackson, Mich.
Cam-Lok Div., Cincinnati, Ohio
Continental Rubber Works, Erie, Pa.
Electro Oceanics, Inc., Compton, Calif.
Fel-Pro Inc., Skokie, Ill.
General Elec. Co., Waterford, N.Y.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hardman Inc., Belleville, N.J.
High Voltage Engrg. Corp., Burlington, Mass.
Houghton, E.F. & Co., Philadelphia, Pa.
Isochem Resins Co., Lincoln, R.I.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minnesota Rubber Co., Minneapolis, Minn.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Parker Seal Co., Culver City, Calif.
Pelmor Labs., Inc., Newtown, Pa.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Richardson Co., Des Plaines, Ill.
Rogers Corp., Rogers, Conn.
Silicone Seals, Chicago, Ill.
Townsend Co., West Newton, Pa.
Vacuum Resch. Mfg., San Ramon, Cal.
Vernay Labs., Yellow Springs, Ohio

Seals, Silicone Rubber

RFL Inds., Instr. Div., Boonton, N.J.
Abesto Corp., Bloomfield, N.J.
ABSCOA Inds., Inglewood, Calif.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Aeroquip Corp., Jackson, Mich.
APM Hexseal Corp., Englewood, N.J.
Armstrong Cork Co., Lancaster, Pa.
Auburn Mfg. Co., Middletown, Conn.
Avionics, Inc., South Bend, Ind.
Bacon Inds., Watertown, Mass.
Bellofram Corp., Burlington, Mass.
Cam-Lok Div., Cincinnati, Ohio
Chomerics, Inc., Woburn, Mass.
Continental Rubber Works, Erie, Pa.
Fel-Pro Inc., Skokie, Ill.
General Elec. Co., Waterford, N.Y.
Hardman Inc., Belleville, N.J.
Hecht Rubber Corp., Jacksonville, Fla.
Houghton, E.F. & Co., Philadelphia, Pa.
Ind'l. Elctrn. Rubber, Twinsburg, Ohio
Isochem Resins Co., Lincoln, R.I.
Johns-Manville Sls. Corp., New York, N.Y.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Kirkhill Rubber Co., Brea, Calif.
Lundey Assocs., Inc., Waltham, Mass.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minnesota Rubber Co., Minneapolis, Minn.
Minor Rubber Co., Inc., Bloomfield, N.J.
Multi-Flex Seals, Inc., Bronx, N.Y.
Parker Seal Co., Culver City, Calif.
Paul, F.H. & Stein Bros., New York, N.Y.
Pelmor Labs., Inc., Newtown, Pa.
Press-On Prods., Addison, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Richardson Co., Des Plaines, Ill.
Silicone Seals, Chicago, Ill.
TRG Prods., E. Boston, Mass.
Vernay Labs., Yellow Springs, Ohio

Seals, Waveguide—See Vol 1

Search Unit, Magnetic Tape—See Tape Search Equipment—Vol 1

Selective Calling Devices—See Comm. Systems, Selective Paging—Vol 1

Self-Lubricating Materials—See Materials, Self-Lubricating

Selsyns—See Motors, Synchronous—Vol 2

Semiconductor Cases—See Cans, Semiconductor

Semiconductor Joint Compound—See Vol 2

Semiconductor Material—See Crystals, Semiconductor—Vol 1

Semiconductor Readouts—See Readouts, Semiconductor—Vol 2

Semiconductor Wafer Fabrication, Artwork (Precision)—See Vol 2

Semiconductor Wafer Fabrication, Assembling (Packaging)—See Vol 2

Semiconductor Wafer Fabrication, Designing (Topological)—See Vol 2

Semiconductor Wafer Fabrication, Maskmaking (Tooling)—See Vol 2

Semiconductor Wafer Fabrication, Processing—See Vol 2

Semiconductor Wafer Fabrication, Testing—See Vol 2

Semiconductors—See Diodes; Rectifiers; Transistors—Vol 2

Sensors, Ice, Sleet & Snow—See Detectors, Ice, Sleet & Snow—Vol 2

Sensors, Temperature—See Bolometers, Thermistors, Transducers—Vol 2

Services, Assembly & Fabrication

Almond Instrs. Co., Covina, Cal
American Elctrn. Labs., Inc., Lansdale, Pa.
Amphenol Cadre Div., Endicott, N.Y. p 2814
Amphenol Ind'l. Div., Chicago, Ill.
Amphenol Sales Div., Broadview, Ill. p 2814
Art Wire & Stamping Co., Cedar Knolls, N.J.
Associated Resch., Chicago, Ill.
Astro-Space Labs., Huntsville, Ala
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Bulova Watch Co., Servo Prods. Elctrns. Div., Woodside, N.Y.
Chicago Switch, Chicago, Ill.
Consolidated Reactive Metals, Mamaroneck, N.Y.
Data-Control Systems, Danbury, Conn.
Datacom, Inc., Ft. Walton Bch., Fla.
DDC, Hicksville, N.Y.
Digitron Corp., Norristown, Pa.
Douglas Electronics, Inc., San Leandro, Cal.
Elco, Willow Grove, Pa.
Electro-Mechanics Co., Austin, Tex. p 452
Electronic Enclosures, El Segundo, Cal.
Elctrn. Molding Corp., Woonsocket, R.I.
FAE Instr. Corp., Huntington Sta., N.Y.
Formica Metal Prods. Co., Inc., Medford, Mass.
Frequency Engrg. Labs., Farmingdale, N.J.
Genisco Tech. Corp., Genistron Div., Compton, Cal. .....p 1514,1515
Gibbs Mfg. & Resch., Janesville, Wisc.
Guardian Elec. Mfg. Co., Chicago, Ill.
Honeywell, Denver, Colo.
Infodex, Inc., Waterbury, Conn.
Int'l. Electro-Magnetics, Palatine, Ill. p 311
Jonard Inds. Corp., Bronx, N.Y.
Kahle Engrg. Co., Union City, N.J.
Melcor Elctrns. Corp., Farmingdale, N.Y.
Neshaminy Transformer, Furlong, Pa.
Oak Mfg., Crystal Lake, Ill.
Opad Elec. Co., Inc., New York, N.Y.
Oven Inds., Mechanicsburg, Pa.
Re-el Circuits, Inc., Totowa Boro, N.J. p 326,327
Rectifier Comps. Corp., Freeport, N.Y.
Ripley Co., Inc., Middletown, Conn. p 2791
Rosemount Plug-In, Nashville, Tenn.
Severna Operation, East Orange, N.J. p 2814
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Summit Engrg. Corp., Bozeman, Mont.
Trio Labs, Inc., Plainview, N.Y.
Wagner Elec. Corp., Livingston, N.J.
Waveline, Inc., W. Caldwell, N.J.
AAI Corp., Baltimore, Md.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abalon Precision Mfg. Corp., Bronx, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Advanced Circuitry Div., Springfield, Mo.
Aero Vac Corp., Troy, N.Y.
Aerolite Electronics Corp., Union City, N.J.
Aerolux Light Co. Inc., New York, N.Y.
Aidlin Automation, Inc., Brooklyn, N.Y.
Airtec, Inc., Roselle, N.J.
Algo, S. Hackensack, N.J.
All Star Prods., Inc., Defiance, Ohio
Alloys Unlimited, Inc., Encino, Calif.
Altron Elctrns. Co., Woodlyn, Pa.
American Aluminum Co., Mountainside, N.J.
American Elec. Cable Co., Holyoke, Mass.
American Elctrns., Inc., Fullerton, Cal.
Amperex Elctrn., Slatersville, R.I.
Analog General Corp., Oceanside, N.Y.
Anchor Specialty Mfg., Teterboro, N.J.
Ansley Div. ACI Inc., Perkasie, Pa.
Apahouser Corp. of N.E., Boston, Mass.
Applied Control Co., Fairfield, N.J.
Applied Design Co., Inc., Tonawanda, N.Y.
A.R.F. Products, Inc., Boulder, Colo.
A.R.F. Products, Inc., Raton, N.M.
Argent Inds., Inc., Dayton, Ohio
Artech Corp., Falls Church, Va.
Artisan Elctrns. Corp., Parsippany, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atlantic Instrs. Corp., Watertown, Mass.
Aubin, A.E. Co., Glastonbury, Conn.
Auricord, Long Island City, N.Y.
Austin Elctrns., Roselle, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Automation Dynamics, Northvale, N.J.
Avco Corp., Cincinnati, Ohio
Avionics, Inc., South Bend, Ind.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
BAC Elctrns., Pennsauken, N.J.
Barger Corp., Sunnyvale, Cal.
Barnes & Reinecke, Inc., Chicago, Ill.
BECO Solid State Systems, Salem, Va.
Belleville Elctrns. Co., Belleville, Mich.
Beman Mfg., Inc., New Cumberland, Pa.
Bio-Medical Elctrns., Inc., Rockville, Md.
Blickman, S., Inc., Weehawken, N.J.
Boehme, H.O., Inc., Plainview, N.Y.
Borg-Warner Thermoelectrics, Des Plaines, Ill.
Broadview Inds. Corp., Hempstead, N.Y.
Brooks & Perkins, Inc., Livonia, Mich.
Bud Radio, Inc., Willoughby, Ohio
Burr-Brown Resch. Corp., Tucson, Ariz.
Canrad Precision Inds., Inc., Pelham, N.Y.
Carter Precision Elec. Co., Skokie, Ill.
Celestial Comps., Inc., Covina, Cal.
Centerline Specialties, Boulder, Colo.
CGS Units, Inc., Rochester, N.Y.
Chemelec Prods., Inc., Cherry Hill, N.J.
Chronomatic Div., Burbank, Cal.
Climatronics Corp., Hauppauge, N.Y.
Coast Elctrns., Manhattan Beach, Cal.
Coil Co. of Amer., Northvale, N.J.
Cole Instr., Costa Mesa, Cal.
Colorado Instrs., Inc., Broomfield, Colo.
ComGeneral Corp., Dayton, Ohio
Computer Components Int'l, Palm Beach Gardens, Fla.
Computer Diode, Fair Lawn, N.J.
Computer Mate, Inc., San Clemento, Cal
Conductorlab, Inc., Groton, Mass.
Consolidated Resistance Sls., Yonkers, N.Y.
Cooke Engrg. Co., Alexandria, Va.
Craig Sys. Corp., Lawrence, Mass.
Data Technology Corp., Palo Alto, Cal.
Design Automation, Inc., Lexington, Mass.
Desman Elctrns., Rochester, N.Y.
Devco Engrg., W. Caldwell, N.J.
Device Seals, Inc., Sun Valley, Calif.
Diamond Repeater Co., Madison, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dura Plastics N.Y., Inc., Westport, Conn.
Dynacool Mfg. Co., Inc., Saugerties, N.Y.
Dynatronic Cable Engrg., Sub. National Wire & Cable, Los Angeles, Cal.
Eastern Co., North Branch, N.J.
Eby Sls. Co., Jamaica, N.Y.
EG & G, Inc., Salem, Mass.
El-Rad Mfg. Co., Chicago, Ill.
Electro-Sonics Inc., Spofford, N.H.
Electro-Standards Labs., Inc., Miami, Fla.
Electrochemical Inds., Inc., Worcester, Mass.
Electrocom Inds., So. Bend, Indiana
Elctrn. Control Co., Dresher, Pa.
Electronic Design Labs., Inc., Phila., Pa.
Elctrn. Ideas, Wyncote, Pa.
Elgin Elctrns., Waterford, Pa.
Eljay Corp., Columbia, Md.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Energy Systems, Palo Alto, Cal.
Engineered Plastics, Inc., Gibsonville, N.C.
E.O. Electronics, Inc., Mountain Lakes, N.J.
Estes Engrg. Co., Gardena, Calif.
Etchit, Inc., S. Hopkins, Minn.
Eugene Engrg. Co., Inc., Rockland, Mass.
Excel Specialty Corp., Chicago, Ill.
Falstrom Co., Passaic, N.J.
Federal Mach. Co., Inc., Jersey City, N.J.
Fifth Dimension, Princeton, N.J.
Fischer & Porter Co., Warminster, Pa.
Flexible Circuits, Inc., Warrington, Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
GAF Corp., New York, N.Y.
Gardner Cryogenics Corp., Bethlehem, Pa.
GCA Technology Div., Bedford, Mass.
General Circuits, Inc., Rochester, N.Y.
General Dynamics, San Diego, Cal.
General Reliance Div., Dover, N.J.
Geo Space, Houston, Tex.
Gerrard, A.J. & Co., Des Plaines, Ill.
Glar-Ban Corp., Buffalo, N.Y.
Glasseal Prods. Co., Linden, N.J.
Golding Mfg. Co., N. Arlington, N.J.
Grafix, Inc., Albuquerque, N.M.
Granite State Machine Co., Inc., Manchester, N.H.
Gray Resch. & Dev. Co., E. Hartford, Conn.
Green Elec. Corp., Fair Lawn, N.J.
GRFF, Port Salerno, Fla.
Gridcraft, Ft. Wayne, Ind.
Gries Reproducer Co., New Rochelle, N.Y.
GTE Sylvania Inc., Warren, Pa.
Halmar Elctrns., Inc., Columbus, Ohio
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hartman Electrical Mfg., Mansfield, Ohio
Haydu Prods., Inc., Opa Locka, Fla.
Hermes Elctrns., Dartmouth N.S., Can.
Hi-Lo Mfg. Corp., Chicago, Ill.
HMW Enterprises, Inc., Steelton, Pa.
Hoagland Instr., Red Bank, N.J.
Hobson Bros., Inc., Chicago, Ill.
Holbrook-Merrill Co., Sunnyvale, Cal.
Holmberg, Inc., Melville, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Hughes-Treitler Mfg. Corp., Garden City, N.Y.
Indofex, Inc., Waterbury, Conn.
Instru-Lec Corp., Mt. Vernon, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Intercontinental Elctrns., E. Rochester, N.Y.
ITI Electronics, Inc., Clifton, N.J.
ITT Mackay Marine, Clark, N.J.
Jersey Tech. Conslts., Morristown, N.J.
Jettron Prods., Hanover, N.J.
Joliet Control Corp., Joliet, Ill.
Kaiser CATV, Phoenix, Ariz
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Kelvin, Van Nuys, Cal.
Kentrox Inds., Inc., Portland, Ore.
Kevlin Mfg. Co., Woburn, Mass.
Keystone Elctrns. Corp., New York, N.Y.
Keystone Micro Scan., Boston, Mass.
Kinetron Corp., Asbury Park, N.J.
Kings Elctrns., Tuckahoe, N.Y.
Lane Inds., North Hollywood, Calif.
Latronics Corp., Latrobe, Pa.
Lear Siegler, Inc., Santa Monica, Calif.

Lear Siegler, Inc., Elyria, Ohio
Lehigh Valley Elctrn., Inc., Fogelsville, Pa.
Lehighton Elctrns., Inc., Lehighton, Pa.
Lem Instrument Corp., Farmingdale, N.Y.
Linden Labs., Inc., State College, Pa.
Livingston Elctrn., Hanover, N.J.
Lochart Inds., Inc., Paramount, Cal.
Lockheed Aircraft Svc., Ont., Cal.
Lockheed Aircraft Svce., Special Devices Div., Ontario, Calif.
Lockheed Elctrns. Co., Watchung, N.J.
M-T Elctrns. Co., San Leandro, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Manger Elec. Co., Inc., Stamford, Conn.
Maryland Lava Co., Bel Air, Md.
Maurer, J.A., Inc., Woodside, N.Y.
Maury Microwave Corp., Cucamonga, Calif.
Maytronics, Inc., Colorado Springs, Colo.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Merco Prods. Co., Inc., Eugene, Ore.
Mercury Elctrns. Corp., York, Pa.
Meson Elctrns. Co., Inc., Rochester, N.Y.
MI-KRO Connector Div., Long Island City, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Microflect Co., Salem, Ore.
Mid-West Metal Prods., Kansas City, Kans.
Midland Standard Inc., Elgin, Ill.
Miller R.A. Inds., Inc., Grand Haven, Mich.
Mobil Elctrns., Inc., Anderson, Ind.
Monitor Sys., Inc., Ft. Washington, Pa.
Mutron Corp., Brockton, Mass.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Ogden Technology Labs., Fullerton, Cal.
O'Hara Metal Prods. Co., San Francisco, Calif.
Omega Labs., Inc., Rowley, Mass.
Ostby & Barton Co., Providence, R.I.
Paraplegics Mfg., Bensenville, Ill.
Parks, Henry Francis Lab., Seattle, Wash.
Permonite Mfg. Co., Chicago, Ill.
Petty Geophysical Engrg., San Antonio, Tex.
Philco-Ford Corp., Washington, D.C.
Photo Chemical Prods. Cal., Santa Monica, Cal.
PMC Designing, Cincinnati,, Ohio
Power Control Corp., Pittsburgh, Pa.
Precision Inc., Minneapolis, Minn
Precision Tube, No. Wales, Pa.
Premier Microwave, Port Chester, N.Y.
Projects Unlimited, Inc., Dayton, Ohio
Quartzite Processing, Inc., Malden, Mass.
Radiation Sys., Inc., McLean, Va.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Ram Meter, Inc., Ferndale, Mich.
RCA Service Co., Camden, N.J.
Rectico, Inc., Cedar Grove, N.J.
Redman Elctrns. Corp., Enfield, Conn.
Rho Engrg. Co., Los Angeles, Calif
Riverbank Labs., Geneva, Ill.
Robertson Instr., Azusa, Cal.
Robinson-Nugent, New Albany, Ind.
Rodale Elctrns., Inc., Garden City, N.Y.
Sage Labs. Inc., Natick, Mass.
Samarius, Inc., Derby, Conn.
Santa Fe Mfg. Co., Bronx, N.Y.
Semicon Assoc., Inc., Lexington, Ky.
Seven Assocs., Sunnyvale, Calif.
Shamban, W.S. & Co., Los Angeles, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Silicone Seals, Chicago, Ill.
Sillcocks-Miller Co., Maplewood, N.J.
SKG Assocs., Inc., Boston, Mass.
Sola Elec. Div., Elk Grove Village, Ill.
Sparton Southwest, Inc., Albuquerque, N.M.
Sperry Marine Sys., Charlottesville, Va.
Stainless, Inc., N. Wales, Pa.
Stanley Ind'l. Hardware Div., New Britain, Conn.
Sterling Instr., New Hyde Pk., NY
Stevenson Engrg. & Mfg., Portland, Ore.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Subminiature Instrs. Corp., Riverside, Calif.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Syncor Prods. Co., Inc., Malden, Mass.
Syntec Corp., Austin, Tex.
Systems Resch. Labs., Dayton, Ohio
TACO Div., Sherburne, N.Y.
Tekform Prods. Co., Anaheim, Cal.
Tempo Instr., Plainview, N.Y.
Textool Prods., Inc., Irving, Tex.
Tickle, Arthur Engrg. Works, Inc., Brooklyn, N.Y.
Times Wire & Cable, Wallingford, Conn.
Tri-Dex Co., Visalia, Calif.
Tri-Tronics Lab., Euless, Tex.
Tricraft Prods., Chicago, Ill.
Twin City Metalseal, Inc., Minneapolis, Minn.
Ultra Carbon Corp., Bay City, Mich.
Unex Labs., Inc., Hathorne, Mass.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
Universal Instrs., Binghamton, N.Y.
U.S. Elctrns., Lyndhurst, N.J.
Valpey Corp., Holliston, Mass.
Varo, Inc., Texas Div., Garland, Tex.
Vestal Modern Design Corp., Vestal, N.Y.
Victor Microwave, Inc., Wakefield, Mass.
Viewlex, Holbrook, N.Y.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Vitro Laboratories, Silver Spring, Md.
Viz Mfg. Co., Philadelphia, Pa.
Waber Elctrns., Inc., Philadelphia, Pa.
Waters Instrs., Inc., Rochester, Minn
Western Coil & Elec. Co., Racine, Wisc.
Western Gear Corp., Pasadena, Cal.
Whalite Mfg. Co., Montville, N.J.
Whitaker Cable Corp., N. Kansas City, Mo.
Wilmer Mfg. Co., Beltsville, Md.
Wiring Services Co, Santa Ana, Cal.
Wood, C.N. Mfg. Co., Newtown, Pa.
Zero Mfg. Co., Burbank, Cal.
Zonic Tech. Labs., Cincinnati, Ohio

Services, Calibration & Instrument Repair

American Elctrn. Labs., Inc., Lansdale, Pa.
Data-Control Systems, Danbury, Conn.
Honeywell, Denver, Colo.
Polarad Elctrn, Instrs., Lake Success, N.Y.
Tektronix, Inc., Beaverton, Ore.
Victoreen Instr., Cleveland, Ohio
A & M Instrument, Inc., Great Neck, N.Y.
Altron Elctrns. Co., Woodlyn, Pa.
AUL Instrs., Inc., Flushng, N.Y.
Avco Corp., Cincinnati, Ohio
Avco Meas. Standards Labs., Wilmington, Mass.
BAC Elctrns., Pennsauken, N.J.
BECO Solid State Systems, Salem, Va.
BLH Elctrns., Inc., Waltham, Mass.
Bludworth Marine Div., Linden, N.J.
Calitronics Corp., Yonkers, NY
Columbia Resch. Labs., Woodlyn, Pa.
Consolidated Resistance Sls., Yonkers, N.Y.
Continental Rentals Div., Bedford, Mass.
Detroit Testing Lab., Detroit, Mich.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrical Instr. Svc., Inc., Mt. Vernon, N.Y.
Electrical Testing Labs., Inc., New York, N.Y.
Electro-Optical Div., Northampton, Mass.
Electro-Standards Labs., Inc., Miami, Fla.
Eppley Lab., Inc., Newport, R.I.
Fischer & Porter Co., Warminster, Pa.
Foxboro Co., Foxboro, Mass.
Hallmark Standards, Inc., Mt. Vernon, N.Y.
Hermes Elctrns., Dartmouth N.S., Can.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Hughes Aircraft Co, Culver City, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
Instrument Labs. Corp., Chicago, Ill.
International Light, Newburyport, Mass.
Japanese Prods. Corp., New Rochelle, N.Y.
Landsverk Electrometer Co., Glendale, Cal.
Lear Siegler, Inc., Santa Monica, Calif.
Leeds & Northrup Corp., No. Wales, Pa.
Lockheed Aircraft Svc., Ont., Cal.
Lockheed Aircraft Svce., Special Devices Div., Ontario, Calif.
Lockheed Elctrns. Co., Watchung, N.J.
Main Elctrns., Inc., Wichita, Kans.
Marlin Mfg. Corp., Cleveland, Ohio
Maury Microwave Corp., Cucamonga, Calif.
National Astro Labs., Burbank, Cal.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Ogden Technology Labs., Fullerton, Cal.
Packard Instrument Co., Inc., Downers Grove, Ill.
Philco-Ford Corp., Washington, D.C.
Photo Resch. Corp., Burbank, Calif.
Ram Meter, Inc., Ferndale, Mich.
Ramsay Engrg. Co., Anaheim, Calif.
RCA Govt. & Comm. Sys., Moorestown, N.J.
RCA Service Co., Camden, N.J.
Robertson Instr., Azusa, Cal.
Rockwell Engrg. Co., Indianapolis, Ind.
Schoeffel Instr. Corp., Westwood, N.J.
SSCO Standards Lab., Inc., Detroit, Mich.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
Systems Resch. Labs., Dayton, Ohio
Taylor Instr. Process Control Div., Rochester, N.Y.
Technical Instrs., Inc., No. Haven, Conn.
Thwing-Albert Instr. Co., Philadelphia, Pa.
Transducers, Inc., Santa Fe Springs, Calif.
Tucker Elctrns. Co., Garland, Tex.
U.S. Testing Co., Inc., Hoboken, N.J.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Weston Instruments, Inc., Newark, N.J.
Wood, C.N. Mfg. Co., Newtown, Pa.
Wyle Labs., El Segundo, Calif.

Services, Coating (All-Types)

Clarke - Hess, New York, N.Y.
Abesto Corp., Bloomfield, N.J.
Acheson Colloids Co., Port Huron, Mich.
Alpha Metals, Inc., Jersey City, N.J.
Artech Corp., Falls Church, Va.
Atlantic Instrs. Corp., Watertown, Mass.
Brooks & Perkins, Inc., Livonia, Mich.
California Fine Wire, Grover City, Cal.
Canrad Precision Inds., Inc., Pelham, N.Y.
Cerac, Inc., Butler, Wisc.
Chase & Sons, Inc., Randolph, Mass.
Chemical Micro Milling Co, Camden, N.J.
Chemplast, Inc., Wayne, N.J.
Collins Radio Co., Dallas, Tex.
Denton Vacuum, Inc., Cherry Hill, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Duramic Prods., Inc., Palisades Park, N.J.
Electrochemical Inds., Inc., Worcester, Mass.
Energy Sciences Inc., Burlington, Mass.
Franklin Fibre-Lamitex, Wilmington, Del.
General Plastics Corp., Bloomfield, N.J.
Green Elec. Corp., Fair Lawn, N.J.
GTE Sylvania, Inc., Towanda, Pa.
Hardman Inc., Belleville, N.J.
Harper-Leader, Inc., Waterbury, Conn.
Hi-Lo Mfg. Corp., Chicago, Ill.
High Voltage Engrg. Corp., Burlington, Mass.
Hughes Aircraft Co, Culver City, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
Isomet Corp., Oakland, N.J.
Kennametal Inc., Latrobe, Pa.
Keystone Micro Scan., Boston, Mass.
Kinney Vacuum Co., Boston, Mass.
Liberty Mirror Div., Brackenridge, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Merit Plating Co., Inc., Bronx, N.Y.
Misco Div., Muskegon, Mich.
National Beryllia Corp., Haskell, N.J.
Natvar Corp., Rahway, N.J.
Optical Inds., Santa Ana, Cal.
Pacific Universal Prods. Corp., Pasadena, Calif.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plasmadyne, Santa Ana, Calif.
Press-On Prods., Addison, Ill.
Rho Engrg. Co., Los Angeles, Calif
Royal Inds, El Segundo, Calif
Sifco Metachemical, Cleveland, Ohio
Spectra-Physics, Inc., Mountain View, Calif.
Sperex Corp., Los Angeles, Calif.
Syncor Prods. Co., Inc., Malden, Mass.
Tempil Div., So. Plainfield, N.J.
Transidyne-General Corp., Ann Arbor, Mich.
Tricraft Prods., Chicago, Ill.
Twin City Metalseal, Inc., Minneapolis, Minn.
Ultra Carbon Corp., Bay City, Mich.
Union Carbide, Indpls., Ind.
Valpey Corp., Holliston, Mass.
Varian Assocs., Palo Alto, Cal.
Zenith Optical Lab., Dobbs Ferry, N.Y.

Services, Design (Circuits, Components, Equipment, Systems, etc.)

Almond Instrs. Co., Covina, Cal
Astro-Space Labs., Huntsville, Ala
Automatic Coil, New Hyde Pk., N.Y.
Chicago Switch, Chicago, Ill.
Data-Control Systems, Danbury, Conn.
Datacom, Inc., Ft. Walton Bch., Fla.
Digitron Corp., Norristown, Pa.
Elco, Willow Grove, Pa.
ESC Elctrns. Corp., Palisades Pk., N.J.
FAE Instr. Corp., Huntington Sta., N.Y.
Frequency Engrg. Labs., Farmingdale, N.J.
Frequency Sources, No. Chelmsford, Mass. ..... **p 1560**
Gibbs Mfg. & Resch., Janesville, Wisc.
Honeywell, Denver, Colo.
Infodex, Inc., Waterbury, Conn.
Intronics, Inc., Newton, Mass.
Kahle Engrg. Co., Union City, N.J.
Melcor Elctrns. Corp., Farmingdale, N.Y.
Mepco, Inc., Morristown, N.J.
(NES) Nationwide Elctrn. Sys., Itasca, Ill.
Optima Enclosures, Tucker, Ga.
Re-el Circuits, Inc., Totowa Boro, N.J. **p 326,327**
AAI Corp., Baltimore, Md.
Achrodyne Corp., Yorktown, Va.
Acme Elec. Corp., Cuba, N.Y.
Amperex Elctrn., Slatersville, R.I.
Ansley Div. ACI Inc., Perkasie, Pa.
Applied Control Co., Fairfield, N.J.
Applied Systems Corp., Detroit, Mich
A.R.F. Products, Inc., Boulder, Colo.
Barger Corp., Sunnyvale, Cal.
Barnes & Reinecke, Inc., Chicago, Ill.
BECO Solid State Systems, Salem, Va.
Belleville Elctrns. Co., Belleville, Mich.
Bertan Assocs., Inc., Plainview, N.Y.
Bio-Medical Elctrns., Inc., Rockville, Md.
Broadview Inds. Corp., Hempstead, N.Y.
Cambridge Memories, Inc., Newtonville, Mass.
Centerline Specialties, Boulder, Colo.
CGS Units, Inc., Rochester, N.Y.
Chronomatic Div., Burbank, Cal.
Climatronics Corp., Hauppauge, N.Y.
Cole Instr., Costa Mesa, Cal.
ComGeneral Corp., Dayton, Ohio
Computer Art Svc., New Hyde Pk., N.Y.
Coral Magnetics Co., Farmingdale, N.Y.
Cybermatics, Inc., Ft. Lee, N.J.
Data Sys. Engrg., Anaheim, Cal.
Data Technology Corp., Palo Alto, Cal.
Datalogic Sys., Inc., Merrimac, Mass.
Dataprobe, Inc., So. Hackensack, N.J.
Design Automation, Inc., Lexington, Mass.
Desman Elctrns., Rochester, N.Y.
Diamond Repeater Co., Madison, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electro-Sonics Inc., Spofford, N.H.
Electronic Design Labs., Inc., Phila., Pa.
Elgin Elctrns., Waterford, Pa.
Engrg. Svcs., Madison, N.J.
Estes Engrg. Co., Gardena, Calif.
Eugene Engrg. Co., Inc., Rockland, Mass.
FJW Inds., Inc., Mt. Prospect, Ill.
Flexible Circuits, Inc., Warrington, Pa.
Foxboro Co., Foxboro, Mass.
General Dynamics, San Diego, Cal.
Goerz Optical Co., Inc., Pittsburgh, Pa.
Goodyear Aerospace Corp., Akron, Ohio
Halmar Elctrns., Inc., Columbus, Ohio
HMW Enterprises, Inc., Steelton, Pa.
Hoagland Instr., Red Bank, N.J.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Indofex, Inc., Waterbury, Conn.
Integrated Circuit Engrg., Phoenix, Ariz.
Intercontinental Elctrns., E. Rochester, N.Y.
Interdyne Co., Los Angeles, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
Jerrold Elctrns. Corp., Philadelphia, Pa.
Jettron Prods., Hanover, N.J.
Johnson R. W. Co., Huntington Beach, Cal
Joliet Control Corp., Joliet, Ill.
Larson Aero Dev., Concord, Calif.
Latronics Corp., Latrobe, Pa.
Lehigh Valley Elctrn., Inc., Fogelsville, Pa.
Lehighton Elctrns., Inc., Lehighton, Pa.

Macrodata, Chatsworth, Cal.
McNally Bros. Mach. & Gear, Mipls., Minn.
Mechanical Technology, Inc., Latham, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Midland Standard Inc., Elgin, Ill.
Mobil Elctrns., Inc., Anderson, Ind.
Optical Inds., Santa Ana, Cal.
Orion Prods. Co., Sunnyvale, Cal.
Parks, Henry Francis Lab., Seattle, Wash.
Philco-Ford Corp., Washington, D.C.
Phoenix Materials Corp., Kittanning, Pa.
Pickard & Burns Inc., Lindenhurst, N.Y.
PMC Designing, Cincinnati,, Ohio
Ragen Precision Inds., Inc., N. Arlington, N.J.
Randtronics, Inc., Palo Alto, Cal.
Rel-Qual Assocs., Bound Brook, N.J.
Robertson Instr., Azusa, Cal.
Robinson-Nugent, New Albany, Ind.
Rogers Corp., Rogers, Conn.
Sage Labs. Inc., Natick, Mass.
Singer - Tele-Signal, Woodbury, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Syntec Corp., Austin, Tex.
TACO Div., Sherburne, N.Y.
Technical Consultants Corp., Ellington, Conn.
Tekform Prods. Co., Anaheim, Cal.
Teledyne Adcom, Cambridge, Mass.
Texas Instruments, Dallas, Tex.
Tri-Tronics Lab., Euless, Tex.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
Varo, Inc., Texas Div., Garland, Tex.
Vestal Modern Design Corp., Vestal, N.Y.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Vitro Laboratories, Silver Spring, Md.
Wheeler Lab. of Hazeltine Corp., Greenlawn, N.Y.
Xerox Data Sys., El Segundo, Cal
Zero Mfg. Co., Burbank, Cal.
Zonic Tech. Labs., Cincinnati, Ohio

Services, Electrical Measurement

All-Tronics Inc., Westbury, N.Y.. p 1508
American Elctrn. Labs., Inc., Lansdale, Pa.
API Instrs. Co., Waltham,, Mass.
Associated Testing Labs., Inc., Wayne, N.J. ..... p 388
Data-Control Systems, Danbury, Conn.
Electro-Mechanics Co., Austin, Tex. p 452
Erie Technological Prods. (EEM), Erie, Pa.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Honeywell, Denver, Colo.
Hopkins Engrg., San Fernando, Cal. p 1519
ITT Jennings, Div. Int'l. Telephone & Telegraph Corp., San Jose, Cal.
Matrix Corp., Beech Grove, Ind.
Ross Engrg. Corp., Campbell, Cal.
Sprague Elec. Co., No. Adams, Mass.
A & M Instrument, Inc., Great Neck, N.Y.
Amperex Elctrn., Slatersville, R.I.
Applied Control Co., Fairfield, N.J.
AUL Instrs., Inc., Flushng, N.Y.
Avco Meas. Standards Labs., Wilmington, Mass.
Calitronics Corp., Yonkers, NY
Consolidated Resistance Sls., Yonkers, N.Y.
Delsen Testing Corp., Glendale, Calif.
Detroit Testing Lab., Detroit, Mich.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrical Instr. Svc., Inc., Mt. Vernon, N.Y.
Electrical Testing Labs., Inc., New York, N.Y.
Epoxylite Corp., S. El Monte, Calif.
Esterline Angus Div., Indianapolis, Ind.
General Dynamics, San Diego, Cal.
Hallmark Standards, Inc., Mt. Vernon, N.Y.
Halmar Elctrns., Inc., Columbus, Ohio
HRB-Singer, Inc., State College, Pa.
Hughes Aircraft Co, Culver City, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
Lockheed Elctrns. Co., Watchung, N.J.
Mechanical Technology, Inc., Latham, N.Y.
National Astro Labs., Burbank, Cal.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Ogden Technology Labs., Fullerton, Cal.
Parks, Henry Francis Lab., Seattle, Wash.
Philco-Ford Corp., Washington, D.C.
PMC Designing, Cincinnati,, Ohio
Radiation Sys., Inc., McLean, Va.
RCA Service Co., Camden, N.J.
Rockwell Engrg. Co., Indianapolis, Ind.
Sage Labs. Inc., Natick, Mass.
Sanders Assocs., Nashua, N.H.
Solar Elctrns. Co., Hollywood, Calif.
Spectrum Control, Inc., Fairview, Pa.
SSCO Standards Lab., Inc., Detroit, Mich.
TACO Div., Sherburne, N.Y.
Teledyne Micronetics, San Diego, Calif.
Tucker Elctrns. Co., Garland, Tex.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
U.S. Testing Co., Inc., Hoboken, N.J.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Wheeler Lab. of Hazeltine Corp., Greenlawn, N.Y.

Services, Encapsulation

Airflyte Elctrns. Co., Bayonne, N.J.
Amphenol Cadre Div., Endicott, N.Y.
Automatic Coil, New Hyde Pk., N.Y.
Centralab, Elctrns., Milwaukee, Wisc.
Elctrn. Molding Corp., Woonsocket, R.I.
Grayhill, Inc., LaGrange, Ill.
Rectifier Comps. Corp., Freeport, N.Y.
American Elec. Cable Co., Holyoke, Mass.
Anchor Alloys, Inc., Brooklyn, N.Y.
Anchor Metal Co., Inc., Brooklyn, N.Y.
Ansley Div. ACI Inc., Perkasie, Pa.
Argent Inds., Inc., Dayton, Ohio
Atlantic Instrs. Corp., Watertown, Mass.
Avionics, Inc., South Bend, Ind.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
Bacon Inds., Watertown, Mass.
Beman Mfg., Inc., New Cumberland, Pa.
Boonton Molding Co., Inc., Boonton, N.J.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
Consolidated Resistance Sls., Yonkers, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynaloy, Inc., Hanover, N.J.
Eastern Delta Corp., Fair Lawn, N.J.
Electrical Plastics Corp., Lyndhurst, N.J.
Eljay Corp., Columbia, Md.
Emerson & Cuming, Inc., Canton, Mass.
Endicott Coil Co., Binghamton, N.Y.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Epoxy Plastic Molders, Irvington, N J
Epoxylite Corp., S. El Monte, Calif.
Estes Engrg. Co., Gardena, Calif.
General Reliance Div., Dover, N.J.
Green Rectifier Corp., Fair Lawn, N.J.
Hardman Inc., Belleville, N.J.
Hightemp Resins, Inc., Stamford, Conn.
Hughes Aircraft Co, Culver City, Cal.
Isochem Resins Co., Lincoln, R.I.
Joy Mfg. Co., New Phila., Ohio
K-Tech., Inc., Framingham, Mass.
Kentrox Inds., Inc., Portland, Ore.
M-T Elctrns. Co., San Leandro, Calif.
Manger Elec. Co., Inc., Stamford, Conn.
Maryland Lava Co., Bel Air, Md.
Mercury Elctrns. Corp., York, Pa.
Mutron Corp., Brockton, Mass.
National Beryllia Corp., Haskell, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Paraplegics Mfg., Bensenville, Ill.
Profile Elctrns., Inc., Concord, N.H.
Projects Unlimited, Inc., Dayton, Ohio
Q.V.S., Inc., East Orange, N.J.
Research Instr. Co., Westbury, N.Y.
Rho Engrg. Co., Los Angeles, Calif
Robinson-Nugent, New Albany, Ind.
Santa Fe Mfg. Co., Bronx, N.Y.
Semicon Assoc., Inc., Lexington, Ky.
SKG Assocs., Inc., Boston, Mass.
Sparton Southwest, Inc., Albuquerque, N.M.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Twin City Metalseal, Inc., Minneapolis, Minn.
United American Metals Div., Brooklyn, N.Y.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
U.S. Elctrns., Lyndhurst, N.J.
Warren Comps. Corp., Warren, Pa.
Whalite Mfg. Co., Montville, N.J.

Services, Engraving & Profiling

Ackerman Engravers, Inc., Long Island City, N.Y.
Acromark Co., Berkeley Hts, N.J.
Apahouser Corp. of N.E., Boston, Mass.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
Bell Co., Inc., Trussville, Ala.
Best Mfg. Co., Kansas City, Mo.
Canrad Precision Inds., Inc., Pelham, N.Y.
Cryptographics, Inc., New York, N.Y.
Devco Engrg., W. Caldwell, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dura Plastics N.Y., Inc., Westport, Conn.
Duramic Prods., Inc., Palisades Park, N.J.
Eljay Corp., Columbia, Md.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Eugene Engrg. Co., Inc., Rockland, Mass.
Fisher & Crome, Inc., Philadelphia, Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
Hermes Plastics, Inc., New York, N.Y.
Insulating Shapes, Inc., Bronx, N.Y.
Kaiser CATV, Phoenix, Ariz
Lehighton Elctrns., Inc., Lehighton, Pa.
Master Engraving, East Paterson, N.J.
Matthews, Jas & Co., Pittsburgh, Pa.
Maury Microwave Corp., Cucamonga, Calif.
Mechanical Engraving Co., Inc., Bronx, N.Y.
N/P Co., Temple City, Calif.
Pantographic Reproduction, Newington, Conn.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Seton Name Plate Corp., New Haven, Conn.
Tech-Etch, Inc., Hingham, Mass.
Western Coil & Elec. Co., Racine, Wisc.

Services, Environmental Testing

American Elctrn. Labs., Inc., Lansdale, Pa.
Associated Testing Labs., Inc., Wayne, N.J. ..... p 388
Bendix Environmtl. Sci., Baltimore, Md.
Data-Control Systems, Danbury, Conn.
Electro-Mechanics Co., Austin, Tex. p 452
Grayhill, Inc., LaGrange, Ill.
Melcor Elctrns. Corp., Farmingdale, N.Y.
Mepco, Inc., Morristown, N.J.
Torwico Elctrns., Inc., Lakewood, N.J.
Abrams Instr., Lansing, Mich.
Amperex Elctrn., Slatersville, R.I.
Artech Corp., Falls Church, Va.
ASC Sys. Corp., Chicago, Ill.
Atlas Electric Devices, Chicago, Ill.
AUL Instrs., Inc., Flushng, N.Y.
Avionics, Inc., South Bend, Ind.
Baganoff Assocs., Inc., St. Louis, Mo.
Barry Controls, Watertown, Mass.
Burlington Opers. Div., Burlington, Mass.
Controlled Environment Equip. Corp., Newton Upper Falls, Mass.
Craig Sys. Corp., Lawrence, Mass.
Dalmo Victor, Belmont, Calif.
Delsen Testing Corp., Glendale, Calif.
Detroit Testing Lab., Detroit, Mich.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrical Testing Labs., Inc., New York, N.Y.
Elctrn. Comm., Inc., St. Petersburg, Fla.
Epoxylite Corp., S. El Monte, Calif.
Fairchild Space & Defense Sys., Syosset, N.Y.
General Dynamics, San Diego, Cal.
General Elec., Baltimore, Md.
Granite State Machine Co., Inc., Manchester, N.H.
Hafstrom Tech. Prods., Inc., San Diego, Calif.
Hermes Elctrns., Dartmouth N.S., Can.
HRB-Singer, Inc., State College, Pa.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
Kaman Nuclear, Colorado Springs, Colo.
Lear Siegler, Inc., Elyria, Ohio
Lochart Inds., Inc., Paramount, Cal.
Lockheed Aircraft Svc., Ont., Cal.
Lockheed Elctrns. Co., Watchung, N.J.
Mechanical Technology, Inc., Latham, N.Y.
Miller R.A. Inds., Inc., Grand Haven, Mich.
N/P Co., Temple City, Calif.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Ogden Technology Labs., Fullerton, Cal.
Pennwalt Corp., Phila., Pa.
Philco-Ford Corp., Washington, D.C.
Plasmadyne, Santa Ana, Calif.
Q.V.S., Inc., East Orange, N.J.
RCA Govt. & Comm. Sys., Moorestown, N.J.
RCA Service Co., Camden, N.J.
Sanders Assocs., Nashua, N.H.
Schoeffel Instr. Corp., Westwood, N.J.
Sparton Southwest, Inc., Albuquerque, N.M.
Spectrum Control, Inc., Fairview, Pa.
SSCO Standards Lab., Inc., Detroit, Mich.
Testing Equip. & Supplies Corp., Natick, Mass.
U.S. Testing Co., Inc., Hoboken, N.J.
Varian Assocs., Vacuum Div., Palo Alto, Cal.
Viewlex, Holbrook, N.Y.
Webber Mfg. Co., Inc., Indianapolis, Ind.
Westinghouse Elec., Elmira, N.Y.
Wyle Labs., El Segundo, Calif.

Services, Film Badge

Franklin Fibre-Lamitex, Wilmington, Del.
Landauer, R.S., Jr. & Co., Glenwood, Ill.
Nuclear-Chicago, Des Plaines, Ill.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
Photo Chemical Prods. Cal., Santa Monica, Cal.
U.S. Testing Co., Inc., Hoboken, N.J.

Services, Glass Blowing & Fabrication

General Elec., Richmond Hgts., Ohio p 2811
Bendix, Rochester, N.Y.
Black Light Corp. Amer., San Gabriel, Cal.
Computer Components Int'l, Palm Beach Gardens, Fla.
Corning Glass Works, Lab. Prods. Dept., Corning, N.Y.
Electron Technology, Inc., Kearny, N.J.
Fischer & Porter Co., Warminster, Pa.
Haydu Prods., Inc., Opa Locka, Fla.
Jersey Tech. Conslts., Morristown, N.J.
Kahl Scientific Instr. Corp., El Cajon, Calif.
Latronics Corp., Latrobe, Pa.
Richland Glass Co., Inc., Richland, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Systems Resch. Labs., Dayton, Ohio
Topper Mfg. Co., Inc., Great Neck, N.Y.
Ultra-Violet Prods., Inc., San Gabriel, Cal.
Xenon Corp., Medford, Mass.

Services, Hermetic Sealing

American Elctrn. Labs., Inc., Lansdale, Pa.
Bendix, Franklin, Ind. ..... p 2756
Electrospace Corp., Westbury
Glass Tech., Newport Bch., Cal. p 2632
Accratronics Seals Corp., Burbank, Calif.
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Associate General Labs., Inc., Brookfield, Ill.
Astro Seal, S. El Monte, Cal.
Basic Ceramics Inc., Hawthorne, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Connector Inds. Amer., Cincinnati, Ohio
Consolidated Ceramics & Metalizing, Flemington, N.J.
Consolidated Resistance Sls., Yonkers, N.Y.
Denton Vacuum, Inc., Cherry Hill, N.J.
Device Seals, Inc., Sun Valley, Calif.
Electrical Inds., Murray Hill, N.J.
Elctrn. Seals, Van Nuys, Cal.
Epoxy Cast Elctrn. Case Co., Yonkers, N.Y.
Fansteel Inc., N Chicago, Ill.
Glass Beads Co., Latrobe, Pa.
Glasseal Prods. Co., Linden, N.J.
Hughes Aircraft Co, Culver City, Cal.
Isotronics, Inc., New Bedford, Mass.
Kinetron Corp., Asbury Park, N.J.
Latronics Corp., Latrobe, Pa.
Lundey Assocs., Inc., Waltham, Mass.
Megadyne Inds., Inc., Rochester, N.Y.

National Vacuum Platers, Inc., Philadelphia, Pa.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Research Instr. Co., Westbury, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Sperry Elctrn. Tube, Gainesville, Fla.
Tekform Prods. Co., Anaheim, Cal.
Texas Instruments, Dallas, Tex.
Texas Instruments, Inc., Attleboro, Mass.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
Warren Comps. Corp., Warren, Pa.

Services, High Vacuum

American Elctrn. Labs., Inc., Lansdale, Pa.
Associated Testing Labs., Inc., Wayne, N.J.
Aero Vac Corp., Troy, N.Y.
Andonian Assocs., Inc., Waltham, Mass.
Artech Corp., Falls Church, Va.
Bendix, Rochester, N.Y.
Cooke Vacuum Prods., S. Norwalk, Conn.
Denton Vacuum, Inc., Cherry Hill, N.J.
Eastern Delta Corp., Fair Lawn, N.J.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Fredericks Co., Huntingdon Valley, Pa.
Gardner Cryogenics Corp., Bethlehem, Pa.
Granville-Phillips Co., Boulder, Colo.
High Voltage Engrg. Corp., Burlington, Mass.
Hughes Aircraft Co, Culver City, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
Jersey Tech. Conslts., Morristown, N.J.
Leybold-Heraeus, Monroeville, Pa.
Materials Resch. Corp., Orangeburg, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Middlesex Gen'l. Inds., Somerville, Mass.
National Astro Labs., Burbank, Cal.
National Vacuum Platers, Inc., Philadelphia, Pa.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Norton Co., Newton, Mass.
Pennwalt Corp., Phila., Pa.
Twin City Metalseal, Inc., Minneapolis, Minn.
Ultek Div., Palo Alto, Calif.
Vacuum Equip. Div., Newton, Mass.
Vacuum Inds., Inc., Somerville, Mass.
Varian Assocs., Palo Alto, Cal.
Varian Assocs., Vacuum Div., Palo Alto, Cal.
Zenith Optical Lab., Dobbs Ferry, N.Y.

Services, Hydraulic Assembly

AAI Corp., Baltimore, Md.
Anchor Specialty Mfg., Teterboro, N.J.
Auto Control Labs., Los Angeles, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Hughes Aircraft Co, Culver City, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Western Coil & Elec. Co., Racine, Wisc.
Zonic Tech. Labs., Cincinnati, Ohio

Services, Mask Making

Alloys Unlimited, Inc., Encino, Calif.
Artech Corp., Falls Church, Va.
Buckbee-Mears Co., St. Paul, Minn.
Chemical Micro Milling Co, Camden, N.J.
Conforming Matrix Corp., Toledo, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Etchit, Inc., S. Hopkins, Minn.
Itek Corp., Lexington, Mass.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Mann, David W. Co., Burlington, Mass.
Micro-Line, Jamestown, N.Y.
Press-On Prods., Addison, Ill.
Tech-Etch, Inc., Hingham, Mass.

Services, Metallizing

Abesto Corp., Bloomfield, N.J.
Alberox Corp., New Bedford, Mass.
Alloys Unlimited, Inc., Encino, Calif.
Artech Corp., Falls Church, Va.
Basic Ceramics Inc., Hawthorne, N.J.
Bron-Shoe Co., Columbus, Ohio
Ceramaseal, Inc., New Lebanon Center, N.Y.
Craig Sys. Corp., Lawrence, Mass.
Dell Optics Co., Inc., N. Bergen, N.J.
Denton Vacuum, Inc., Cherry Hill, N.J.
Device Seals, Inc., Sun Valley, Calif.
Dilectrix Corp., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eastern Delta Corp., Fair Lawn, N.J.
E.B.L. Co, East Hartford, Conn.
Elecpac Inc., Cary, Ill.
Electro-Science Labs., Philadelphia, Pa.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Kidco, Inc., Medford, N.J.
Kinney Vacuum Co., Boston, Mass.
Latronics Corp., Latrobe, Pa.
Mechanical Technology, Inc., Latham, N.Y.
Megadyne Inds., Inc., Rochester, N.Y.
Metallized Prods., Norwalk, Conn.
Metaplast Electrochemicals, Bronx, N.Y.
Micro-Line, Jamestown, N.Y.
National Vacuum Platers, Inc., Philadelphia, Pa.
Norton Co., Newton, Mass.
Pacific Universal Prods. Corp., Pasadena, Calif.
Pennwalt Corp., Phila., Pa.
Plasmadyne, Santa Ana, Calif.
Schweitzer, Peter J. Div., Lee, Mass.
Sperry Elctrn. Tube, Gainesville, Fla.
Syncor Prods. Co., Inc., Malden, Mass.
Tickle, Arthur Engrg. Works, Inc., Brooklyn, N.Y.
Union Carbide, Indpls., Ind.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
Vacuum Equip. Div., Newton, Mass.
Varian Assocs., Palo Alto, Cal.

Services, Molding

Elctrn. Molding Corp., Woonsocket, R.I.
ITT Thermotech Inc., Hopkins, Minn. p 2766
Thermotech Coil Forms & Comps. Div., Hopkins, Minn. p 2766
Thermotech Plastics, Co., Hopkins, Minn.
Wilcox Prods. Co., Hopkins, Minn. p 2766
AAI Corp., Baltimore, Md.
Argent Inds., Inc., Dayton, Ohio
Beman Mfg., Inc., New Cumberland, Pa.
Booker & Wallestad, Hopkins, Minn.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
Chemelec Prods., Inc., Cherry Hill, N.J.
Clover Inds. Div., Tonawanda, N.Y.
Computer Components Int'l, Palm Beach Gardens, Fla.
Emeloid Co., Inc., Hillside, N.J.
Epoxy Plastic Molders, Irvington, N J
Grayhill Moldtronics, Inc., Downers Grove, Ill.
Hardman Inc., Belleville, N.J.
Kelm G.R. Mach. Works, Inc., Paterson, N.J.
Litton Inds., Van Nuys, Calif.
Maryland Lava Co., Bel Air, Md.
Minnesota Rubber Co., Minneapolis, Minn.
Pelmor Labs., Inc., Newtown, Pa.
Plastiglide Mfg. Corp., Santa Monica, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Research Instr. Co., Westbury, N.Y.
Robinson-Nugent, New Albany, Ind.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Subminiature Instrs. Corp., Riverside, Calif.
Unex Labs., Inc., Hathorne, Mass.
Unitron Inds. Corp., Taipei, Taiwan, Republic of China
Warren Comps. Corp., Warren, Pa.
Whalite Mfg. Co., Montville, N.J.

Services, Plastics Fabrication

American Elctrn. Labs., Inc., Lansdale, Pa.
Amphenol Cadre Div., Endicott, N.Y. p 2814
Amphenol Sales Div., Broadview, Ill. p 2814
Berg Elctrns., Inc., New Cumberland, Pa.
Electronic Hardware, Jamaica, N.Y.
Grayhill, Inc., LaGrange, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Parabam, Inc., Compton, Cal.
Scanbe Mfg. Corp., El Monte, Cal.
Severna Operation, East Orange, N.J. p 2814
AAI Corp., Baltimore, Md.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Ace Plastic Co., Inc., Jamacia, N.Y.
Acme Mfg. & Gasket Co., Philadelphia, Pa.
Alloys Unlimited, Inc., Encino, Calif.
Anchor Specialty Mfg., Teterboro, N.J.
Apahouser Corp. of N.E., Boston, Mass.
Applied Design Co., Inc., Tonawanda, N.Y.
Atlas Fibre Co., Chicago, Ill.
Aubin, A.E. Co., Glastonbury, Conn.
Bell Co., Inc., Trussville, Ala.
Best Mfg. Co., Kansas City, Mo.
Bodnar Prods. Corp., New Rochelle, N.Y.
Boonton Molding Co., Inc., Boonton, N.J.
Budd Co., Philadelphia, Pa.
Cadilac Plastics & Chems., Detroit, Mich.
Celestial Comps., Inc., Covina, Cal.
Central Plastics Dists., Chicago, Ill.
Chemelec Prods., Inc., Cherry Hill, N.J.
Chemplast, Inc., Wayne, N.J.
Comco Plastics, Inc., Richmond Hill, N.Y.
Conap, Inc., Allegany, N.Y.
Devco Engrg., W. Caldwell, N.J.
Dilectrix Corp., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dura Plastics N.Y., Inc., Westport, Conn.
Dynaloy, Inc., Hanover, N.J.
Eljay Corp., Columbia, Md.
Emeloid Co., Inc., Hillside, N.J.
Emerson & Cuming, Inc., Canton, Mass.
Engineered Plastics, Inc., Gibsonville, N.C.
Epoxy Plastic Molders, Irvington, N J
Estes Engrg. Co., Gardena, Calif.
Eugene Engrg. Co., Inc., Rockland, Mass.
Federal Mach. Co., Inc., Jersey City, N.J.
Fischer & Porter Co., Warminster, Pa.
Fisher & Crome, Inc., Philadelphia, Pa.
Fluoro Plastics, Phila., Pa.
Fluorocarbon Co., Anaheim, Cal.
Franklin Fibre-Lamitex, Wilmington, Del.
Globe Plastics, Pomona, Cal.
GTE Sylvania Inc., Warren, Pa.
Haskon, Inc., Taunton, Mass.
Hermes Plastics, Inc., New York, N.Y.
Hoagland Instr., Red Bank, N.J.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Hughes Aircraft Co, Culver City, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Insulating Shapes, Inc., Bronx, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Lockheed Aircraft Svc., Ont., Cal.
M-T Elctrns. Co., San Leandro, Calif.
Maryland Lava Co., Bel Air, Md.
Matthews Resch., Inc., Alexandria, Va.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Midwest Molding & Mfg. Co., Gurnee, Ill.
Miller R.A. Inds., Inc., Grand Haven, Mich.
Minnesota Rubber Co., Minneapolis, Minn.
N/P Co., Temple City, Calif.
Norelcom Inds., Inc., Farmingdale, N.Y.
Nuclear Supply Co., Washington, D.C.
NVF Co., Yorklyn, Del.
NY-Glass Plastics, Paramount, Calif.
Nylogrip Prods. Co., Waltham, Mass.
Nylomatic Corp., Morrisville, Pa.
Omega Labs., Inc., Rowley, Mass.
Pantographic Reproduction, Newington, Conn.
Pennwalt Corp., Phila., Pa.
Permonite Mfg. Co., Chicago, Ill.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Plastic Assocs., Inc., Inwood, N.Y.
Richardson Co., Des Plaines, Ill.
Robinson-Nugent, New Albany, Ind.
Rogers Corp., Rogers, Conn.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Seton Name Plate Corp., New Haven, Conn.
Shamban, W.S. & Co., Los Angeles, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Sparta Mfg. Co., Dover, Ohio
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Subminiature Instrs. Corp., Riverside, Calif.
Teledyne Mecca, Houston, Tex.
Textool Prods., Inc., Irving, Tex.
Thiokol Chemical Div., Trenton, N.J.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Tri-Dex Co., Visalia, Calif.
Unex Labs., Inc., Hathorne, Mass.
Viz Mfg. Co., Philadelphia, Pa.
Vlchek Plastics Co., Middlefield, Ohio
Warren Comps. Corp., Warren, Pa.
Western Coil & Elec. Co., Racine, Wisc.
Whalite Mfg. Co., Montville, N.J.
Whittaker Corp., Los Angeles, Cal.
Winzeler Mfg. & Tool Co., Chicago, Ill.

Services, Plating—See Vol 1

Services, Qualification—See Services, Environmental Testing

Services, Rental, Electronic Instrumentation

Data-Control Systems, Danbury, Conn.
Datacom, Inc., Ft. Walton Bch., Fla.
Genisco Tech. Corp., Genistron Div., Compton, Cal.
Tektronix, Inc., Beaverton, Ore.
A & M Instrument, Inc., Great Neck, N.Y.
Ampex Corp., Redwood City, Calif.
Continental Rentals Div., Bedford, Mass.
Hughes Aircraft Co, Culver City, Cal.
International Scanatron Sys., Wyandanch, N.Y.
Leader Instr. Corp., Long Island City, N.Y.
Microwave Div, Nashua, N.H.
National Astro Labs., Burbank, Cal.
N.Y. Testing Labs., Inc., Westbury, N.Y.
Rental Elctrns., Gaithersburg, Md.
Sunshine Sci. Instrs., Inc., Philadelphia, Pa.
3M Co., St. Paul, Minn.
Tucker Elctrns. Co., Garland, Tex.

Services, RFI Measuring—See Services, Electrical Measurement

Services, Silk Screening

Douglas Electronics, Inc., San Leandro, Cal. p 1303
LVC Ind's., Inc., Corona, N.Y.
Multitech Microelctrns., Monterey Pk., Cal.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Alloys Unlimited, Inc., Encino, Calif.
Apahouser Corp. of N.E., Boston, Mass.
Artech Corp., Falls Church, Va.
Avionics, Ltd., Niagara-on-the-Lake, Ont., Can.
BECO Solid State Systems, Salem, Va.
Bell Co., Inc., Trussville, Ala.
Bodnar Prods. Corp., New Rochelle, N.Y.
Canrad Precision Inds., Inc., Pelham, N.Y.
Centerline Specialties, Boulder, Colo.
Conductorlab, Inc., Groton, Mass.
Decalcraft, Hatfield, Pa.
Devco Engrg., W. Caldwell, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dura Plastics N.Y., Inc., Westport, Conn.
Electro-Science Labs., Philadelphia, Pa.
Electro-Sonics Inc., Spofford, N.H.
Elgin Elctrns., Waterford, Pa.
Eljay Corp., Columbia, Md.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Emeloid Co., Inc., Hillside, N.J.
Engineered Plastics, Inc., Gibsonville, N.C.
Flexible Circuits, Inc., Warrington, Pa.
GM Nameplate, Inc., Seattle, Wash.
Graphtex Inc., Lodi, NJ
Hughes Aircraft Co, Culver City, Cal.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Lehighton Elctrns., Inc., Lehighton, Pa.
Liberty Mirror Div., Brackenridge, Pa.
M-T Elctrns. Co., San Leandro, Calif.
Mac Panel Co., High Pt., N.C.
Mechanical Engraving Co., Inc., Bronx, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Mobil Elctrns., Inc., Anderson, Ind.
N/P Co., Temple City, Calif.
Norgus Silk Screen Co., Inc., Clifton, N.J.
Permonite Mfg. Co., Chicago, Ill.
Photo Chemical Prods. Cal., Santa Monica, Cal.
Seton Name Plate Corp., New Haven, Conn.
Sillcocks-Miller Co., Maplewood, N.J.
Strandberg Engrg. Labs., Inc., Greensboro, N.C.
Techron Corp., Boston, Mass.
Tri-Tronics Lab., Euless, Tex.
Western Coil & Elec. Co., Racine, Wisc.

Zero Mfg. Co., Burbank, Cal.

Services, Tower Erection & Maintenance—See Vol 1

Services, Training Aids

AAI Corp., Baltimore, Md.
Applied Control Co., Fairfield, N.J.
Austin Elctrns., Roselle, N.J.
Avco Corp., Cincinnati, Ohio
Barger Corp., Sunnyvale, Cal.
Barnes & Reinecke, Inc., Chicago, Ill.
Collins Radio Co., Dallas, Tex.
Digiac Corp., Plainview, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electraid, Inc., Cambridge, Mass.
Film Assocs., Inc., Dayton, Ohio
General Dynamics, San Diego, Cal.
Honeywell, Aerospace & Def., Minneapolis, Minn.
Hughes Aircraft Co, Culver City, Cal.
Lockheed Aircraft Svc., Ont., Cal.
Lockheed Aircraft Svce., Special Devices Div., Ontario, Calif.
Norgus Silk Screen Co., Inc., Clifton, N.J.
Parks, Henry Francis Lab., Seattle, Wash.
Philco-Ford Corp., Washington, D.C.
RCA Service Co., Camden, N.J.
Reflectone, Inc., Stamford, Conn.
Rel-Qual Assocs., Bound Brook, N.J.
Sands, Leo G. & Assocs., Inc., New York, N.Y.
Technical Consultants Corp., Ellington, Conn.
Viewlex, Holbrook, N.Y.

Services, Vibration Surveys

American Elctrn. Labs., Inc., Lansdale, Pa.
Associated Testing Labs., Inc., Wayne, N.J. ..... p 388
Data-Control Systems, Danbury, Conn.
Dytronics Co., Columbus, Ohio
Teledyne Geotech, Dallas, Tex.
Torwico Elctrns., Inc., Lakewood, N.J.
Avco Corp., Cincinnati, Ohio
Detroit Testing Lab., Detroit, Mich.
Hughes Aircraft Co, Culver City, Cal.
Inland Testing Labs., Inc., Morton Grove, Ill.
IRD Mechanalysis, Inc., Columbus, Ohio
Lockheed Elctrns. Co., Watchung, N.J.
Mechanical Technology, Inc., Latham, N.Y.
N.Y. Testing Labs., Inc., Westbury, N.Y.
U.S. Testing Co., Inc., Hoboken, N.J.
Westinghouse Elec., Elmira, N.Y.
Westinghouse Elec. Corp., Pittsburgh, Pa.
Wyle Labs., El Segundo, Calif.

Services, Waveform Analysis

American Elctrn. Labs., Inc., Lansdale, Pa.
Associated Testing Labs., Inc., Wayne, N.J. ..... p 388
HRB-Singer, Inc., State College, Pa.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Lockheed Elctrns. Co., Watchung, N.J.
Petty Geophysical Engrg., San Antonio, Tex.
Signatron, Inc., Lexington, Mass.
Weston Instruments, Inc., Newark, N.J.

Services, Wire Cutting & Stripping

Amphenol Cadre Div., Endicott, N.Y.
Art Wire & Stamping Co., Cedar Knolls, N.J.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Drake Mfg., Harwood Hgts., Ill.
Saxton Prods., Congers, N.Y.
Scanbe Mfg. Corp., El Monte, Cal.
Aircraft & Elctrn. Spec., Plainfield, Ind.
American Elec. Cable Co., Holyoke, Mass.
Auricord, Long Island City, N.Y.
Avionics, Inc., South Bend, Ind.
Beman Mfg., Inc., New Cumberland, Pa.
Cable Sys. & Assembly Co., Inc., Everett, Mass.
California Fine Wire, Grover City, Cal.
Cambridge Thermionic, Cambridge, Mass
Chronomatic Div., Burbank, Cal.
Cole Instr., Costa Mesa, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eby Sls. Co., Jamaica, N.Y.
Eraser Co., Syracuse, N.Y.
Estes Engrg. Co., Gardena, Calif.
Excel Specialty Corp., Chicago, Ill.
Geo Space, Houston, Tex.
Gray Resch. & Dev. Co., E. Hartford, Conn.
Halmar Elctrns., Inc., Columbus, Ohio
Haydu Prods., Inc., Opa Locka, Fla.
Hi-Lo Mfg. Corp., Chicago, Ill.
Hobson Bros., Inc., Chicago, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Joliet Control Corp., Joliet, Ill.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
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M-T Elctrns. Co., San Leandro, Calif.
Manger Elec. Co., Inc., Stamford, Conn.
Maryland Lava Co., Bel Air, Md.
Merco Prods. Co., Inc., Eugene, Ore.
Mercury Elctrns. Corp., York, Pa.
Meson Elctrns. Co., Inc., Rochester, N.Y.
Mid-West Metal Prods., Kansas City, Kans.
Mutron Corp., Brockton, Mass.
Pacific Electricord, Gardena, Cal.
Paraplegics Mfg., Bensenville, Ill.
Permonite Mfg. Co., Chicago, Ill.
Projects Unlimited, Inc., Dayton, Ohio
Ram Meter, Inc., Ferndale, Mich.
Seven Assocs., Sunnyvale, Calif.
Syntec Corp., Austin, Tex.
Tricraft Prods., Chicago, Ill.
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Virginia Elctrns. Co., Inc., Falls Church, Va.
Waters Instrs., Inc., Rochester, Minn
Whistler Elctrns., Inc., Northridge, Cal.
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Wiring Services Co, Santa Ana, Cal.

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Gardner-Denver Co., Quincy, Ill.
Gettys Mfg. Co., Racine, Wisc.
Halmar Elctrns., Inc., Columbus, Ohio
Holyoke Wire & Cable, Holyoke, Mass.
Hughes Aircraft Co, Culver City, Cal.
Interdyne Co., Los Angeles, Cal.
Kentrox Inds., Inc., Portland, Ore.
Lane Inds., North Hollywood, Calif.
Malco Mfg. Co., Chicago, Ill.
Midland Standard Inc., Elgin, Ill.
Raytheon Co., Lexington, Mass.
RCA Govt. & Comm. Sys., Moorestown, N.J.
Robinson-Nugent, New Albany, Ind.
Syntec Corp., Austin, Tex.
Varied Ind'l. Prods., Inc., Paterson, N.J.
Viking Inds., Inc., Chatsworth, Calif.
Waters Instrs., Inc., Rochester, Minn
Whitaker Cable Corp., N. Kansas City, Mo.
Wiring Services Co, Santa Ana, Cal.
Xerox Data Sys., El Segundo, Cal

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Abbott Prods., Inc., College Point, N.Y.
Advance Gear & Mach., Los Angeles, Cal.
Birnbach Co., Inc., Freeport, N.Y.
Granite State Machine Co., Inc., Manchester, N.H.
Helitronics Corp., Newark, N.J.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Kahlenberg Bros. Co., Two Rivers, Wisc.
PIC Design Corp., Ridgefield,, Conn.
Star Stainless Screw Co., Totowa, N.J.
Sterling Instr., New Hyde Pk., NY
Stock Drive Prods., New Hyde Pk., N.Y.
Torrington Co., Torrington, Conn.

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Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Millen, James Mfg., Malden, Mass.
Miller, J.W. Co., Compton, Cal.
Perfection Mica Co., Bensenville, Ill.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Eagle Magnetic Co., Indianapolis, Ind.
Kinetron Corp., Asbury Park, N.J.
Mirro Aluminum Co., Manitowoc, Wisc.
Precision Paper Tube Co., Wheeling, Ill.
Staver Co., Inc., Bay Shore, N.Y.
Tapecon, Inc., Rochester, N.Y.

Shields, Corona

Rowe Inds., Div., Toledo, Ohio
Ceramaseal, Inc., New Lebanon Center, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Fansteel Inc., N Chicago, Ill.

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Drake Mfg., Harwood Hgts., Ill.
Metex Corp., Edison, N.J.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Staver Co., Inc., Bay Shore, N.Y.

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Aircraft & Elctrn. Spec., Plainfield, Ind.
American Silver Co. Div., Flushing, N.Y.
Amuneal Mfg. Corp., Philadelphia, Pa.
ATV Research, Dakota City, Neb.
Ceramic Magnetics, Inc., Fairfield, N.J.
Chemical Micro Milling Co, Camden, N.J.
Consolidated Prods., Gardena, Calif.
Eldre Comps., Inc., Rochester, N.Y.
Estes Engrg. Co., Gardena, Calif.
Int'l. Elctrn. Resch., Burbank, Cal.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Kinetron Corp., Asbury Park, N.J.
LectroMagnetics, Los Angeles, Cal.
Lindgren, Erik A. & Assoc., Chicago, Ill.
Magnetic Core Corp., Newburgh, N.Y.
National Moldite, Newark, N.J.
Permaluster, Inc., Burbank, Calif.
Ray Proof Corp., Norwalk, Conn.
Russell Inds., Inc., Lynbrook, N.Y.
Tapecon, Inc., Rochester, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Zippertubing Co., Los Angeles, Calif.

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Victor Wire & Cable, L.A., Cal.
Allaco Prods., Braintree, Mass.
Alloys Unlimited, Inc., Encino, Calif.
APM Hexseal Corp., Englewood, N.J.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Burlington Opers. Div., Burlington, Mass.
Chomerics, Inc., Woburn, Mass.
Consolidated Prods., Gardena, Calif.
Core-Tronics, Inc., Orange, N.J.
Custom Comps., Fairfield, N.J.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Estes Engrg. Co., Gardena, Calif.
Evaporated Coatings, Inc., Huntingdon Valley, Pa.
Glenair, Inc., Glendale, Calif.
Hoffman Engrg. Co., Anoka, Minn.
Icore, Inc., Santa Clara, Cal.
Int'l. Elctrn. Resch., Burbank, Cal.
LectroMagnetics, Los Angeles, Cal.
Liberty Mirror Div., Brackenridge, Pa.
Lindgren, Erik A. & Assoc., Chicago, Ill.
Metex Corp., Edison, N.J.
Microwave Assocs., Inc., Burlington, Mass.
Microwave Development Labs., Inc., Needham Hgts., Mass.
Pioneer Metals, Inc., Harrodsburg, Ky.
Ray Proof Corp., Norwalk, Conn.
Royal Inds, El Segundo, Calif
Russell Inds., Inc., Lynbrook, N.Y.
Spectrum Control, Inc., Fairview, Pa.
Staver Co., Inc., Bay Shore, N.Y.
Tapecon, Inc., Rochester, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
3M Co., St. Paul, Minn.
Zippertubing Co., Los Angeles, Calif.

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Eagle Magnetic Co., Indianapolis, Ind.
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Kinetron Corp., Asbury Park, N.J.
LectroMagnetics, Los Angeles, Cal.
MSL Steel Co., Chicago, Ill.
Russell Inds., Inc., Lynbrook, N.Y.
Staver Co., Inc., Bay Shore, N.Y.
Tapecon, Inc., Rochester, N.Y.

Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.

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Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
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Dell Optics Co., Inc., N. Bergen, N.J.
Dynasil Corp. America, Berlin, N J
O & S Research, Inc., Riverton, N.J.
Quartz & Silice, Paris 8e, France
S & S Optical Co., Inc., Ft. Wayne, Ind.
Syncor Prods. Co., Inc., Malden, Mass.
Thermal Amer. Fused Quartz, Montville, N.J.

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Pickett Industries, Inc., Santa Barbara, Calif.
Techni-Tool, Inc., Philadelphia, Pa.

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GC Elctrns., Rockford, Ill.
Lambda Elctrns., Melville, N.Y.
Optima Enclosures, Tucker, Ga.
Premier Metal Prods. Co., Bronx, N.Y.
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Accuride Div., Santa Fe Springs, Calif.
Acro Prods. Corp., Chicago, Ill.
Amco Engrg. Co., Chicago, Ill.
Barnes Engrg. Co., Santa Ana, Calif.
Bud Radio, Inc., Willoughby, Ohio
Chassis-Trak, Inc., Indianapolis, Ind.
Data Technology Corp., Palo Alto, Cal.
Donnelly Mfg. Co., Waltham, Mass.
Eugene Engrg. Co., Inc., Rockland, Mass.
Grant Pulley & Hardware Co., W. Nyack, N.Y.
Gries Reproducer Co., New Rochelle, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Ingersoll Prods., Chicago, Ill.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Par-Metal Prods. Div., Brooklyn, N.Y.
Vent-Rak, Inc., Indianapolis, Ind.
Watson Mfg. Co., Inc., Jamestown, N.Y.
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

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Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Air-O-Tronics Prods., Morrisville, N.Y.
Birnbach Co., Inc., Freeport, N.Y.
Cable Elec. Prods., Inc., Providence, R.I.
Cinch Mfg. Co., Elk Grove Village, Ill.
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Eagle Elec. Mfg. Co., L. I. C., N.Y.
Eby Sls. Co., Jamaica, N.Y.
Epoxy Plastic Molders, Irvington, N J
IFE Div, E Providence, R.I.
Kings Elctrns., Tuckahoe, N.Y.
Leviton Mfg. Co., Inc., Brooklyn, N.Y.
Loranger Mfg. Corp., Warren, Pa.
Phelps Dodge Comm., North Haven, Conn.
Robinson-Nugent, New Albany, Ind.
Rodale Mfg. Co., Inc., Emmaus, Pa.
Schoeffel Instr. Corp., Westwood, N.J.
Staffall, Inc., Providence, R.I.
Textool Prods., Inc., Irving, Tex.

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Accurate Elctrns. Corp., Elyria, Ohio
Azimuth Elctrns., San Clemente, Cal.
Cam-Lok Div., Cincinnati, Ohio
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Eby Sls. Co., Jamaica, N.Y.
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Hypertronics Corp., Watertown, Mass.
IFE Div, E Providence, R.I.
Industrial Elctrn. Hardware, New York, N.Y.
Jettron Prods., Hanover, N.J.
Loranger Mfg. Corp., Warren, Pa.
Photologic Co., Orange, Cal.
Pylon Co., Inc., Attleboro, Mass.
Robinson-Nugent, New Albany, Ind.
Solatron Enterprises, Inglewood, Calif.
Textool Prods., Inc., Irving, Tex.
U.S. Terminals, Inc., Cincinnati, Ohio
Workman Elctrn. Prods., Inc., Sarasota, Fla.

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Alpha Metals, Inc., Jersey City, N.J.
American Silver Co. Div., Flushing, N.Y.
American Smelting & Refining Co., New York, N.Y.
Anchor Alloys, Inc., Brooklyn, N.Y.
ARC Prods. Div., Chicago, Ill.
Bow Solder Products, Newark, N.J.
Caig Labs., Inc., Westbury, N.Y.
Chase Metal Service Div., Cleveland, Ohio
Chemalloy Elctrns., Santee, Cal.
Chemtronics, Inc., Brooklyn, N.Y.
Division Lead Co., Summit, Ill.
Dunton, M.W. Co., Providence, R.I.
Electro Mats. Corp. Amer., Mamaroneck, N.Y.
Eutectic Corp., Flushing, N.Y.
Gardiner Solder Co., Chicago, Ill.
Indium Corp. America, Utica, N.Y.
Johnson Mfg. Co., Princeton, Iowa
Keller, Hugo P., Inc., New York, N.Y.
Kester Solder Co, Chicago, Ill.
Lenk Manufacturing Co., Inc., Franklin, Ky.
MacDonald & Co., Glendale, Calif.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Mico Instr. Co., Cambridge, Mass.
Nat'l. Lead Co., New York, N.Y.
New York Solder Co., Bronx, N.Y.
Porcelain Prods. Co., Carey, Ohio
Semi Alloys, Inc., Mt. Vernon, N.Y.
Unibraze Corp, White Plains, N.Y.
United American Metals Div., Brooklyn, N.Y.

Solder Pots

Hexacon Elec. Co., Roselle Park, N.J.
American Elec. Heater, Detroit, Mich.
Anchor Alloys, Inc., Brooklyn, N.Y.
Caig Labs., Inc., Westbury, N.Y.
Dee Elec. Co., Chicago, Ill.
Device Seals, Inc., Sun Valley, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrovert, Inc., Mt. Vernon, N.Y.
Hollis Engrg., Inc., Nashua, N.H.
MacDonald & Co., Glendale, Calif.
Precision Elctrns. Corp., Marshfield, Mass.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Sta-Warm Elec. Co., Ravenna, Ohio
Techni-Tool, Inc., Philadelphia, Pa.
Trent, Inc., Philadelphia, Pa.
UNGAR, Compton, Calif.
United American Metals Div., Brooklyn, N.Y.
Waage Elec., Inc., Kenilworth, N.J.
Wenesco Inc., Chicago, Ill.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Zeva Elec. Corp., Hanover, N.J.

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Bow Solder Products, Newark, N.J.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Division Lead Co., Summit, Ill.
Gardiner Solder Co., Chicago, Ill.
Indium Corp. America, Utica, N.Y.
Kester Solder Co, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
Metal Ceram, Inc., Mt. Vernon, N.Y.
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Alpha Metals, Inc., Jersey City, N.J.
American Elec. Heater, Detroit, Mich.
Anchor Alloys, Inc., Brooklyn, N.Y.
By-Buk Co., Los Angeles, Calif.
Caig Labs., Inc., Westbury, N.Y.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Electrovert, Inc., Mt. Vernon, N.Y.
Enterprise Development Corp., Indianapolis, Ind.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Hughes Aircraft Co., Vacuum Tube Prods. Div/Welding Equip., Oceanside, Calif.
Hunter Tools, El Monte, Calif
Janel, Inc., Stirling, N.J.
Kester Solder Co, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
Maryland Lava Co., Bel Air, Md.
Miller, L.C. Co., Monterey Park, Calif.
Mueller Brass Co., Port Huron, Mich.
Newman, M.M. Corp., Marblehead, Mass.
Photomation, Inc., Mountain View, Calif.
Scientific Inds., Inc., Mineola, N.Y.
Solder Removal Co., Covina, Cal.
Superior Flux & Mfg., Cleveland, Ohio
Techni-Tool, Inc., Philadelphia, Pa.
Telvac Instr. Co., Van Nuys, Cal.
Thermal Ind'l. Prod., Atchison, Kans.
Titchener, E.H. & Co., Binghamton, N.Y.
UNGAR, Compton, Calif.
Western Elctrn. Prods. Co., San Clemente, Cal.
Wilder Mfg. Co., Inc., Port Jervis, N.Y.
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Zeva Elec. Corp., Hanover, N.J.

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Fostoria-Fannon, Inc., Fostoria, Ohio
Hollis Engrg., Inc., Nashua, N.H.
Hughes Aircraft Co., Ind'l. Prods. Div., Oceanside, Cal.
Janel, Inc., Stirling, N.J.
Laurier Assocs., Westford, Mass.
Lear Siegler, Inc., Santa Monica, Calif.
MacDonald & Co., Glendale, Calif.
Mechanization Assocs., Mt. View, Calif.
Micro-Meas. Div., Romulus, Mich.
Techni-Tool, Inc., Philadelphia, Pa.
Unitek Corp., Monrovia, Calif.
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Communications Tech. Corp., Los Angeles, Cal.
Components Specialties, Inc., Freeport, N.Y.
Fedtro, Inc., Rockville Centre, N.Y.
Janel, Inc., Stirling, N.J.
MacDonald & Co., Glendale, Calif.
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Janel, Inc., Stirling, N.J.
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MacDonald & Co., Glendale, Calif.
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Philmore Mfg. Co., Richmond Hill, N.Y.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
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UNGAR, Compton, Calif.
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Amatom Elctrn. Hardware, New Rochelle, N.Y.
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Auto-Swage Products, Inc., Shelton, Conn.
Bell Fasteners Corp., Paramus, N.J.
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Brush Beryllium Co., Cleveland, Ohio
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Corning Glass Works, Television Prods. Div., Corning, N.Y.
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Fischer Special Mfg. Co., Cincinnati, Ohio
Franklin Fibre-Lamitex, Wilmington, Del.
General Mfg. Co., Glendale, Calif.
Instru-Lec Corp., Mt. Vernon, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Jones, A.D. Optical Works, Burlington, Mass.
Kentucky Elctrns., Owensboro, Ky.
Keystone Elctrns. Corp., New York, N.Y.
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Nyltite Corp. America, S. Plainfield, N.J.
Perkins Machine & Gear, W. Springfield, Mass.
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Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Burndy Corp., Norwalk, Conn.
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Connectrol Corp., New York, N Y
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Finney Co., Bedford, Ohio
Javex Elctrns., Cherry Valley, Calif.
Phelps Dodge Comm., North Haven, Conn.
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Buchanan Elec. Prods., Union, N.J.
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Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Communications Tech. Corp., Los Angeles, Cal.
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Sjoberg, C. & Son, Inc., Cranston, R.I.
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Acme Model Engrg. Co., Ridgefield, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Ce-Ja Springs, Inc., Newington, Conn.
Chatillon John & Sons, Kew Gardens, N.Y.
Chronomatic Div., Burbank, Cal.
Connor Spring & Mfg. Co., San Jose, Cal.
Dudek & Bock Spring Mfg. Co., Chicago, Ill.
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Helix Spring Corp., Long Island City, N.Y.
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Larsen Importing Co., New York, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
O'Hara Metal Prods. Co., San Francisco, Calif.
PIC Design Corp., Ridgefield,, Conn.
Stanley Ind'l. Comps. Div., Forestville, Conn.
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Helix Spring Corp., Long Island City, N.Y.
Hunter Spring, Hatfield, Pa.
O'Hara Metal Prods. Co., San Francisco, Calif.
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Auto-Swage Products, Inc., Shelton, Conn.
Braun, H., Tool & Instr. Co., Hawthorne, N.J.
Chatillon John & Sons, Kew Gardens, N.Y.
Chemical Micro Milling Co, Camden, N.J.
Connor Spring & Mfg. Co., San Jose, Cal.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Helix Spring Corp., Long Island City, N.Y.
H.K. Metalcraft Mfg. Co., Lodi, N.J.
Holmberg, Inc., Melville, N.Y.
Hunter Spring, Hatfield, Pa.
Kentucky Elctrns., Owensboro, Ky.
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Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Pamcor, Inc., Paoli, Pa
Apahouser Corp. of N.E., Boston, Mass.
Ark-Les Switch Corp., Watertown, Mass.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
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Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Chronomatic Div., Burbank, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Curtis Dev. & Mfg., Milwaukee, Wisc.
D-Cemco, Inc., Burbank, Calif.
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Eby Sls. Co., Jamaica, N.Y.
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Electrical Plastics Corp., Lyndhurst, N.J.
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Franklin Fibre-Lamitex, Wilmington, Del.
Holmberg, Inc., Melville, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Industrial Elctrn. Hardware, New York, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
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Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
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Morey Corp, Downers Grove, Ill.
N/P Co., Temple City, Calif.
Permonite Mfg. Co., Chicago, Ill.
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Sjoberg, C. & Son, Inc., Cranston, R.I.
Square D Co., Park Ridge, Ill.
Staffall, Inc., Providence, R.I.
States Co., Hartford, Conn.
3M Co., St. Paul, Minn.
Tri-Dex Co., Visalia, Calif.
Tri-Tronics Lab., Euless, Tex.
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Waldom Elctrns., Inc., Chicago, Ill.
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Radio Materials Co., Chicago, Ill.
Alloys Unlimited, Inc., Encino, Calif.
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Brush Beryllium Co., Cleveland, Ohio
Ceramic Magnetics, Inc., Fairfield, N.J.
Cermetron Corp., San Diego, Cal.
Commander Labs., Inc., Escondido, Calif.
Coors Porcelain Co., Golden, Colo.
Custom Materials, Inc., Chelmsford, Mass.
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Electro-Science Labs., Philadelphia, Pa.
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Hughes Aircraft Co, Culver City, Cal.
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Kidco, Inc., Medford, N.J.
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Atlantic Optical Moulding Co., Dudley, Mass.
Bell & Howell Co., Pasadena, Calif.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Dell Optics Co., Inc., N. Bergen, N.J.
Garner Glass Co., Claremont, Calif.
Hughes Aircraft Co, Culver City, Cal.
Jenaer Glaswerk Schott & Gen. Inc., New York, N.Y.
Kopp Glass, Inc., Pittsburgh, Pa.
Liberty Mirror Div., Brackenridge, Pa.
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Tapes, Electrical Insulation
Markel, L. Frank & Sons, Norristown, Pa.
Rye Inds., Inc., Mamaroneck, N.Y.
Tensolite, Tarrytown, N.Y.
Transcon Mfg. Co., Dallas, Tex.
American Biltrite Rubber Co., Inc., Boston, Mass.
Arlin Mfg. Co., Inc., Lowell, Mass.
Automatic Die Cutting Mach. Co., New York, N.Y.
Birnbach Co., Inc., Freeport, N.Y.
Borden Chem., New York, N.Y.
Brady, W.H. Co., Milwaukee, Wisc.
Brand Dielectrics, Inc., N. Windham, Conn.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Budd Co., Philadelphia, Pa.
Burlington Opers. Div., Burlington, Mass.
By-Buk Co., Los Angeles, Calif.
Chase & Sons, Inc., Randolph, Mass.
Chemplast, Inc., Wayne, N.J.
Connecticut Hard Rubber Co., New Haven, Conn.
Corkpak Co., Inc., New Rochelle, N.Y.
Dennison Mfg., Framingham, Mass.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Fedtro, Inc., Rockville Centre, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Schenectady, N.Y.
General Elec., Providence, R.I.
IE Mfg. Co., Chicago, Ill.
Johns-Manville Sls. Corp., New York, N.Y.
Kendall Co., Chicago, Ill.
Lundy Elctrns. & Sys., Inc., Glen Head, N.Y.
Mystik Tape, Borden Inc, Northfield, Ill.
Natvar Corp., Rahway, N.J.
Okonite Co., Ramsey, N.J.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Polymer Corp., Reading, Pa.
Porcelain Prods. Co., Carey, Ohio
Port Plastics, Inc., Montebello, Cal.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Royal Inds, El Segundo, Calif
Russell Inds., Inc., Lynbrook, N.Y.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Schjeldahl, G.T. Co., Northfield, Minn.
Shamban, W.S. & Co., Los Angeles, Calif.
Sparta Mfg. Co., Dover, Ohio
Technical Tape Corp., New Rochelle, N.Y.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Westinghouse Elec., W. Mifflin, Pa.

Tapes, Films & Foils, Pressure Sensitive
Aero Devices, Inc., Totowa, N.J. p 2994
Centron Engrg., Gardena, Cal. .... p 1299
Circuit-Stik, Inc., Gardena, Cal. .. p 1299
Automatic Die Cutting Mach. Co., New York, N.Y.
Avery Prods. Graphics Div., Santa Ana, Calif
Bishop Graphics, No. Hollywood, Cal.
By-Buk Co., Los Angeles, Calif.
Canrad Precision Inds., Inc., Pelham, N.Y.
Chase & Sons, Inc., Randolph, Mass.
Chemplast, Inc., Wayne, N.J.
Corkpak Co., Inc., New Rochelle, N.Y.
Crane Packing Co., Morton Grove, Ill.
Dilectrix Corp., Farmingdale, N.Y.
Fitchburg Coated Products, Scranton, Pa.
Kendall Co., Chicago, Ill.
Labelon Corp., Canandaigua, N.Y.
Master Tape Printers, Inc., Chicago, Ill.
Morgan Adhesives Co., Stow, Ohio
Mystik Tape, Borden Inc, Northfield, Ill.
Norton Coated Abrasive & Tape Divs., Troy, N.Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Port Plastics, Inc., Montebello, Cal.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Press-On Prods., Addison, Ill.
Royal Inds, El Segundo, Calif

Russell Inds., Inc., Lynbrook, N.Y.
Seton Name Plate Corp., New Haven, Conn.
Tapecon, Inc., Rochester, N.Y.
3M Co., St. Paul, Minn.
Topflight Corp., York, Pa.
Tri-Point Inds., Inc., Commack, N.Y.
Westinghouse Elec., W. Mifflin, Pa.
Zippertubing Co., Los Angeles, Calif.

Tapes, Heat Shrinkable—See Caps, Forms & Tapes, Heat Shrinkable

Tapes, Paper, Plastic, etc. (For Punching)—See Vol 1

Tapes, Recording, Magnetic (All Types)—See Vol 1

Tape To Film Transfer Equip.—See Vol 2

Taps—See Dies & Taps

Teaching Machines—See Vol 1

Technical Books
RCA Elctrns. Comps., Harrison, N.J.
Allied Elctrns. Corp., Chicago, Ill.
American Radio Relay League, Inc., Newington, Conn.
Barnes & Reinecke, Inc., Chicago, Ill.
Beckman Instrs., (AISSD), Fullerton, Cal.
D.A.T.A., Inc., Orange, N.J.
Editors & Engrs., New Augusta, Ind.
General Elctrn. Labs., Boston, Mass.
G/L Tab Books, Blue Ridge Summit, Pa.
Hayden Book Co., New York, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Integrated Circuit Engrg., Phoenix, Ariz.
Johnson Research Corp., Farmingdale, N.Y.
Lockheed Elctrns. Co., Watchung, N.J.
Monitor Sys., Inc., Ft. Washington, Pa.
Motorola Semiconductor Prods., Phoenix, Ariz.
Philco-Ford Corp., Washington, D.C.
Quality Documents Co., Bound Brook, N.J.
Rel-Qual Assocs., Bound Brook, N.J.
Sams, Howard W. & Co., Inc., Indianapolis, Ind.
Sands, Leo G. & Assocs., Inc., New York, N.Y.
Supreme Publications, Highland Park, Ill.

Tees, Coaxial—See Vol 2

Tees, Waveguide—See Vol 2

Telegraph Keys—See Keys, Telegraph—Vol 1

Telemetering Indicators—See Analyzers, Telemetric Data—Vol 1

Telemetering Systems, Electronic—See Comm. Systems, Telemetering—Vol 1

Telemetering Testers & Calibrators—See Vol 1

Telemetric Data Analyzers—See Analyzers, Telemetric Data—Vol 1

Telemetry Preamplifiers—See Preamplifiers, Telemetry—Vol 1

Telephone Handsets—See Handsets—Vol 1

Telephone Systems—See Comm. Systems, Telephone—Vol 1

Telephones, Sound Powered—See Comm. Systems, Telephone—Vol 1

Teleprinter Error Correction Equipment—See Error Correction Equipment—Vol 1

Teleprinters—See Vol 1

Teletypewriter Testers—See Testers, Teletypewriter—Vol 1

Teletypewriters & Equipment—See Vol 1

Television Equipment—See Antennas; Cameras; Coils; Monitors;Recorders, Video—Vol 1

Television Systems, Closed-Circuit—See Vol 1

Temperature Controls—See Controls, Temperature—Vol 2

Temperature Indicators—See Meters, Temperature—Vol 1

Temperature Sensors—See Transducers, Temperature—Vol 2

Templates, Drafting—See Drafting Equipment

Tempo Regulators—See Regulators, Pitch & Tempo—Vol 1

Tensile Testers—See Testers, Material—Vol 1

Terminal Blocks—See Blocks, Terminal

Terminal Boards—See Boards, Terminal

Terminal Boards, Prepunched
Douglas Electronics, Inc., San Leandro, Cal.
Elctrn. Molding Corp., Woonsocket, R.I.
Interswitch, Burlingame, Cal.
National Tel-Tronics Corp., Great Neck, N.Y.
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Brandywine Fibre Prods. Co., Wilmington, Del.
Cambridge Thermionic, Cambridge, Mass
Cinch Mfg. Co., Elk Grove Village, Ill.
Cole Instr., Costa Mesa, Cal.
D-Cemco, Inc., Burbank, Calif.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electrical Insulation Co., Inc., Copiague, N.Y.
Elgin Elctrns., Waterford, Pa.
Fansteel Inc., N Chicago, Ill.
Franklin Fibre-Lamitex, Wilmington, Del.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Industrial Elctrn. Hardware, New York, N.Y.
Insulating Fabricators, E. Rutherford, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Long, T.J., Inc., Carle Pl., N.Y.
Maxson Elctrns. Div., Great River, N.Y.
Miller Dial, El Monte, Calif.
Morey Corp, Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
SKG Assocs., Inc., Boston, Mass.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Spruce Pine Mica Co Inc., Spruce Pine, N.C.
Synthane Corp, Oaks, Pa.
Tri-State Elctrns. Corp., Camden, N.J.

Terminal Equipment, Digital—See Vol 1

Terminal Strips—See Strips, Terminal

Terminals, Feedthru
American Lava Corp., Chattanooga, Tenn.
Art Wire & Stamping Co., Cedar Knolls, N.J.
Augat Inc., Attleboro, Mass.
Berg Elctrns., Inc., New Cumberland, Pa.
Concord Elctrns., New York, N.Y. p 2611
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I. p 2626
Johnson E. F. Co., Waseca, Minn.
Jones Hiram Elctrns., No. Hollywood, Cal. ..... p 2634,2635
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
Positronic Inds., Springfield, Mo.
Precision Metal Prods. Co., Stoneham, Mass. ..... p 2705
RDI, Glen Ellyn, Ill.
Sealectro Corp., Mamaroneck, N.Y. p 2709
Smith, Herman H., Inc., Bklyn., N.Y. p 2717
Taurus Corp., Lambertville, N.J.
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Alberox Corp., New Bedford, Mass.
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Armel Elctrns., Inc., N. Bergen, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Basic Ceramics Inc., Hawthorne, N.J.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Cambridge Thermionic, Cambridge, Mass
Cary Instrs., Monrovia, Calif.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Chemelec Prods., Inc., Cherry Hill, N.J.
Connectrol Corp., New York, N Y
Coors Porcelain Co., Golden, Colo.
Curtis Dev. & Mfg., Milwaukee, Wisc.
D-Cemco, Inc., Burbank, Calif.
Delbert Blinn. Co., Pomona, Calif.
Deutsch Co., Banning, Calif.
Device Seals, Inc., Sun Valley, Calif.
Dixon Corp., Bristol, R.I.
Eimac, San Carlos, Calif.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Elctrn. Seals, Van Nuys, Cal.
Ercona Corp., Bellmore, N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Fabri-Tek, Inc., Minneapolis, Minn.
Federal Screw Prods., Inc., Chicago, Ill.
Gemp Terminals, Inc., Yonkers, N.Y.
General Mfg. Co., Glendale, Calif.
Glass Beads Co., Latrobe, Pa.
Glasseal Prods. Co., Linden, N.J.
Gleason-Avery Co., Auburn, N.Y.
Goe Engrg. Co., City of Industry, Calif.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Gridcraft, Ft. Wayne, Ind.
Helitronics Corp., Newark, N.J.
Heyman Mfg. Co., Kenilworth, N.J.
Hughes Aircraft Co, Culver City, Cal.
Isotronics, Inc., New Bedford, Mass.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Javex Elctrns., Cherry Valley, Calif.
Joy Mfg. Co., New Phila., Ohio
Keystone Elctrns. Corp., New York, N.Y.
Latronics Corp., Latrobe, Pa.
Litton Inds., Van Nuys, Calif.
Lundey Assocs., Inc., Waltham, Mass.
Malco Mfg. Co., Chicago, Ill.
Maryland Lava Co., Bel Air, Md.
Molex Prods. Co., Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Physical Sciences, Arcadia,, Cal.
Pylon Co., Inc., Attleboro, Mass.
Rostone Corp., Lafayette, Ind.
Royal Inds, El Segundo, Calif
Silicone Seals, Chicago, Ill.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Staffall, Inc., Providence, R.I.
Statham Instrs., Inc., Oxnard, Cal.
Sterling Instr., New Hyde Pk., NY
Stettner-Trush Inc., Cazenovia, N.Y.
Teale Machine Co., Rochester, N.Y.
Teledyne Positive Connector, Ansonia, Conn.
3M Co., St. Paul, Minn.
Tinnerman Div., Cleveland, Ohio
Tri-Point Inds., Inc., Commack, N.Y.
Tri-State Elctrns. Corp., Camden, N.J.
U.S. Terminals, Inc., Cincinnati, Ohio
Varian Assocs., Palo Alto, Cal.
Veritron West, Inc., Chatsworth, Calif.
Whitso, Inc, Schiller Park, Ill.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Terminals, Ferrule, Cable-End
Amp Inc., Harrisburg, Pa.
Berg Elctrns., Inc., New Cumberland, Pa. ..... p 2592
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Chronomatic Div., Burbank, Cal.
Connectrol Corp., New York, N Y
Eimac, San Carlos, Calif.
MI-KRO Connector Div., Long Island City, N.Y.
Sjoberg, C. & Son, Inc., Cranston, R.I.

Terminals, Hermetic—See Terminals (As Modified)

Terminals, Lug
Amp Inc., Harrisburg, Pa.
Augat Inc., Attleboro, Mass.
Berg Elctrns., Inc., New Cumberland, Pa.
Buchanan Elec. Prods., Union, N.J.
Circon Corp., Goleta, Cal.
Concord Elctrns., New York, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elctrn. Molding Corp., Woonsocket, R.I.
ETC, Inc., Cleveland, Ohio ..... p 2628
GC Elctrns., Rockford, Ill.
General Elec. Co., Schenectady, N.Y.
Jackson Bros., (London) Ltd., New York, N.Y. ..... p 2419
Jones Hiram Elctrns., No. Hollywood, Cal.
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
Pomona Elctrns. Co., Inc., Pomona, Cal. p 2662
Precision Metal Prods. Co., Stoneham, Mass. ..... p 2705
Sealectro Corp., Mamaroneck, N.Y. p 2709
Showa Musen Kogyo Co., Ltd., Shinagawa-Ku Tokyo 141, Japan
Smith, Herman H., Inc., Bklyn., N.Y.
Taurus Corp., Lambertville, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Acme Model Engrg. Co., Ridgefield, N.J.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Bud Radio, Inc., Willoughby, Ohio
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Cinch Mfg. Co., Elk Grove Village, Ill.
Cole-Hersee Co., S. Boston, Mass.
Connectrol Corp., New York, N Y
D-Cemco, Inc., Burbank, Calif.
Dante Elec. Mfg. Co., Bantam, Conn.
Delbert Blinn. Co., Pomona, Calif.
Eby Sls. Co., Jamaica, N.Y.
Electric Terminal Corp., Warwick, R.I.
Electrical Inds., Murray Hill, N.J.
Ercona Corp., Bellmore, N.Y.
Fabri-Tek, Inc., Minneapolis, Minn.
Federal Screw Prods., Inc., Chicago, Ill.
Gemp Terminals, Inc., Yonkers, N.Y.
General Mfg. Co., Glendale, Calif.
Great Eastern Metal Prod. Co., Yonkers, N.Y.
Hobson Bros., Inc., Chicago, Ill.
Hollingsworth Solderless Terminal, Phoenixville, Pa.
Ico/Rally, Palo Alto, Cal.
Industrial Elctrn. Hardware, New York, N.Y.
Jackson, J.A. Corp., Mamaroneck, N.Y.
Kent Corp., Mundelein, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Litton Inds., Van Nuys, Calif.

Malco Mfg. Co., Chicago, Ill.
Network Inds., Inc., Bayonne, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Permonite Mfg. Co., Chicago, Ill.
Philmore Mfg. Co., Richmond Hill, N.Y.
Shakeproof Div., Elgin, Ill.
Shigoto Inds., Ltd., New York, N.Y.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Staffall, Inc., Providence, R.I.
Stimpson Co., Inc., Bayport, N.Y.
Teale Machine Co., Rochester, N.Y.
Teledyne Penn-Union Elec., Edinboro, Pa.
Teledyne Positive Connector, Ansonia, Conn.
Thomas & Betts Co., Elizabeth, N.J.
3M Co. Electro Prods. Div., St. Paul, Minn.
Tri-State Elctrns. Corp., Camden, N.J.
Twin Lock Inc., Los Angeles, Cal.
U.S. Terminals, Inc., Cincinnati, Ohio
Veritron West, Inc., Chatsworth, Calif.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Terminals, Miniature & Subminiature

American Lava Corp., Chattanooga, Tenn.
Amp Inc., Harrisburg, Pa.
Art Wire & Stamping Co., Cedar Knolls, N.J. ..... p 2815
Augat Inc., Attleboro, Mass. ..... p 1536
Berg Elctrns., Inc., New Cumberland, Pa. ..... p 2593
Concord Elctrns., New York, N.Y. p 2611
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I.
ETC, Inc., Cleveland, Ohio ..... p 2628
GC Elctrns., Rockford, Ill.
Grayhill, Inc., LaGrange, Ill. ..... p 1915
Jackson Bros., (London) Ltd., New York, N.Y. ..... p 2419
Jones Hiram Elctrns., No. Hollywood, Cal. ..... p 2634,2635
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
Positronic Inds., Springfield, Mo.
Precision Metal Prods. Co., Stoneham, Mass. ..... p 2705
Sealectro Corp., Mamaroneck, N.Y. p 2709
Smith, Herman H., Inc., Bklyn., N.Y. p 2717
Taurus Corp., Lambertville, N.J.
United Prods. Co., New Hyde Pk., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal. p 2722
Vero Electronics, Inc., Hauppauge, N.Y.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Armel Elctrns., Inc., N. Bergen, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Cambridge Thermionic, Cambridge, Mass
Chronomatic Div., Burbank, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Connectrol Corp., New York, N Y
Connectron Corp., Van Nuys, Cal
Curtis Dev. & Mfg., Milwaukee, Wisc.
D-Cemco, Inc., Burbank, Calif.
Delbert Blinn. Co., Pomona, Calif.
Eby Sls. Co., Jamaica, N.Y.
Electrical Inds., Murray Hill, N.J.
Ercona Corp., Bellmore, N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Fabri-Tek, Inc., Minneapolis, Minn.
Federal Screw Prods., Inc., Chicago, Ill.
General Mfg. Co., Glendale, Calif.
Goe Engrg. Co., City of Industry, Calif.
Holmberg, Inc., Melville, N.Y.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
IFE Div, E Providence, R.I.
Javex Elctrns., Cherry Valley, Calif.
Kent Corp., Mundelein, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Latronics Corp., Latrobe, Pa.
Litton Inds., Van Nuys, Calif.
Lundey Assocs., Inc., Waltham, Mass.
Malco Mfg. Co., Chicago, Ill.
MI-KRO Connector Div., Long Island City, N.Y.
Molex Prods. Co., Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Permonite Mfg. Co., Chicago, Ill.
Pylon Co., Inc., Attleboro, Mass.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Robinson-Nugent, New Albany, Ind.
Royal Inds, El Segundo, Calif
Shigoto Inds., Ltd., New York, N.Y.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Staffall, Inc., Providence, R.I.
Teledyne Penn-Union Elec., Edinboro, Pa.
Teledyne Positive Connector, Ansonia, Conn.
Tri-State Elctrns. Corp., Camden, N.J.
U.S. Terminals, Inc., Cincinnati, Ohio
Veritron West, Inc., Chatsworth, Calif.
Whitaker Cable Corp., N. Kansas City, Mo.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Terminals, Printed Circuit Board

Amp Inc., Harrisburg, Pa.
Barnes Corp., Lansdowne, Pa.
Berg Elctrns., Inc., New Cumberland, Pa. ..... p 2592,2593
Circon Corp., Goleta, Cal.
Concord Elctrns., New York, N.Y. p 2611
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I.
Jones Hiram Elctrns., No. Hollywood, Cal. ..... p 2634,2635
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
Positronic Inds., Springfield, Mo.
Precision Metal Prods. Co., Stoneham, Mass. ..... p 2705
RDI, Glen Ellyn, Ill.
Sealectro Corp., Mamaroneck, N.Y. p 2709
Vector Elctrn. Co., Inc., Sylmar, Cal.
Vero Electronics, Inc., Hauppauge, N.Y.
Virginia Panel Corp., Waynesboro, Va.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Cambridge Thermionic, Cambridge, Mass
Chronomatic Div., Burbank, Cal.
Cinch Mfg. Co., Elk Grove Village, Ill.
Connectrol Corp., New York, N Y
Connectron Corp., Van Nuys, Cal
Curtis Dev. & Mfg., Milwaukee, Wisc.
D-Cemco, Inc., Burbank, Calif.
Essex Int'l, Inc., Sycamore, Ill.
Fabri-Tek, Inc., Minneapolis, Minn.
Fansteel Inc., N Chicago, Ill.
General Mfg. Co., Glendale, Calif.
Goe Engrg. Co., City of Industry, Calif.
Gridcraft, Ft. Wayne, Ind.
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co, Fullerton, Cal.
Kent Corp., Mundelein, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Litton Inds., Van Nuys, Calif.
Magnum Elec. Corp., Erie, Mich.
Malco Mfg. Co., Chicago, Ill.
Maxson Elctrns. Div., Great River, N.Y.
MI-KRO Connector Div., Long Island City, N.Y.
Molex Prods. Co., Downers Grove, Ill.
Morey Corp, Downers Grove, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Engrg. & Mfg. Corp., Doylestown, Pa.
Permonite Mfg. Co., Chicago, Ill.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Shigoto Inds., Ltd., New York, N.Y.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Teledyne Positive Connector, Ansonia, Conn.
U.S. Terminals, Inc., Cincinnati, Ohio
Zierick Mfg. Corp., Mt. Kisco, N.Y.

Terminals, Push-On—See Connectors & Terminals, Push-On, Quick Disconnect

Terminals, Solderless

Amp Inc., Harrisburg, Pa.
Augat Inc., Attleboro, Mass. ..... p 1536
Berg Elctrns., Inc., New Cumberland, Pa. ..... p 2593
Buchanan Elec. Prods., Union, N.J.
Circon Corp., Goleta, Cal.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Elco, Willow Grove, Pa.
Elctrn. Molding Corp., Woonsocket, R.I.
ETC, Inc., Cleveland, Ohio ..... p 2628
GC Elctrns., Rockford, Ill.
National Tel-Tronics Corp., Great Neck, N.Y. ..... p 2650
RDI, Glen Ellyn, Ill.
Sealectro Corp., Mamaroneck, N.Y. p 2709
Smith, Herman H., Inc., Bklyn., N.Y.
Vaco Prods. Co., Chicago, Ill. ..... p 2944
Vector Elctrn. Co., Inc., Sylmar, Cal. p 2722
Winchester Elctrns. Div., Oakville, Conn.
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
American Pamcor, Inc., Paoli, Pa
Ark-Les Switch Corp., Watertown, Mass.
Auto-Swage Products, Inc., Shelton, Conn.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Burndy Corp., Norwalk, Conn.
Bussco Engrg., El Segundo, Cal.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Cinch Mfg. Co., Elk Grove Village, Ill.
Cole-Hersee Co., S. Boston, Mass.
Connectrol Corp., New York, N Y
Dante Elec. Mfg. Co., Bantam, Conn.
Doran Mfg. Co., Cincinnati, Ohio
Electraid, Inc., Cambridge, Mass.
Electric Terminal Corp., Warwick, R.I.
Ercona Corp., Bellmore, N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Fabri-Tek, Inc., Minneapolis, Minn.
Federal Screw Prods., Inc., Chicago, Ill.
Hollingsworth Solderless Terminal, Phoenixville, Pa.
Holub Inds., Inc., Sycamore, Ill.
Ico/Rally, Palo Alto, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Jackson, J.A. Corp., Mamaroneck, N.Y.
Javex Elctrns., Cherry Valley, Calif.
Kent Corp., Mundelein, Ill.
Keystone Elctrns. Corp., New York, N.Y.
Kolton Elec. Mfg. Co., Newark, N.J.
Litton Inds., Van Nuys, Calif.
Magnum Elec. Corp., Erie, Mich.
Malco Mfg. Co., Chicago, Ill.
MI-KRO Connector Div., Long Island City, N.Y.
Molex Prods. Co., Downers Grove, Ill.
Network Inds., Inc., Bayonne, N.J.
Permonite Mfg. Co., Chicago, Ill.
Shakeproof Div., Elgin, Ill.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Square D Co., Park Ridge, Ill.
Staffall, Inc., Providence, R.I.
Teledyne Penn-Union Elec., Edinboro, Pa.
Teledyne Positive Connector, Ansonia, Conn.
Thomas & Betts Co., Elizabeth, N.J.
3M Co. Electro Prods. Div., St. Paul, Minn.
Tri-State Elctrns. Corp., Camden, N.J.
Triple-A Specialty Co., Chicago, Ill.
Twin Lock Inc., Los Angeles, Cal.
U.S. Terminals, Inc., Cincinnati, Ohio
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Whitso, Inc, Schiller Park, Ill.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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United Prods. Co., New Hyde Pk., N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Abacus Elctrns. Corp., Dobbs Ferry, N.Y.
Abadak Inds., Inc., Farmingdale, N.Y.
Accurate Elctrns. Corp., Elyria, Ohio
Alberox Corp., New Bedford, Mass.
Amatom Elctrn. Hardware, New Rochelle, N.Y.
American Pamcor, Inc., Paoli, Pa
Armel Elctrns., Inc., N. Bergen, N.J.
Auto-Swage Products, Inc., Shelton, Conn.
Basic Ceramics Inc., Hawthorne, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Cambridge Thermionic, Cambridge, Mass
CCA Elctrns. Corp., Gloucester, N.J.
Ceramaseal, Inc., New Lebanon Center, N.Y.
Chemelec Prods., Inc., Cherry Hill, N.J.
Cinch Mfg. Co., Elk Grove Village, Ill.
Coors Porcelain Co., Golden, Colo.
D-Cemco, Inc., Burbank, Calif.
Delbert Blinn. Co., Pomona, Calif.
Device Seals, Inc., Sun Valley, Calif.
Dixon Corp., Bristol, R.I.
Edal Inds., Inc., E. Haven, Conn.
Elecpac Inc., Cary, Ill.
Electrical Inds., Murray Hill, N.J.
Ercona Corp., Bellmore, N.Y.
Essex Int'l, Inc., Sycamore, Ill.
Fabri-Tek, Inc., Minneapolis, Minn.
Federal Screw Prods., Inc., Chicago, Ill.
General Mfg. Co., Glendale, Calif.
Goe Engrg. Co., City of Industry, Calif.
Grayhill Moldtronics, Inc., Downers Grove, Ill.
Hydro Molding Co., Inc., Plattsburgh, N.Y.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
Latronics Corp., Latrobe, Pa.
Litton Inds., Van Nuys, Calif.
MI-KRO Connector Div., Long Island City, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Penn Engrg. & Mfg. Corp., Doylestown, Pa.
Permonite Mfg. Co., Chicago, Ill.
Rosenthal China Corp., New York, N.Y.
Royal Inds, El Segundo, Calif
Sjoberg, C. & Son, Inc., Cranston, R.I.
Staffall, Inc., Providence, R.I.
Sterling Instr., New Hyde Pk., NY
Teledyne Positive Connector, Ansonia, Conn.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
U.S. Terminals, Inc., Cincinnati, Ohio
Veritron West, Inc., Chatsworth, Calif.
Whitso, Inc, Schiller Park, Ill.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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Concord Elctrns., New York, N.Y.
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Accurate Elctrns. Corp., Elyria, Ohio
Basic Ceramics Inc., Hawthorne, N.J.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass

Cinch Mfg. Co., Elk Grove Village, Ill.
D-Cemco, Inc., Burbank, Calif.
Ercona Corp., Bellmore, N.Y.
Federal Screw Prods., Inc., Chicago, Ill.
General Mfg. Co., Glendale, Calif.
Helitronics Corp., Newark, N.J.
Litton Inds., Van Nuys, Calif.
Magnum Elec. Corp., Erie, Mich.
Penn Engrg. & Mfg. Corp., Doylestown, Pa.
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Accurate Elctrns. Corp., Elyria, Ohio
American Pamcor, Inc., Paoli, Pa
Cambridge Thermionic, Cambridge, Mass
Connectron Corp., Van Nuys, Cal
D-Cemco, Inc., Burbank, Calif.
Electrical Inds., Murray Hill, N.J.
Federal Screw Prods., Inc., Chicago, Ill.
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Rowe Inds., Div., Toledo, Ohio
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Alberox Corp., New Bedford, Mass.
American Pamcor, Inc., Paoli, Pa
Barth Elctrns., Inc., Cleveland, Ohio
Basic Ceramics Inc., Hawthorne, N.J.
Cam-Lok Div., Cincinnati, Ohio
Coleman Cable & Wire Co., River Grove, Ill.
General Elec., Schenectady, N.Y.
Herley Inds., Inc., Syosset, N.Y.
Joy Mfg. Co., New Phila., Ohio
Narda Microwave Corp., Plainview, N.Y.
Peschel Instrs., Cape Coral, Fla.
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Adre Co., Milwaukee, Wisc.
Allied Elctrns. Corp., Chicago, Ill.
American Pamcor, Inc., Paoli, Pa
Armstrong Bros. Tool Co., Chicago, Ill.
Bearing Inspection, Santa Fe Springs, Cal.
By-Buk Co., Los Angeles, Calif.
Channellock, Inc., Meadville, Pa.
Cole-Parmer Instr. Co., Chicago, Ill.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
General Hardware Mfg. Co., New York, N.Y.
Goldsman, Inc., Philadelphia, Pa.
Hammel, Riglander & Co., New York, N.Y.

Hunter Tools, El Monte, Calif
Janel, Inc., Stirling, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Keystone Elctrns. Corp., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Milbar, Chagrin Falls, Ohio
Moody Machine Prods. Co., Inc., Providence, R.I.
Multi-Amp Corp., Cranford, N.J.
Philmore Mfg. Co., Richmond Hill, N.Y.
Proto Tool Co, Los Angeles, Calif.
Rosenberg Bros. & Co., Smithtown, N.Y.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Telvac Instr. Co., Van Nuys, Cal.
Thomas & Betts Co., Elizabeth, N.J.
Uber Grafic Instrs., Palo Alto, Calif.
UNGAR, Compton, Calif.
Upson Tools, Inc., Rochester, N.Y.
Utica Tool Co., Inc., Orangeburg, S.C.
Wharton Unitools, Moosup, Conn.
Williams J.H. & Co., Buffalo, N.Y.
Wilmer Mfg. Co., Beltsville, Md.
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Electro Optics Assocs., Palo Alto, Calif.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
Injectorall Elctrns. Corp., Great Neck, N.Y.
Janel, Inc., Stirling, N.J.
Keystone Elctrns. Corp., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Philmore Mfg. Co., Richmond Hill, N.Y.
Snap-On Tools Corp., Kenosha, Wisc.
Solder Removal Co., Covina, Cal.
Techni-Tool, Inc., Philadelphia, Pa.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

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Winchester Elctrns. Div., Oakville, Conn.
American Pamcor, Inc., Paoli, Pa
Americon Corp., Waltham, Mass.
Ark-Les Switch Corp., Watertown, Mass.
Beman Mfg., Inc., New Cumberland, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Burndy Corp., Norwalk, Conn.
Cam-Lok Div., Cincinnati, Ohio
Cambridge Thermionic, Cambridge, Mass
Connectrol Corp., New York, N Y
Crimpco Engrg., Cangoga Park, Calif.
Electric Terminal Corp., Warwick, R.I.
Eyelet Tool Co., Inc., Cambridge, Mass.
Gardner-Denver Co., Quincy, Ill.
General Hardware Mfg. Co., New York, N.Y.
Hollingsworth Solderless Terminal, Phoenixville, Pa.
Holub Inds., Inc., Sycamore, Ill.
Hunter Tools, El Monte, Calif
Ideal Industries, Inc., Sycamore, Ill.
Janel, Inc., Stirling, N.J.
Keystone Elctrns. Corp., New York, N.Y.
Kings Elctrns., Tuckahoe, N.Y.
Klein, Mathias & Sons, Chicago, Ill.
Magnetec Corp., Van Nuys, Calif.
Malco Mfg. Co., Chicago, Ill.
Molex Prods. Co., Downers Grove, Ill.
Penn Engrg. & Mfg. Corp., Doylestown, Pa.
Pico Crimping Tools Co., Santa Fe Springs, Calif.
Porter, H.K., Inc., Somerville, Mass.
Shure Bros., Inc., Evanston, Ill.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Stromberg Carlson Corp., Rochester, N.Y.
Superior Continental Corp., Hickory, N.C.
Techni-Tool, Inc., Philadelphia, Pa.
Thomas & Betts Co., Elizabeth, N.J.
Triple-A Specialty Co., Chicago, Ill.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Zierick Mfg. Corp., Mt. Kisco, N.Y.

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E.T.M. Corp., Monrovia, Calif.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Janel, Inc., Stirling, N.J.
Laser Technology, Inc., N. Hollywood, Calif.
Laurier Assocs., Westford, Mass.
MacDonald & Co., Glendale, Calif.
Moser Jewel Co., Perth Amboy, N.J.
Orbit Inds., San Luis Obispo, Calif.
Techni-Tool, Inc., Philadelphia, Pa.
Tempress Inds., Inc., Los Gatos, Calif.
UNGAR, Compton, Calif.
Vigor Tool Co., New York, N.Y.
Wendon Co., Inc., Stamford, Conn.
Xcelite, Inc., Orchard Park, N.Y.

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Jonard Inds. Corp., Bronx, N.Y.
Air-Vac Engrg. Co., Milford, Conn.
American Pamcor, Inc., Paoli, Pa
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atlantic India Rubber Co., Chicago, Ill.
E.T.M. Corp., Monrovia, Calif.
Foredom Elec. Co., Bethel, Conn.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Henes Mfg. Co., Phoenix, Ariz.
Janel, Inc., Stirling, N.J.
Lear Siegler, Inc., Santa Monica, Calif.
MacDonald & Co., Glendale, Calif.
Scientific Inds., Inc., Mineola, N.Y.
Techni-Tool, Inc., Philadelphia, Pa.
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GTE Automatic Elec., Northlake, Ill.
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MacDonald & Co., Glendale, Calif.
Techni-Tool, Inc., Philadelphia, Pa.

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Elco, Willow Grove, Pa.
Jonard Inds. Corp., Bronx, N.Y.
Vector Elctrn. Co., Inc., Sylmar, Cal.
Advanced Kinetics, Costa Mesa, Calif.
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Eyelet Tool Co., Inc., Cambridge, Mass.
Helitronics Corp., Newark, N.J.
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ADC Prods., Minneapolis, Minn.
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Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
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Pico Elctrns Inc., Mount Vernon, N.Y. p 2970
Rye Inds., Inc., Mamaroneck, N.Y.
Sennheiser Elctrn. Corp., New York, NY
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. .....p 2988,2989
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Astrolab Inc., Linden, N J
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Davis J.W. & Co., Dallas, Texas
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio

General Radio Co., Concord, Mass.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Gotham Audio Corp., New York, N.Y.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
Hughes Aircraft Co, Culver City, Cal.
Hyperion Inds. Corp., Watertown, Mass.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jensen Mfg. Div., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Optimation, Inc., Sun Valley, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Quam-Nichols Co., Chicago, Ill.
Queensboro Transformer & Mach., College Pt., N.Y.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
RFL Inds., Comms. Div., Boonton, N.J.
RHA-Audio Communications, W. New York, N.J.
Rohde & Schwarz Sls., Passaic, N.J.
Sartron, Inc., Newberg, Ore.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Standard Winding Co., Newsburgh, N.Y.
Sterling Transformer Corp., Brooklyn, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Autotransformer

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Arnold Magnetics, Culver City, Cal.
Austron, Inc., Austin, Tex.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electro Cube, San Gabriel, Cal.... p 2950
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Gates Elctrn. Co., Bronx, N.Y.
General Elec. Co., Schenectady, N.Y.
Hisonic, Inc., Olathe, Kans.
Kepco, Inc., Flushing, N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J.
Ohmite Mfg. Co., Skokie, Ill.
Perkin-Elmer Corp., Wilton, Conn.
Pico Elctrns Inc., Mount Vernon, N.Y.
RCA Elctrns. Comps., Harrison, N.J. p 551
Signal Transformer, Bklyn., N.Y. p 2976,2977
Spellman High Voltage Elctrns. Corp., Bronx, N.Y.
SRC Div., Newport Bch., Cal. ..... p 1992
Staco, Inc., Dayton, Ohio..... p 2983
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Allis-Chalmers, Milwaukee, Wisc.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Anzac Elctrns., Waltham, Mass.
Astro-Metrix, Burbank, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Eastern Specialty Co., Philadelphia, Pa.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
General Radio Co., Concord, Mass.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Hughey & Phillips, Inc., Burbank, Cal.
Hyperion Inds. Corp., Watertown, Mass.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jefferson Elec., Bellwood, Ill.
Jensen Mfg. Div., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Peschel Instrs., Cape Coral, Fla.
Piconics Inc., Tyngsboro, Mass.
Polygon Inds. Ltd., Toronto 16, Ont., Canada
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Torelco Inc., Irvington, N.J.
Tranex, Inc., Mountain View, Cal.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Westinghouse Elec., Buffalo, N. Y.
Westinghouse Elec., Greenville, Pa.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Bias

Abbott Transistor Labs., L.A., Cal. p 2948
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
Nortronics, Mpls., Minn.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
American Magnetics Corp., Carterville, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Hyperion Inds. Corp., Watertown, Mass.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Merrimack Magnetics, Lowell, Mass.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad-Utrad, Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Bridging

ADC Prods., Minneapolis, Minn.
Astrosystems, Lake Success, N.Y.
Coast Coil Co., Los Angeles, Calif. p 2487
Dranetz Engrg. Labs., Plainfield, N.J.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
North Atlantic Inds., Plainview, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hyperion Inds. Corp., Watertown, Mass.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Magnetico, Inc., E. Northport, N.Y.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.

Transformers, Chopper

Coast Coil Co., Los Angeles, Calif.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Hisonic, Inc., Olathe, Kans.
James Elctrns., Inc., Chicago, Ill.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2960
Neshaminy Transformer, Furlong, Pa.
Pico Elctrns Inc., Mount Vernon, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Stevens-Arnold, Inc., So. Boston, Mass. p 2007
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2988
Zaring Inds., Inc., Carmel, Ind.
American Magnetics Corp., Carterville, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Components Corp., Chicago, Ill.
Consolidated Transformers Unltd., San Gabriel, Cal.

Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Hyperion Inds. Corp., Watertown, Mass.
Johnson Elec. Coil Co., Elmhurst, Ill.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Rawco Instrs., Inc., Ft. Worth, Tex.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Transformers, Constant Voltage

ADC Prods., Minneapolis, Minn.
CML-Macarr, Inc., Edison, N.J.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y. p 2953
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. p 2955
Kepco, Inc., Flushing, N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa. p 2965
North Elec. Co., Galion, Ohio
Signal Transformer, Bklyn., N.Y. p 2978,2979
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Wanlass Div., Fort Washington, Pa.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
B.H. Inds., Los Angeles, Cal.
Bogen Div., Paramus, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Constant Voltage Co., Chicago, Ill.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Davis J.W. & Co., Dallas, Texas
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Permavolt Transformers, Inc., S. Bend, Ind.
Polyphase Instr. Co., Bridgeport, Pa.
Queensboro Transformer & Mach., College Pt., N.Y.
Ratelco, Inc., Seattle, Wash.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Standard Winding Co., Newsburgh, N.Y.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Utah Elctrns., Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Ward Leonard, Mt. Vernon, N.Y.

Transformers, Control

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
DDC, Hicksville, N.Y.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Kepco, Inc., Flushing, N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y. p 2958
North Elec. Co., Galion, Ohio
Signal Transformer, Bklyn., N.Y. p 2980
Staco, Inc., Dayton, Ohio..... p 2983
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Arrow-Hart, Inc., Hartford, Conn.
Astro-Metrix, Burbank, Cal.
Basler Elec. Co., Highland, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Caig Labs., Inc., Westbury, N.Y.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Clifton Div., Clifton Hgts., Pa.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Furnas Elec. Co., Batavia, Ill.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HJS Engrg. Co., Park Ridge, Ill.
Honeywell, Residential Div., Mpls., Minn.
Hughes Aircraft Co, Culver City, Cal.
Hyperion Inds. Corp., Watertown, Mass.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jefferson Elec., Bellwood, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
Peschel Instrs., Cape Coral, Fla.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Square D Co., Park Ridge, Ill.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Ward Leonard, Mt. Vernon, N.Y.
Webster Elec. Co., Inc., Racine, Wisc.
Westinghouse Elec., Greenville, Pa.

Transformers, Converter, D-C To D-C

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Amp Inc., Harrisburg, Pa.
Arnold Magnetics, Culver City, Cal.
Austron, Inc., Austin, Tex.
Automatic Coil, New Hyde Pk., N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N.Y. ..... p 2484
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y. p 2953
Hisonic, Inc., Olathe, Kans.
K.G.S. Elctrns., Pasadena, Cal..... p 2956
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2961
Multitech Power Sys., Costa Mesa, Cal.
North Elec. Co., Galion, Ohio
Pico Elctrns Inc., Mount Vernon, N.Y.
Powertec, Chatsworth, Cal.
Tecnetics, Inc., Boulder, Colo.
Topaz Elctrns., San Diego, Cal.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Wanlass Div., Fort Washington, Pa.
Zaring Inds., Inc., Carmel, Ind. .... p 2993
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
Basler Elec. Co., Highland, Ill.
Beebe Instrs., Inc., N. White Plains, N.Y.
Bertan Assocs., Inc., Plainview, N.Y.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Components Corp., Chicago, Ill.
Consolidated Transformers Unltd., San Gabriel, Cal.
Constant Voltage Co., Chicago, Ill.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
El-Rad Mfg. Co., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Halmar Elctrns., Inc., Columbus, Ohio
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
Iso-Switch Corp., Costa Mesa, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Mil Elctrns. Inc., Hudson, N.H.
Novatronics, Inc., Pompano Beach, Fla.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Spectran Elctrns., Pompano Beach, Fla.
Stancor, Chicago, Ill.
Standard Winding Co., Newsburgh, N.Y.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
Teledyne Inet, Gardena, Cal.
Torelco Inc., Irvington, N.J.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Wabash Magnetics, Inc., Huntington, Ind.
Ward Leonard, Mt. Vernon, N.Y.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Current—See Transformers, Instrument

Transformers, Decade

Arnold Magnetics, Culver City, Cal.
Astrosystems, Lake Success, N.Y. p 406
Coast Coil Co., Los Angeles, Calif.
Electro Sci. Inds., Portland, Ore. p 2919
Hipotronics, Inc., Brewster, N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
North Atlantic Inds., Plainview, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torwico Elctrns., Inc., Lakewood, N.J.
American Magnetics Corp., Carterville, Ill.
Basler Elec. Co., Highland, Ill.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins, G.L. Corp., Long Beach, Calif.

Elctrn. Transformer Corp., Paterson, N.J.
Ferranti Ltd., Hollinwood, Lancs., England
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Idalee Elctrns. Corp., Valley Stream, N.Y.
Johnson Elec. Coil Co., Elmhurst, Ill.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.

Transformers, Differential

ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
CML-Macarr, Inc., Edison, N.J.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Hewlett-Packard, Palo Alto, Cal.
Lambda Elctrns., Melville, N.Y.
Multitech Power Sys., Costa Mesa, Cal.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Automatic Control Elctrns. Co., San Antonio, Tex.
Automatic Timing & Controls, Inc., King of Prussia, Pa.
Bicron Elctrns. Co., Canaan, Conn.
Bourns, Inc., Riverside, Calif.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Clifton Div., Clifton Hgts., Pa.
Coil Co. of Amer., Northvale, N.J.
Columbia Resch. Labs., Woodlyn, Pa.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Elctrn. Coils, Springfield, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Invertronics, Pine Brook, N.J.
Kavlico Elctrns., Chatsworth, Cal.
Minnetech Labs., Inc., Minneapolis, Minn.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Pickering & Co., Plainview, N.Y.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
Torotron, Mt. Vernon, N.Y.
Transducer Systems, Inc., Willow Grove, Pa.
Vanguard Elctrns., Inglewood, Cal.
Varo, Inc., Texas Div., Garland, Tex.

Transformers, Discriminator

ADC Prods., Minneapolis, Minn.
Automatic Coil, New Hyde Pk., N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Hisonic, Inc., Olathe, Kans.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
Miller, J.W. Co., Compton, Cal..... p 2496
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electrocom Inds., So. Bend, Indiana
Elctrn. Transformer Corp., Paterson, N.J.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Johnson Elec. Coil Co., Elmhurst, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rollan Electric Co., Chicago, Ill
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Torotron, Mt. Vernon, N.Y.
Vanguard Elctrns., Inglewood, Cal.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Donut—See Transformers, Toroidal

Transformers, Driver

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Tecnetics, Inc., Boulder, Colo.
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2989
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
American Magnetics Corp., Carterville, Ill.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
General Instr. Corp., Chicopee, Mass.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Filament

Abbott Transistor Labs., L.A., Cal. p 2948
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Arnold Magnetics, Culver City, Cal.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y. p 680
Elcor Prods. Welex Elctrns., Silver Spring, Md.
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y. p 2952
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. p 2955
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J. p 809
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2958,2963
Neshaminy Transformer, Furlong, Pa.
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
Zaring Inds., Inc., Carmel, Ind.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
American Magnetics Corp., Carterville, Ill.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Powerpacs Corp., Cambridge, Mass.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Knopp, Inc., Oakland, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Peschel Instrs., Cape Coral, Fla.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, 400 CPS

Abbott Transistor Labs., L.A., Cal. p 2949
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Arnold Magnetics, Culver City, Cal.
Austron, Inc., Austin, Tex.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Electro Cube, San Gabriel, Cal.... p 2950
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y.
K.G.S. Elctrns., Pasadena, Cal.... p 2956
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.

Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2958,2959
Multitech Power Sys., Costa Mesa, Cal.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J.
Perkin-Elmer Corp., Wilton, Conn.
Pico Elctrns Inc., Mount Vernon, N.Y.
Powertec, Chatsworth, Cal.
Signal Transformer, Bklyn., N.Y.
Staco, Inc., Dayton, Ohio
Topaz Elctrns., San Diego, Cal.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J. p 2987
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
Astro-Metrix, Burbank, Cal.
Avionics, Inc., South Bend, Ind.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Coils, Springfield, Mass.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jefferson Elec., Bellwood, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Knopp, Inc., Oakland, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Maxwell Labs., Inc., San Diego, Calif.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Wabash Magnetics, Inc., Huntington, Ind.
Ward Leonard, Mt. Vernon, N.Y.

Transformers, Flyback

Amperex Elctrn. Corp., Hauppauge, N.Y.
Lambda Elctrns., Melville, N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Advance Ross Elctrns. Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
El-Rad Mfg. Co., Chicago, Ill.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Chicopee, Mass.
Hughes Aircraft Co, Culver City, Cal.
Renco Elctrns., Inc., Hicksville, N.Y.
Rollan Electric Co., Chicago, Ill
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Elcor Prods. Welex Elctrns., Silver Spring, Md.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
American Magnetics Corp., Carterville, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Cycle Transformer Corp., West Orange, N.J.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Foster Transformer Co., Cincinnati, Ohio
Grand Transformers, Grand Haven, Mich.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Johnson Elec. Coil Co., Elmhurst, Ill.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
Tranex, Inc., Mountain View, Cal.
Tresco an Aydin Co., Phila., Pa.

Transformers, HV

ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Amp Inc., Elizabethtown, Pa.
Associated Resch., Chicago, Ill.
Automatic Coil, New Hyde Pk., N.Y. p 2483
Beckman Instrs., Cedar Grove, N.J.
CML-Macarr, Inc., Edison, N.J. ..... p 666
Del Elctrns. Corp., Mt. Vernon, N.Y. p 680
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. p 2955
K.G.S. Elctrns., Pasadena, Cal.
Kilovolt Corp., Hackensack, N.J.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J. p 809
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J. p 2966
Spellman High Voltage Elctrns. Corp., Bronx, N.Y. ..... p 877
Tecnetics, Inc., Boulder, Colo.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Universal Voltronics Corp., Mt. Kisco, N.Y.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
Beebe Instrs., Inc., N. White Plains, N.Y.
Bertan Assocs., Inc., Plainview, N.Y.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Magnetic Prods., Wabash, Ind.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Fischer, H.G. & Co., Franklin Park, Ill.
Foster Transformer Co., Cincinnati, Ohio
General Instr. of Can., Waterloo, Ont., Can.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
Jefferson Elec., Bellwood, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Maxwell Labs., Inc., San Diego, Calif.
Modelectric Prods. Corp., Asbury Park, N.J.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Peschel Instrs., Cape Coral, Fla.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Raytheon Co., Waltham, Mass.
Redman Elctrns. Corp., Enfield, Conn.
Sartron, Inc., Newberg, Ore.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Wabash Magnetics, Inc., Huntington, Ind.

Transformers, I-F

ADC Prods., Minneapolis, Minn.
Allen Avionics, Mineola, N.Y.
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N.Y. ..... p 2484,2485
CML-Macarr, Inc., Edison, N.J.
Dale Elctrns., Inc., Yankton, S.D.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Lambda Elctrns., Melville, N.Y.
Miller, J.W. Co., Compton, Cal. ..... p 2496
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... p 2967
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Astrolab Inc., Linden, N J
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
General Instr. Corp., Chicopee, Mass.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hughes Aircraft Co, Culver City, Cal.
Johnson Elec. Coil Co., Elmhurst, Ill.
Linell Engrg. Corp., Chicago, Ill.
Magnetico, Inc., E. Northport, N.Y.
Mini-Circuits Lab., Brooklyn, N.Y.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Profile Elctrns., Inc., Concord, N.H.
Relcom, Mt. View, Calif.
Renco Elctrns., Inc., Hicksville, N.Y.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Transrex Div., Torrance, Cal.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Transformers, Input

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynamic Instr. Corp., Plainview, N.Y. p 681
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y. p 2952
James Elctrns., Inc., Chicago, Ill.
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y. p 2958,2960
Multitech Power Sys., Costa Mesa, Cal.
Neshaminy Transformer, Furlong, Pa.
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Powertec, Chatsworth, Cal.
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo.
Topaz Elctrns., San Diego, Cal.
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.

United Transformer Co. Div. of TRW Inc., New York, N.Y. .....p 2988,2989
Vari-L Co., Inc., Denver, Colo. .... p 2990
Wanlass Div., Fort Washington, Pa.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Astrolab Inc., Linden, N J
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Powerpacs Corp., Cambridge, Mass.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Gotham Audio Corp., New York, N.Y.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HJS Engrg. Co., Park Ridge, Ill.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Spectran Elctrns., Pompano Beach, Fla.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Ward Leonard, Mt. Vernon, N.Y.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Instrument

ADC Prods., Minneapolis, Minn.
Associated Resch., Chicago, Ill.
Astrosystems, Lake Success, N.Y. p 406
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dranetz Engrg. Labs., Plainfield, N.J.
Elcor Prods. Welex Elctrns., Silver Spring, Md. ..... p 701
Ferrodyne Corp., Venice, Calif. .. p 2951
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y.
Hoyt Elec. Instr. Works, Belmont, Mass. p 495
James Elctrns., Inc., Chicago, Ill.
K.G.S. Elctrns., Pasadena, Cal..... p 2957
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Multitech Power Sys., Costa Mesa, Cal.
North Atlantic Inds., Plainview, N.Y.
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Sangamo Elec. Co., Pickens, S.C.
Signal Transformer, Bklyn., N.Y. p 2972,2973
Simpson Elec. Co., Chicago, Ill.
Stevens-Arnold, Inc., So. Boston, Mass.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
American Magnetics Corp., Carterville, Ill.
Annis, R.B. Co., Indianapolis, Ind.
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Canadian Research Institute, Don Mills, Ont., Canada
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Instr. Svc., Inc., Mt. Vernon, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Components Corp., Addison, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Esterline Angus Div., Indianapolis, Ind.
Ferranti Ltd., Hollinwood, Lancs., England
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hallmark Standards, Inc., Mt. Vernon, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Knopp, Inc., Oakland, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Midwest Electric Products, Mankato, Minn.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
PCA Elctrns., Inc., Sepulveda, Calif.
Pearson Elctrns., Palo Alto, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Princeton Applied Resch. Corp., Princeton, N.J.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Rohde & Schwarz Sls., Passaic, N.J.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Sterling Transformer Corp., Brooklyn, N.Y.
Superior Elec., Bristol, Conn.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Torelco Inc., Irvington, N.J.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Weston Instruments, Inc., Newark, N.J.

Transformers, Interstage

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y. p 1512
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y. p 2952
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2958
Neshaminy Transformer, Furlong, Pa.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Rye Inds., Inc., Mamaroneck, N.Y.
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. .....p 2988,2989
Vari-L Co., Inc., Denver, Colo. .... p 2990
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
General Instr. Corp., Automatic Mfg. Div., Newark, N.J.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Todd Systems, Yonkers, N.Y.
Transformer Design, Milwaukee, Wisc.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Isolation

Abbott Transistor Labs., L.A., Cal. p 2948
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Astrosystems, Lake Success, N.Y.
Austron, Inc., Austin, Tex.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CEA, Monrovia, Cal.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y. p 680
Delevan Div., Coil Prods., E. Aurora, N.Y.
Dranetz Engrg. Labs., Plainfield, N.J.
Dynage, Bloomfield, Conn.
Dynamics Instr. Co., Monterey Pk., Cal.
Elcor Prods. Welex Elctrns., Silver Spring, Md. ..... p 701
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y.
Gates Elctrn. Co., Bronx, N.Y.
Gulton Inds., Inc., Metuchen, N.J.
Hipotronics, Inc., Brewster, N.Y. p 2955
James Elctrns., Inc., Chicago, Ill.
K.G.S. Elctrns., Pasadena, Cal..... p 2956
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2958,2959,2963
Multitech Data Prods., Monterey Pk., Cal.
Neshaminy Transformer, Furlong, Pa.
North Atlantic Inds., Plainview, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... p 2967
NWL Transformers, Trenton, N.J. p 2966
Perkin-Elmer Corp., Wilton, Conn. p 2969
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y. p 2977,2980
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Stevens-Arnold, Inc., So. Boston, Mass. p 2007
Topaz Elctrns., San Diego, Cal. .... p 904
Torotel, Inc., Grandview, Mo. ..... p 2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.

Unitron, Garland, Tex.
Universal Voltronics Corp., Mt. Kisco, N.Y.
Vari-L Co., Inc., Denver, Colo.
Wanlass Div., Fort Washington, Pa.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Powerpacs Corp., Cambridge, Mass.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
HJS Engrg. Co., Park Ridge, Ill.
Hughes Aircraft Co, Culver City, Cal.
Hughey & Phillips, Inc., Burbank, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Magnetics, Sandy Lake, Pa.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Miller, Sanford Corp., Brooklyn, N.Y.
Mini-Circuits Lab., Brooklyn, N.Y.
Nytronics, Inc., Alpha, N.J.
Olektron Corp., Dudley, Mass.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Permavolt Transformers, Inc., S. Bend, Ind.
Polygon Inds. Ltd., Toronto 16, Ont., Canada
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Relcom, Mt. View, Calif.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Greenville, Pa.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Line

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Tecnetics, Inc., Boulder, Colo.
Topaz Elctrns., San Diego, Cal. .... p 904
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Anritsu Electric Co., Ltd., Tokyo, Japan
Atlas Sound Div., Parsippany, N.J.
Basler Elec. Co., Highland, Ill.
B.H. Inds., Los Angeles, Cal.
Bogen Div., Paramus, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro-Voice, Inc., Buchanan, Mich.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Geo Space, Houston, Tex.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HJS Engrg. Co., Park Ridge, Ill.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oaktron Inds., Monroe, Wisc.
Peerless Elec. Prods., Anaheim, Cal.
Permavolt Transformers, Inc., S. Bend, Ind.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Quam-Nichols Co., Chicago, Ill.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Todd Systems, Yonkers, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Ward Leonard, Mt. Vernon, N.Y.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Linear

ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Automatic Timing & Controls, Inc., King of Prussia, Pa.
Basler Elec. Co., Highland, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Columbia Resch. Labs., Woodlyn, Pa.
Coral Magnetics Co., Farmingdale, N.Y.
Elctrn. Transformer Corp., Paterson, N.J.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
General Instr. Corp., Chicopee, Mass.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetico, Inc., E. Northport, N.Y.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Design, Milwaukee, Wisc.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Ward Leonard, Mt. Vernon, N.Y.

Transformers, Magnetic Amplifier—See Transformers, Saturable

Transformers, Matching

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Alford Mfg. Co., Winchester, Mass.
Automatic Coil, New Hyde Pk., N.Y. p 2483
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N.Y. ..... p 2484
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Electro Impulse, Inc., Red Bank, N.J. p 450
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y. p 2952
Hewlett-Packard, Palo Alto, Cal.
Hisonic, Inc., Olathe, Kans.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal.... p 2956
Krohn-Hite, Cambridge, Mass.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J. p 809
Lorch Elctrns. Corp., Englewood, N.J.
Microtran Co., Valley Stream, N.Y. p 2963
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Saxton Prods., Congers, N.Y.
Signal Transformer, Bklyn., N.Y.
Staco, Inc., Dayton, Ohio
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. .....p 2988,2989
Vari-L Co., Inc., Denver, Colo. .... p 2990
Zaring Inds., Inc., Carmel, Ind.
Aerolite Electronics Corp., Union City, N.J.
Aladdin Elctrns., Nashville, Tenn.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Anritsu Electric Co., Ltd., Tokyo, Japan
Anzac Elctrns., Waltham, Mass.
Astrolab Inc., Linden, N J
Atlas Sound Div., Parsippany, N.J.
Ava Elctrns., Upper Darby, Pa.
Berkshire Transformer Corp., Kent, Conn.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Bogen Div., Paramus, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Delta Elctrns., Alexandria, Va.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Edko Elctrns., Inc., Brooklyn, N.Y.
Elcom Sys., Deer Pk., N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro-Voice, Inc., Buchanan, Mich.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Finney Co., Bedford, Ohio
Foster Transformer Co., Cincinnati, Ohio
Gavin Instrs., Somerville, N.J.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Koss Elctrns., Inc., Milwaukee, Wisc.
Lear Siegler, Inc., Santa Monica, Calif.
Lieco, Inc., Lindenhurst, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Premier Microwave, Port Chester, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
Quam-Nichols Co., Chicago, Ill.
Radio Resch. Co., Rockaway, N.J.
Raytheon Co., Waltham, Mass.

RFL Inds., Comms. Div., Boonton, N.J.
Rohde & Schwarz Sls., Passaic, N.J.
Sartron, Inc., Newberg, Ore.
Scala Radio Corp., San Leandro, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Sitco Antennas, Portland, Ore.
Spatron Inc, Alhambra, Calif.
Sterling Transformer Corp., Brooklyn, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
Technical Mat'l., Mamaroneck, N.Y.
Torotron, Mt. Vernon, N.Y.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Transformers, Matrix

ADC Prods., Minneapolis, Minn.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Anzac Elctrns., Waltham, Mass.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Elctrn. Transformer Corp., Paterson, N.J.
Gotham Audio Corp., New York, N.Y.
Johnson Elec. Coil Co., Elmhurst, Ill.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Design, Milwaukee, Wisc.

Transformers, Mercury Vapor

ACDC Elctrns., Oceanside, Cal.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
NWL Transformers, Trenton, N.J.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Foster Transformer Co., Cincinnati, Ohio
GTE Sylvania Inc., Danvers, Mass.
Hanovia Lamp Div., Newark, N.J.
Invertronics, Pine Brook, N.J.
Jefferson Elec., Bellwood, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Pek, Inc., Sunnyvale, Calif.
Shannon Luminous Mat'ls., Hollywood, Cal.
Sola Elec. Div., Elk Grove Village, Ill.
Varo, Inc., Texas Div., Garland, Tex.

Transformers, Metered

Lambda Elctrns., Melville, N.Y.
Ohmite Mfg. Co., Skokie, Ill. ..... p 2968
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Superior Elec., Bristol, Conn.
Triad Distributor Div., Huntington, Ind.

Transformers, Microphone

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2958
Torotel, Inc., Grandview, Mo.
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Geloso Elctrns., Inc., New York, N.Y.
American Magnetics Corp., Carterville, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bogen Div., Paramus, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Gotham Audio Corp., New York, N.Y.
Hammond Mfg. Co., Ltd., Guelph, Ont. Can.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
RHA-Audio Communications, W. New York, N.J.
Sartron, Inc., Newberg, Ore.
Shure Bros., Inc., Evanston, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Stanford Int'l., San Carlos, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Mfrs., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Transformers, Microwave

ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Ferrodyne Corp., Venice, Calif.
Lambda Elctrns., Melville, N.Y.
Transco Prods., Inc., Venice, Cal.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Vari-L Co., Inc., Denver, Colo.
Aircom, Inc., Union, N.H.
Anzac Elctrns., Waltham, Mass.
Astrolab Inc., Linden, N J
C.B.C. Inds., Inc., Ft. Washington, Pa.
CES Elctrns., Brooklyn, N.Y.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Dynographic Elctrns. Corp., Hicksville, N.Y.
General Microwave Corp., Farmingdale, N.Y.
Hughes Aircraft Co, Culver City, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetico, Inc., E. Northport, N.Y.
Maury Microwave Corp., Cucamonga, Calif.
MCS Corp., Monrovia, Calif.
Meca Elctrns., Inc., Denville, N.J.
Microlab/FXR, Livingston, N.J.
Microwave Development Labs., Inc., Needham Hgts., Mass.
Microwave Labs. America, Brooklyn, N.Y.
Nurad, Inc., Baltimore, Md.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Premier Microwave, Port Chester, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
RF Systems, Inc., Cohasset, Mass.
Sanders Assocs., Nashua, N.H.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Struthers Elctrns. Corp., Mamaroneck, N.Y.
Transformer Tech., Inc., Chicago, Ill.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Zeta Labs., Inc., Mountain View, Calif.

Transformers, Miniature, Subminiature & Microminiature

Abbott Transistor Labs., L.A., Cal. p 2949
ADC Prods., Minneapolis, Minn.
Alco Elctrn. Prods., Lawrence, Mass.
Allen Avionics, Mineola, N.Y.
American Elctrn. Labs., Inc., Lansdale, Pa.
Arnold Magnetics, Culver City, Cal. p 651
Artronic Instr. Co., Silver Spring, Md.
Astrosystems, Lake Success, N.Y.
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y. p 1512
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D. p 2488,2489
Delevan Div., Coil Prods., E. Aurora, N.Y.
Dynamic Instr. Corp., Plainview, N.Y. p 681
Ferrodyne Corp., Venice, Calif. .. p 2951
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Hisonic, Inc., Olathe, Kans.
James Elctrns., Inc., Chicago, Ill.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2958-2961
Miller, J.W. Co., Compton, Cal..... p 2496
Multitech Power Sys., Costa Mesa, Cal.
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... p 2967
Pico Elctrns Inc., Mount Vernon, N.Y. p 2970
Rye Inds., Inc., Mamaroneck, N.Y.
Signal Transformer, Bklyn., N.Y. p 2980,2981
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Stevens-Arnold, Inc., So. Boston, Mass. p 2007
Torotel, Inc., Grandview, Mo. ..... p 2984
Torwico Elctrns., Inc., Lakewood, N.J. p 2987
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2988
Vari-L Co., Inc., Denver, Colo. p 2990,2991
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Magnetics Corp., Carterville, Ill.
Anzac Elctrns., Waltham, Mass.
Astrolab Inc., Linden, N J
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Coils, Springfield, Mass.
Elctrn. Components Corp., Addison, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Gotham Audio Corp., New York, N.Y.
Grafix, Inc., Albuquerque, N.M.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Mil Elctrns. Inc., Hudson, N.H.
Mini-Circuits Lab., Brooklyn, N.Y.
Morey Corp, Downers Grove, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rawco Instrs., Inc., Ft. Worth, Tex.
Raytheon Co., Waltham, Mass.
Relcom, Mt. View, Calif.
Rystl Elctrns. Corp., N. Miami Beach, Fla.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Stanford Int'l., San Carlos, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Vanguard Elctrns., Inglewood, Cal.
Western Transformer Co., Tijeras, N. M.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Mixing

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Vari-L Co., Inc., Denver, Colo.
Zaring Inds., Inc., Carmel, Ind.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Anzac Elctrns., Waltham, Mass.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Mid-West Coil & Transformer Co., Chicago, Ill.
Mini-Circuits Lab., Brooklyn, N.Y.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.

Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Spatron Inc, Alhambra, Calif.
Sterling Transformer Corp., Brooklyn, N.Y.
Torotron, Mt. Vernon, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Transformers, Modulation

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
CML-Macarr, Inc., Edison, N.J.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
Multitech Power Sys., Costa Mesa, Cal.
North Hills Elctrns., Inc., Glen Cove, N.Y.
NWL Transformers, Trenton, N.J.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
American Magnetics Corp., Carterville, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
Bullock Magnetics Corp., Pomona, Calif.
CCA Elctrns. Corp., Gloucester, N.J.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Mechanical Technology, Inc., Latham, N.Y.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Spectran Elctrns., Pompano Beach, Fla.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Tranex, Inc., Mountain View, Cal.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.

Transformers, Output

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y. p 1512
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynamic Instr. Corp., Plainview, N.Y. p 681
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y. p 2952
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y. p 2958
Neshaminy Transformer, Furlong, Pa.
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Rye Inds., Inc., Mamaroneck, N.Y.
Signal Transformer, Bklyn., N.Y. p 2975
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio..... p 2983
Torotel, Inc., Grandview, Mo. p 2984,2985
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. .....p 2988,2989
Unitron, Garland, Tex.
Vari-L Co., Inc., Denver, Colo. .... p 2990
Zaring Inds., Inc., Carmel, Ind. .... p 2993
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Components Specialties, Inc., Freeport, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Powerpacs Corp., Cambridge, Mass.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jensen Mfg. Div., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
RHA-Audio Communications, W. New York, N.J.
Sartron, Inc., Newberg, Ore.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Spectran Elctrns., Pompano Beach, Fla.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Ward Leonard, Mt. Vernon, N.Y.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Phase Conversion

ACDC Elctrns., Oceanside, Cal.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dranetz Engrg. Labs., Plainfield, N.J.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y.
NWL Transformers, Trenton, N.J.
Perkin-Elmer Corp., Wilton, Conn. p 2969
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Vari-L Co., Inc., Denver, Colo.
Wanlass Div., Fort Washington, Pa.
American Magnetics Corp., Carterville, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Goslin Elec. & Mfg. Co., Burbank, Calif.
Green Rectifier Corp., Fair Lawn, N.J.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Merrimac Resch. & Dev., Inc., West Caldwell, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Peerless Elec. Prods., Anaheim, Cal.
Polyphase Instr. Co., Bridgeport, Pa.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Sartron, Inc., Newberg, Ore.
Spatron Inc, Alhambra, Calif.
Sterling Transformer Corp., Brooklyn, N.Y.
Taylor-Winfield Corp., Warren, Ohio
Transformer Design, Milwaukee, Wisc.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.

Transformers, Photoflash Power

Caddel-Burns Mfg. Co., Inc., Mineola, N.Y. ..... p 2484
Del Elctrns. Corp., Mt. Vernon, N.Y.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
Tecnetics, Inc., Boulder, Colo.
American Magnetics Corp., Carterville, Ill.
B.H. Inds., Los Angeles, Cal.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Dormeyer Inds., Chicago, Ill.
EG&G, Inc., Electro-Optics Div., Salem, Mass.
Electro Magnetic Prods., Wabash, Ind.
Electro Windings & Comps., Kenilworth, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Maxwell Labs., Inc., San Diego, Calif.
Modelectric Prods. Corp., Asbury Park, N.J.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Pek, Inc., Sunnyvale, Calif.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Sartron, Inc., Newberg, Ore.
Siemens Corp., Comps. Div., Iselin, N.J.
SKG Assocs., Inc., Boston, Mass.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Wabash Magnetics, Inc., Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Plate

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
CML-Macarr, Inc., Edison, N.J. ..... p 666
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y. p 2952
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. p 2955
K.G.S. Elctrns., Pasadena, Cal.... p 2956
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
NWL Transformers, Trenton, N.J. p 2966
Signal Transformer, Bklyn., N.Y.
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2988
Universal Voltronics Corp., Mt. Kisco, N.Y.
Zaring Inds., Inc., Carmel, Ind.
Acme Elec. Corp., Cuba, N.Y.
American Magnetics Corp., Carterville, Ill.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.

Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Powerpacs Corp., Cambridge, Mass.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Pickard & Burns Inc., Lindenhurst, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Power

Abbott Transistor Labs., L.A., Cal. p 2948
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Arnold Magnetics, Culver City, Cal. p 651
Austron, Inc., Austin, Tex.
CML-Macarr, Inc., Edison, N.J. ..... p 666
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Elcor Prods. Welex Elctrns., Silver Spring, Md. ..... p 701
Electro Cube, San Gabriel, Cal.... p 2950
Electronic Resch. Assocs., Cedar Grove, N.J.
Ferrodyne Corp., Venice, Calif. .. p 2951
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y. p 2952
General Elec. Co., Schenectady, N.Y.
James Elctrns., Inc., Chicago, Ill.
K.G.S. Elctrns., Pasadena, Cal.... p 2956
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa. p 2964
Microtran Co., Valley Stream, N.Y. p 2958,2959,2963
Multitech Power Sys., Costa Mesa, Cal.
Neshaminy Transformer, Furlong, Pa.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J. p 2966
Pico Elctrns Inc., Mount Vernon, N.Y.
Powertec, Chatsworth, Cal.
Signal Transformer, Bklyn., N.Y. p 2971,2973,2975,2977,2980,2981
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo..... p 885
Topaz Elctrns., San Diego, Cal.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J. p 2987
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Universal Voltronics Corp., Mt. Kisco, N.Y.
Vari-L Co., Inc., Denver, Colo. .... p 2991
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Allis-Chalmers, Milwaukee, Wisc.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
American Rectifier Corp., College Point, N.Y.
Arrow-Hart, Inc., Hartford, Conn.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
BECO Solid State Systems, Salem, Va.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Cable Elec. Prods., Inc., Providence, R.I.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Chu Assocs., Inc., Littleton, Mass.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jefferson Elec., Bellwood, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Permavolt Transformers, Inc., S. Bend, Ind.
Polygon Inds. Ltd., Toronto 16, Ont., Canada
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Rae Co. Inc., Indianapolis, Ind.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Ramm Rectifier Co., Inc., Bronx, N.Y.
Rapid Elec. Co., Bronx, N.Y.
Raytheon Co., Waltham, Mass.
Rho Engrg. Co., Los Angeles, Calif
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Square D Co., Park Ridge, Ill.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Superior Elec., Bristol, Conn.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Torelco Inc., Irvington, N.J.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Universal Transistor Prods., Copiague, N.Y.
Varo, Inc., Texas Div., Garland, Tex.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Greenville, Pa.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Printed Circuit Mounting

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Arnold Magnetics, Culver City, Cal.
Artronic Instr. Co., Silver Spring, Md.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D. p 2488,2489
Dynamic Instr. Corp., Plainview, N.Y. p 681
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y.
Hisonic, Inc., Olathe, Kans.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2958-2961
Miller, J.W. Co., Compton, Cal..... p 2496
Neshaminy Transformer, Furlong, Pa. p 2965
North Hills Elctrns., Inc., Glen Cove, N.Y.
Perkin-Elmer Corp., Wilton, Conn.
Pico Elctrns Inc., Mount Vernon, N.Y. p 2970
Signal Transformer, Bklyn., N.Y. p 2971,2981
Solid State Elctrns., Sepulveda, Cal.
Sprague Elec. Co., No. Adams, Mass.
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo.
Torotel, Inc., Grandview, Mo. ..... p 2984
Torwico Elctrns., Inc., Lakewood, N.J. p 2987
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2988
Vari-L Co., Inc., Denver, Colo.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Magnetics Corp., Carterville, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Avionics, Inc., South Bend, Ind.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dormeyer Inds., Chicago, Ill.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Elctrn. Components Corp., Addison, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Chicopee, Mass.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Mid-West Coil & Transformer Co., Chicago, Ill.
Mini-Circuits Lab., Brooklyn, N.Y.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Stancor, Chicago, Ill.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
Todd Systems, Yonkers, N.Y.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Vanguard Elctrns., Inglewood, Cal.

Virginia Elctrns. Co., Inc., Falls Church, Va.
Wintron Co., Inc., S. El Monte, Calif.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Transformers, Pulse

American Elctrn. Labs., Inc., Lansdale, Pa.
Amp Inc., Elizabethtown, Pa.
Amp Inc., Harrisburg, Pa.
Artronic Instr. Co., Silver Spring, Md.
Automatic Coil, New Hyde Pk., N.Y.
Bel Fuse, Inc., Jersey City, N.J.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... **p 2484**
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Delevan Div., Coil Prods., E. Aurora, N.Y.
E-H Resch. Labs., Inc., Oakland, Cal.
Ferrodyne Corp., Venice, Calif. .. **p 2951**
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Gulton Inds., Inc., Metuchen, N.J.
Hipotronics, Inc., Brewster, N.Y.
James Elctrns., Inc., Chicago, Ill.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Multitech Power Sys., Costa Mesa, Cal.
Neshaminy Transformer, Furlong, Pa.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Powertec, Chatsworth, Cal.
Sprague Elec. Co., No. Adams, Mass. **p 2474**
Tobe Deutschmann Labs., Inc., Canton, Mass. ..... **p 2476**
Tohoku Metal Inds., Ltd., Tokyo, Japan
Torotel, Inc., Grandview, Mo.
Triac Elctrn. Sys., N.Y., N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... **p 2988**
Unitron, Garland, Tex.
Vari-L Co., Inc., Denver, Colo. .... **p 2990**
Zaring Inds., Inc., Carmel, Ind.
Aladdin Elctrns., Nashville, Tenn.
American Magnetics Corp., Carterville, Ill.
Bertan Assocs., Inc., Plainview, N.Y.
B.H. Inds., Los Angeles, Cal.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Burmac Elctrns., Lindenhurst, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Component Specialties, Temple City, Cal.
Components Corp., Chicago, Ill.
Consolidated Resistance Sls., Yonkers, N.Y.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Edko Elctrns., Inc., Brooklyn, N.Y.
E.F.E. Labs., Inc., Horsham, Pa.
EG & G, Inc., Salem, Mass.
EG&G, Inc., Electro-Optics Div., Salem, Mass.
El-Rad Mfg. Co., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Goslin Elec. & Mfg. Co., Burbank, Calif.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
LAD Electro-Sys., Inc., Hicksville, N.Y.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnavolt Inc., Yonkers, N.Y.
Magnetico, Inc., E. Northport, N.Y.
Maxwell Labs., Inc., San Diego, Calif.
Mid-West Coil & Transformer Co., Chicago, Ill.
Modelectric Prods. Corp., Asbury Park, N.J.
Nanosecond Systems, Inc., Fairfield, Conn.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Pearson Elctrns., Palo Alto, Cal.
Peerless Elec. Prods., Anaheim, Cal.
Pek, Inc., Sunnyvale, Calif.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
"The Potter Co.", Inglewood, Calif
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shigoto Inds., Ltd., New York, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
TDK Elctrns. Corp., Long Island City, N.Y.
Torotron, Mt. Vernon, N.Y.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Unitek Corp., Monrovia, Calif.
U.S. Scientific Instrs., Watertown, Mass.
Wintron Co., Inc., S. El Monte, Calif.
Workman Elctrn. Prods., Inc., Sarasota, Fla.

Transformers, Rectifier

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Elcor Prods. Welex Elctrns., Silver Spring, Md.
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y. **p 2954**
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. **p 2955**
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J. **p 809**
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa.
North Elec. Co., Galion, Ohio
NWL Transformers, Trenton, N.J. **p 2966**
Signal Transformer, Bklyn., N.Y. **p 2976**
Tecnetics, Inc., Boulder, Colo.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Allis-Chalmers, Milwaukee, Wisc.
American Magnetics Corp., Carterville, Ill.
American Rectifier Corp., College Point, N.Y.
Astro-Metrix, Burbank, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
B.H. Inds., Los Angeles, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dormeyer Inds., Chicago, Ill.
Eastern Delta Corp., Fair Lawn, N.J.
EDC (Electro Dev.), Lynnwood, Wash.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
HJS Engrg. Co., Park Ridge, Ill.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Miller, Sanford Corp., Brooklyn, N.Y.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
Peerless Elec. Prods., Anaheim, Cal.
Polygon Inds. Ltd., Toronto 16, Ont., Canada
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Rae Co. Inc., Indianapolis, Ind.
Ramm Rectifier Co., Inc., Bronx, N.Y.
Rapid Elec. Co., Bronx, N.Y.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Reference

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
North Atlantic Inds., Plainview, N.Y.
Perkin-Elmer Corp., Wilton, Conn. **p 2969**
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y. **p 2980**
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
American Magnetics Corp., Carterville, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Ferranti Ltd., Hollinwood, Lancs., England
Goslin Elec. & Mfg. Co., Burbank, Calif.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Idalee Elctrns. Corp., Valley Stream, N.Y.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
Sartron, Inc., Newberg, Ore.
Sterling Transformer Corp., Brooklyn, N.Y.
Teledyne Inet, Gardena, Cal.
Tresco an Aydin Co., Phila., Pa.
Varo, Inc., Texas Div., Garland, Tex.

Transformers, R-F

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Allen Avionics, Mineola, N.Y.
American Elctrn. Labs., Inc., Lansdale, Pa.
Automatic Coil, New Hyde Pk., N.Y. **p 2483**
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... **p 2485**
Dale Elctrns., Inc., Yankton, S.D. **p 2489**
Delevan Div., Coil Prods., E. Aurora, N.Y.
Ferrodyne Corp., Venice, Calif.
Lambda Elctrns., Melville, N.Y.
Lorch Elctrns. Corp., Englewood, N.J.
Miller, J.W. Co., Compton, Cal..... **p 2496**
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... **p 2967**
Nytronics, Inc., Essex Elctrns. Div., Darlington, S.C.
Spellman High Voltage Elctrns. Corp., Bronx, N.Y. ..... **p 877**
Summit Engrg. Corp., Bozeman, Mont.
Torotel, Inc., Grandview, Mo.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Vari-L Co., Inc., Denver, Colo.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
American Trans-Coil Corp., Richmond Hill, N.Y.
Anzac Elctrns., Waltham, Mass.
Astrolab Inc., Linden, N J
Avionics, Inc., South Bend, Ind.
Barker & Williamson, Bristol, Pa.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Cambridge Thermionic, Cambridge, Mass
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
El-Rad Mfg. Co., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Navigation Inds., Inc., Rochester, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Finney Co., Bedford, Ohio
Forbes & Wagner, Inc., Silver Creek, N.Y.
Gavin Instrs., Somerville, N.J.

General Instr. of Can., Waterloo, Ont., Can.
General Instr. Corp., Chicopee, Mass.
Hughes Aircraft Co, Culver City, Cal.
Linell Engrg. Corp., Chicago, Ill.
Magnetico, Inc., E. Northport, N.Y.
Mini-Circuits Lab., Brooklyn, N.Y.
Morey Corp, Downers Grove, Ill.
Mutron Corp., Brockton, Mass.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Pickard & Burns Inc., Lindenhurst, N.Y.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Profile Elctrns., Inc., Concord, N.H.
Redman Elctrns. Corp., Enfield, Conn.
Relcom, Mt. View, Calif.
Renco Elctrns., Inc., Hicksville, N.Y.
Sinclair Radio Labs., Maple, Ont., Can.
Smallwood, S.G., Ltd., Kitchener, Ont., Canada
Sterling Transformer Corp., Brooklyn, N.Y.
Syscon Int'l., Inc., So. Bend, Ind.
TACO Div., Sherburne, N.Y.
Taylor-Winfield Corp., Warren, Ohio
Torotron, Mt. Vernon, N.Y.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Warsaw Coil Co. Inc., Warsaw, Ind.
Workman Elctrn. Prods., Inc., Sarasota, Fla.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Rotary

Ferrodyne Corp., Venice, Calif.
Lambda Elctrns., Melville, N.Y.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Clifton Div., Clifton Hgts., Pa.
Coil Co. of Amer., Northvale, N.J.
Electric Indicator Co., Inc., Wilton, Conn.
Himmelstein, S. & Co., Elk Grove Village, Ill.
Hughes Aircraft Co, Culver City, Cal.
Oeco Corp., Portland, Ore.
Sterling Transformer Corp., Brooklyn, N.Y.

Transformers, Saturable

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Artronic Instr. Co., Silver Spring, Md.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
General Magnetics, Bloomfield, N.J.
Hipotronics, Inc., Brewster, N.Y. p 2955
Hisonic, Inc., Olathe, Kans.
Kepco, Inc., Flushing, N.Y.
K.G.S. Elctrns., Pasadena, Cal..... p 2957
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
Multitech Power Sys., Costa Mesa, Cal.
Neshaminy Transformer, Furlong, Pa.
North Elec. Co., Galion, Ohio
Signal Transformer, Bklyn., N.Y.
Sprague Elec. Co., No. Adams, Mass.
Staco, Inc., Dayton, Ohio
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
Transmagnetics Inc., Farmingdale, N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Acme Elec. Corp., Cuba, N.Y.
Allis-Chalmers, Milwaukee, Wisc.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Chu Assocs., Inc., Littleton, Mass.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Electrical Windings, Inc., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
EMP Elctrns., Inc., Phoenix, Ariz.
Epco Prods., Inc., Wallkill, N.Y.
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Magnetics, Sandy Lake, Pa.
Mid-West Coil & Transformer Co., Chicago, Ill.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Permavolt Transformers, Inc., S. Bend, Ind.
Pickard & Burns Inc., Lindenhurst, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Torelco Inc., Irvington, N.J.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad-Utrad, Huntington, Ind.
Varo, Inc., Texas Div., Garland, Tex.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Greenville, Pa.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Servo

ACDC Elctrns., Oceanside, Cal.
Coast Coil Co., Los Angeles, Calif.
Ferrotran Elctrn., New York, N.Y.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
American Magnetics Corp., Carterville, Ill.
Bendix, S. Montrose, Pa.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Clifton Div., Clifton Hgts., Pa.
Collins Radio Co., Dallas, Tex.
Consolidated Transformers Unltd., San Gabriel, Cal.
Edison, T.A., Instr. Div., Ft. Lauderdale, Fla.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electro Windings & Comps., Kenilworth, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hughes Aircraft Co, Culver City, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Preferred Electronics, Inc., Westfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Sartron, Inc., Newberg, Ore.
Sterling Transformer Corp., Brooklyn, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.

Transformers, Step-Down, Step-Up

Abbott Transistor Labs., L.A., Cal. p 2948
ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Artronic Instr. Co., Silver Spring, Md.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dranetz Engrg. Labs., Plainfield, N.J.
Dynage, Bloomfield, Conn.
Elcor Prods. Welex Elctrns., Silver Spring, Md.
Electro Cube, San Gabriel, Cal.... p 2950
Ferrodyne Corp., Venice, Calif.
Ferrotran Elctrn., New York, N.Y. p 2954
Freed Transformer Co., Bklyn., N.Y. p 2952
Gates Elctrn. Co., Bronx, N.Y.
General Elec. Co., Schenectady, N.Y.
Hipotronics, Inc., Brewster, N.Y. p 2955
Hisonic, Inc., Olathe, Kans.
K.G.S. Elctrns., Pasadena, Cal. p 2956,2957
Lambda Elctrns., Melville, N.Y.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y. p 2958-2961,2963
Neshaminy Transformer, Furlong, Pa. p 2965
North Elec. Co., Galion, Ohio
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... p 2967
NWL Transformers, Trenton, N.J. p 2966
Perkin-Elmer Corp., Wilton, Conn. p 2969
Pico Elctrns Inc., Mount Vernon, N.Y.
RFL Inds., Instr. Div., Boonton, N.J.
Signal Transformer, Bklyn., N.Y. p 2972-2974,2976,2977,2980
Solid State Elctrns., Sepulveda, Cal.
Staco, Inc., Dayton, Ohio
Tecnetics, Inc., Boulder, Colo..... p 885
Topaz Elctrns., San Diego, Cal. .... p 904
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Vari-L Co., Inc., Denver, Colo. .... p 2990
Zaring Inds., Inc., Carmel, Ind. .... p 2992
A C Electronics Co., Santa Monica, Cal.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allied Elctrns. Corp., Chicago, Ill.
Altec, Anaheim, Calif.
American Magnetics Corp., Carterville, Ill.
Astro-Metrix, Burbank, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
Basler Elec. Co., Highland, Ill.
Berkshire Transformer Corp., Kent, Conn.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Chu Assocs., Inc., Littleton, Mass.
Coil Co. of Amer., Northvale, N.J.
Component Specialties, Temple City, Cal.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dormeyer Inds., Chicago, Ill.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Edko Elctrns., Inc., Brooklyn, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Magnetic Prods., Wabash, Ind.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Coils, Springfield, Mass.
Elctrn. Components Corp., Addison, Ill.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
EMP Elctrns., Inc., Phoenix, Ariz.
Energy Systems, Palo Alto, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Ferranti Ltd., Hollinwood, Lancs., England
Foster Transformer Co., Cincinnati, Ohio
General Elec., Providence, R.I.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
Grand Transformers, Grand Haven, Mich.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Jefferson Elec., Bellwood, Ill.
Jerome Elec. Corp., Orange, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Magnetics, Sandy Lake, Pa.
Merrimack Magnetics, Lowell, Mass.
Mid-West Coil & Transformer Co., Chicago, Ill.
Miller, Sanford Corp., Brooklyn, N.Y.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Optimation, Inc., Sun Valley, Calif.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polygon Inds. Ltd., Toronto 16, Ont., Canada
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Rae Co. Inc., Indianapolis, Ind.
Raytheon Co., Waltham, Mass.
RFL Inds., Comms. Div., Boonton, N.J.
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
Sierra Elec., Gardena, Calif.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Todd Systems, Yonkers, N.Y.
Torelco Inc., Irvington, N.J.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Virginia Elctrns. Co., Inc., Falls Church, Va.

Wabash Magnetics, Inc., Huntington, Ind.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Greenville, Pa.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Toroidal

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Allen Avionics, Mineola, N.Y.
American Elctrn. Labs., Inc., Lansdale, Pa.
Amp Inc., Harrisburg, Pa.
Arnold Magnetics, Culver City, Cal.
Artronic Instr. Co., Silver Spring, Md.
Automatic Coil, New Hyde Pk., N.Y.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y. ..... p 2484
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Diversified Elctrns., Evansville, Ind p 1684
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y.
Hisonic, Inc., Olathe, Kans.
Ind'l. Control Co., Farmingdale, N.Y.
James Elctrns., Inc., Chicago, Ill.
JFD Elctrns./Sub. Riker-Maxson, Bklyn., N.Y.
K.G.S. Elctrns., Pasadena, Cal..... p 2957
Lambda Elctrns., Melville, N.Y.
Lorch Elctrns. Corp., Englewood, N.J.
Microtran Co., Valley Stream, N.Y. p 2959
Multitech Power Sys., Costa Mesa, Cal.
North Hills Elctrns., Inc., Glen Cove, N.Y.
Perkin-Elmer Corp., Wilton, Conn. p 2969
Seg Elctrns., Richmond Hill, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Sprague Elec. Co., No. Adams, Mass.
Tecnetics, Inc., Boulder, Colo.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Prods. Co., New Hyde Pk., N.Y.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Unitron, Garland, Tex.
Zaring Inds., Inc., Carmel, Ind.
A C Electronics Co., Santa Monica, Cal.
Aladdin Elctrns., Nashville, Tenn.
Altec, Anaheim, Calif.
American Trans-Coil Corp., Richmond Hill, N.Y.
Anzac Elctrns., Waltham, Mass.
Barwood Elctrns., Inc., Glendale, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins Radio Co., Dallas, Tex.
Collins Radio Co., Newport Beach, Calif.
Components Corp., Chicago, Ill.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
De Coursey Engrg. Lab., Culver City, Cal.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
El-Rad Mfg. Co., Chicago, Ill.
Electro-Pacific, Inc., Goleta, Calif.
Electro Windings & Comps., Kenilworth, N.J.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
EMP Elctrns., Inc., Phoenix, Ariz.
Ferranti Ltd., Hollinwood, Lancs., England
Forbes & Wagner, Inc., Silver Creek, N.Y.
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Glentronics, Glendora, Cal.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grafix, Inc., Albuquerque, N.M.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Harder, Donald C. Co., Inc., San Diego, Calif.
Hughes Aircraft Co, Culver City, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Midwest Electric Products, Mankato, Minn.
Mil Elctrns. Inc., Hudson, N.H.
Mini-Circuits Lab., Brooklyn, N.Y.
Morey Corp, Downers Grove, Ill.
Novatronics, Inc., Pompano Beach, Fla.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
Osborne Transformer Corp., Detroit, Mich.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Profile Elctrns., Inc., Concord, N.H.
Prototype Transformer Corp., E. Orange, N.J.
Pulse Engrg., Inc., San Diego, Cal.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Ram Meter, Inc., Ferndale, Mich.
Raytheon Co., Waltham, Mass.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
Rho Engrg. Co., Los Angeles, Calif
Sartron, Inc., Newberg, Ore.
Shane Inds., Sunny Vale, Cal.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spatron Inc, Alhambra, Calif.
Spectran Elctrns., Pompano Beach, Fla.
Stanford Applied Engrg., Santa Clara, Cal.
Sterling Transformer Corp., Brooklyn, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Torelco Inc., Irvington, N.J.
Torotron, Mt. Vernon, N.Y.
Transformer Design, Milwaukee, Wisc.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Vanguard Elctrns., Inglewood, Cal.
Vectrol, Inc., Rockville, Md.
Virginia Elctrns. Co., Inc., Falls Church, Va.
Ward Leonard, Mt. Vernon, N.Y.
Western Transformer Co., Tijeras, N. M.
Wintron Co., Inc., S. El Monte, Calif.
Y.T. & T. Corp., Roslyn Hgts., N.Y.

Transformers, Transistor

ADC Prods., Minneapolis, Minn.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Computer Comps., Jamaica, N.Y.
Dale Elctrns., Inc., Yankton, S.D.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y. p 2952
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y. p 2959-2961
Miller, J.W. Co., Compton, Cal.
Pico Elctrns Inc., Mount Vernon, N.Y.
Solid State Elctrns., Sepulveda, Cal.
Torotel, Inc., Grandview, Mo.
United Transformer Co. Div. of TRW Inc., New York, N.Y. ..... p 2989
Vari-L Co., Inc., Denver, Colo.
Zaring Inds., Inc., Carmel, Ind.
Allied Elctrns. Corp., Chicago, Ill.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Coral Magnetics Co., Farmingdale, N.Y.
Custom Coil Co., Zanesville, Ohio
Cycle Transformer Corp., West Orange, N.J.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Electrical Windings, Inc., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Foster Transformer Co., Cincinnati, Ohio
General Instr. Corp., Chicopee, Mass.
Geo Space, Houston, Tex.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Mid-West Coil & Transformer Co., Chicago, Ill.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Philmore Mfg. Co., Richmond Hill, N.Y.
Polyphase Instr. Co., Bridgeport, Pa.
Power Elctrns. Co., Houston, Tex.
Precision Inc., Minneapolis, Minn
Preferred Electronics, Inc., Westfield, Mass.
Pulse Engrg., Inc., San Diego, Cal.
Rae Co. Inc., Indianapolis, Ind.
Shigoto Inds., Ltd., New York, N.Y.
SKG Assocs., Inc., Boston, Mass.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.

Transformers, Ultrasonic

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
Coast Coil Co., Los Angeles, Calif.
Dale Elctrns., Inc., Yankton, S.D.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Microtran Co., Valley Stream, N.Y.
Pico Elctrns Inc., Mount Vernon, N.Y.
Signal Transformer, Bklyn., N.Y.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Advanced Patent Technology, Inc., Las Vegas, Nev.
Automation Inds., Los Angeles, Cal.
Barwood Elctrns., Inc., Glendale, Cal.
Beebe Instrs., Inc., N. White Plains, N.Y.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Cycle Transformer Corp., West Orange, N.J.
Edko Elctrns., Inc., Brooklyn, N.Y.
El-Rad Mfg. Co., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Mag-Con Engrg. Co., St. Paul, Minn.
Nat'l. Coil Co., Douglas, Ariz.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
Oeco Corp., Portland, Ore.
Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Precision Elctrns., Inc., Amityville, N.Y.
Prototype Transformer Corp., E. Orange, N.J.
Raytheon Co., Waltham, Mass.
Redman Elctrns. Corp., Enfield, Conn.
Renco Elctrns., Inc., Hicksville, N.Y.
Sartron, Inc., Newberg, Ore.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Spectran Elctrns., Pompano Beach, Fla.
Sterling Transformer Corp., Brooklyn, N.Y.
TDK Elctrns. Corp., Long Island City, N.Y.
Transformer Mfrs., Inc., Chicago, Ill.
Wintron Co., Inc., S. El Monte, Calif.

Transformers, Variable

Allen Avionics, Mineola, N.Y.
Bowmar Instr. Corp., Ft. Wayne, Ind.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
CML-Macarr, Inc., Edison, N.J.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Delevan Div., Coil Prods., E. Aurora, N.Y.
General Elec. Co., Schenectady, N.Y.
Kepco, Inc., Flushing, N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
Miller, J.W. Co., Compton, Cal.
Ohmite Mfg. Co., Skokie, Ill. ..... p 2968
Spellman High Voltage Elctrns. Corp., Bronx, N.Y. ..... p 877
Staco, Inc., Dayton, Ohio..... p 2983
Aladdin Elctrns., Nashville, Tenn.
Allied Elctrns. Corp., Chicago, Ill.
American Trans-Coil Corp., Richmond Hill, N.Y.
Bicron Elctrns. Co., Canaan, Conn.
Carson Mfg. Co., Indianapolis, Ind.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Coil Co. of Amer., Northvale, N.J.
Collins, G.L. Corp., Long Beach, Calif.
Columbia Resch. Labs., Woodlyn, Pa.
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Dynographic Elctrns. Corp., Hicksville, N.Y.
Eder Instrument Co., Inc., Chicago, Ill.
Electro Assemblies, Inc., Chicago, Ill.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
General Instr. Corp., Chicopee, Mass.
General Radio Co., Concord, Mass.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Hughes Aircraft Co, Culver City, Cal.
Johnson Elec. Coil Co., Elmhurst, Ill.
Oeco Corp., Portland, Ore.
Piconics Inc., Tyngsboro, Mass.
Precision Elctrns. Corp., Marshfield, Mass.
Ragen Precision Inds., Inc., N. Arlington, N.J.
Renco Elctrns., Inc., Hicksville, N.Y.
Sartron, Inc., Newberg, Ore.
Spatron Inc, Alhambra, Calif.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Superior Elec., Bristol, Conn.
Transrex Div., Torrance, Cal.
Vanguard Elctrns., Inglewood, Cal.
Virginia Elctrns. Co., Inc., Falls Church, Va.

Transformers, Vibrator

CML-Macarr, Inc., Edison, N.J.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
Lambda Elctrns., Melville, N.Y.
Microtran Co., Valley Stream, N.Y.
NWL Transformers, Trenton, N.J.
American Magnetics Corp., Carterville, Ill.
Barwood Elctrns., Inc., Glendale, Cal.
Berkshire Transformer Corp., Kent, Conn.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Cycle Transformer Corp., West Orange, N.J.
Electrical Windings, Inc., Chicago, Ill.
Electro Powerpacs Corp., Cambridge, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Foster Transformer Co., Cincinnati, Ohio
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Grand Transformers, Grand Haven, Mich.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
Johnson Elec. Coil Co., Elmhurst, Ill.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.

Polyphase Instr. Co., Bridgeport, Pa.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Rae Co. Inc., Indianapolis, Ind.
Sartron, Inc., Newberg, Ore.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Stancor, Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Todd Systems, Yonkers, N.Y.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Wintron Co., Inc., S. El Monte, Calif.

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Transformers, Voltage-Regulating-Also See Regulators & Stabilizers, Voltage

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
CML-Macarr, Inc., Edison, N.J.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Ferrodyne Corp., Venice, Calif.
Freed Transformer Co., Bklyn., N.Y.
General Elec. Co., Schenectady, N.Y.
Kepco, Inc., Flushing, N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Magnetic Windings Co., Easton, Pa.
Microtran Co., Valley Stream, N.Y.
Neshaminy Transformer, Furlong, Pa. p 2965
North Elec. Co., Galion, Ohio
Ohmite Mfg. Co., Skokie, Ill. ..... p 2968
Signal Transformer, Bklyn., N.Y. p 2978,2979
Topaz Elctrns., San Diego, Cal.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Zaring Inds., Inc., Carmel, Ind.
A C Transformer Corp., Newark, N.J.
Acme Elec. Corp., Cuba, N.Y.
Allis-Chalmers, Milwaukee, Wisc.
Altec, Anaheim, Calif.
AMBAC Inds., Garden City, N.Y.
American Magnetics Corp., Carterville, Ill.
American Rectifier Corp., College Point, N.Y.
Barwood Elctrns., Inc., Glendale, Cal.
Bicron Elctrns. Co., Canaan, Conn.
Bourns Pacific Magnetic Corp., Romoland, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Constant Voltage Co., Chicago, Ill.
Coral Magnetics Co., Farmingdale, N.Y.
Cycle Transformer Corp., West Orange, N.J.
Electro-Pacific, Inc., Goleta, Calif.
Electronic Devices, Cleve., Ohio
Elctrn. Transformer Corp., Paterson, N.J.
Elgin Elctrns., Waterford, Pa.
Elnetic Elctrns., Inc., Venice, Cal.
Foster Transformer Co., Cincinnati, Ohio
General Radio Co., Concord, Mass.
Geo Space, Houston, Tex.
Goslin Elec. & Mfg. Co., Burbank, Calif.
Green Rectifier Corp., Fair Lawn, N.J.
GTE Sylvania Inc., Danvers, Mass.
Hughes Aircraft Co, Culver City, Cal.
Invertronics, Pine Brook, N.J.
JB Elctrn. Transformers, Inc., Chicago, Ill.
Johnson Elec. Coil Co., Elmhurst, Ill.
Lear Siegler, Inc., Santa Monica, Calif.
Mag-Con Engrg. Co., St. Paul, Minn.
Magnetic Circuit Elements, Monterey, Cal.
Nat'l. Coil Co., Douglas, Ariz.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Permavolt Transformers, Inc., S. Bend, Ind.
Polyphase Instr. Co., Bridgeport, Pa.
Queensboro Transformer & Mach., College Pt., N.Y.
Sartron, Inc., Newberg, Ore.
SKG Assocs., Inc., Boston, Mass.
SNC Mfg. Co., Inc., Oshkosh, Wisc.
Sola Elec. Div., Elk Grove Village, Ill.
Spatron Inc, Alhambra, Calif.
Sterling Transformer Corp., Brooklyn, N.Y.
TDC Div., Littleton, Mass.
Transformer Tech., Inc., Chicago, Ill.
Transitron Elctrn. Corp., Wakefield, Mass.
Transrex Div., Torrance, Cal.
Tresco an Aydin Co., Phila., Pa.
Triad Distributor Div., Huntington, Ind.
Triad-Utrad, Huntington, Ind.
Ward Leonard, Mt. Vernon, N.Y.
Westinghouse Elec., Greenville, Pa.

Transformers, Welding

Del Elctrns. Corp., Mt. Vernon, N.Y.
Dynage, Bloomfield, Conn.
Freed Transformer Co., Bklyn., N.Y.
Hipotronics, Inc., Brewster, N.Y.
K.G.S. Elctrns., Pasadena, Cal.
Lambda Elctrns., Melville, N.Y.
Light Elec. Corp., Rancocas, N.J.
Neshaminy Transformer, Furlong, Pa.
North Elec. Co., Galion, Ohio
Torwico Elctrns., Inc., Lakewood, N.J.
Zaring Inds., Inc., Carmel, Ind.
Basler Elec. Co., Highland, Ill.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Century Coil Corp., Chicago, Ill.
Chu Assocs., Inc., Littleton, Mass.
Coil Co. of Amer., Northvale, N.J.
Consolidated Transformers Unltd., San Gabriel, Cal.
Edko Elctrns., Inc., Brooklyn, N.Y.
Elnetic Elctrns., Inc., Venice, Cal.
Epco Prods., Inc., Wallkill, N.Y.
Eutectic Corp., Flushing, N.Y.
Ewald Instrs. Corp., Kent, Conn.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Hobart Bros. Co., Troy, Ohio
Hughes Aircraft Co, Culver City, Cal.
Hughes Aircraft Co., Vacuum Tube Prods. Div/Welding Equip., Oceanside, Calif.
Isofilm Int'l., Chatsworth, Cal.
Johnson Elec. Coil Co., Elmhurst, Ill.
Kolton Elec. Mfg. Co., Newark, N.J.
Lincoln Elec. Co., Cleveland, Ohio
Maxwell Labs., Inc., San Diego, Calif.
Nytronics, Inc., Alpha, N.J.
Oeco Corp., Portland, Ore.
Precision Elctrns. Corp., Marshfield, Mass.
Prototype Transformer Corp., E. Orange, N.J.
Queensboro Transformer & Mach., College Pt., N.Y.
Sartron, Inc., Newberg, Ore.
Sciaky Bros., Inc., Chicago, Ill.
Sterling Transformer Corp., Brooklyn, N.Y.
Taylor-Winfield Corp., Warren, Ohio
Test Equip. Corp., Dallas, Tex.
Transformer Mfrs., Inc., Chicago, Ill.
Transformer Tech., Inc., Chicago, Ill.
Transrex Div., Torrance, Cal.
Unitek Corp., Monrovia, Calif.
Wabash Magnetics, Inc., Huntington, Ind.
Walters, W.A., Inc., Chicago, Ill.
Westinghouse Elec., Sykesville, Md.

Transformers, Wide Band

ACDC Elctrns., Oceanside, Cal.
ADC Prods., Minneapolis, Minn.
American Elctrn. Labs., Inc., Lansdale, Pa.
Bulova Watch Co., Freq. Control Prods., Elctrns. Div., Woodside, N.Y.
Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
CML-Macarr, Inc., Edison, N.J.
Coast Coil Co., Los Angeles, Calif.
Delevan Div., Coil Prods., E. Aurora, N.Y.
Dranetz Engrg. Labs., Plainfield, N.J.
Ferrodyne Corp., Venice, Calif. .. p 2951
Freed Transformer Co., Bklyn., N.Y.
Kappa Networks, Inc., Carteret, N.J.
K.G.S. Elctrns., Pasadena, Cal..... p 2956
Lambda Elctrns., Melville, N.Y.
Lorch Elctrns. Corp., Englewood, N.J.
Microtran Co., Valley Stream, N.Y.
North Hills Elctrns., Inc., Glen Cove, N.Y. ..... p 2967
Pico Elctrns Inc., Mount Vernon, N.Y.
Torotel, Inc., Grandview, Mo.
Torwico Elctrns., Inc., Lakewood, N.J.
United Transformer Co. Div. of TRW Inc., New York, N.Y.
Vari-L Co., Inc., Denver, Colo. p 2990,2991
Zaring Inds., Inc., Carmel, Ind.
Aladdin Elctrns., Nashville, Tenn.
American Magnetics Corp., Carterville, Ill.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Bourns Pacific Magnetic Corp., Romoland, Calif.
Bullock Magnetics Corp., Pomona, Calif.
C.B.C. Inds., Inc., Ft. Washington, Pa.
Central Transformer Co., Chicago, Ill.
Coil Co. of Amer., Northvale, N.J.
Comdel, Inc., Beverly, Mass.
Dynographic Elctrns. Corp., Hicksville, N.Y.
El-Rad Mfg. Co., Chicago, Ill.
Electro Windings & Comps., Kenilworth, N.J.
Elctrn. Coils, Springfield, Mass.
Elctrn. Transformer Corp., Paterson, N.J.
Elnetic Elctrns., Inc., Venice, Cal.
Forbes & Wagner, Inc., Silver Creek, N.Y.
Gavin Instrs., Somerville, N.J.
Geo Space, Houston, Tex.
GTE Sylvania Inc., Danvers, Mass.
Hammond Mfg. Co., Ltd., Guelph, Ont., Can.
Johnson Elec. Coil Co., Elmhurst, Ill.
Magnetic Circuit Elements, Monterey, Cal.
Magnetico, Inc., E. Northport, N.Y.
Nat'l. Coil Co., Douglas, Ariz.
Oeco Corp., Portland, Ore.
Olektron Corp., Dudley, Mass.
PCA Elctrns., Inc., Sepulveda, Calif.
Peerless Elec. Prods., Anaheim, Cal.
Piconics Inc., Tyngsboro, Mass.
Polyphase Instr. Co., Bridgeport, Pa.
Pulse Engrg., Inc., San Diego, Cal.
Radio Resch. Co., Rockaway, N.J.
Raytheon Co., Waltham, Mass.
Sartron, Inc., Newberg, Ore.
Sinclair Radio Labs., Maple, Ont., Can.
Sterling Transformer Corp., Brooklyn, N.Y.
Torotron, Mt. Vernon, N.Y.
Tranex, Inc., Mountain View, Cal.
Transformer Design, Milwaukee, Wisc.
Vanguard Elctrns., Inglewood, Cal.

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Transistors, Germanium, Switching—See Vol 2

Transistors, Pressure Sensitive—See Vol 2

Transistors, Silicon, Photo—See Vol 2

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Transistors, Silicon, R-F—See Vol 2

Transistors, Silicon, Switching—See Vol 2

Transistors, Unijunction—See Vol 2

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M M Elctrn. Enclosures, Hicksville, N.Y. p 2319
Perfection Mica Co., Bensenville, Ill.
American Aluminum Co., Mountainside, N.J.
Applied Design Co., Inc., Tonawanda, N.Y.
Bal, William Corp., Elizabeth, N.J.
Bud Radio, Inc., Willoughby, Ohio
Calabro Unitrack, Upper Darby, Pa.
Craig Sys. Corp., Lawrence, Mass.
Elzee Metal Prods. Co., Inc., Brooklyn, N.Y.
Environmental Container Sys., Union City, Calif.
Golding Mfg. Co., N. Arlington, N.J.
Goldsman, Inc., Philadelphia, Pa.
Koch, H. & Sons, Corte Madera, Cal.
Muckle Mfg. Co., Owatonna, Minn.
Republic Steel Corp, Cleveland, Ohio
Skydyne, Inc., Port Jervis, N.Y.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
TA Mfg. Corp., Los Angeles, Cal.
Technical Mat'l., Mamaroneck, N.Y.
Warwick Prods. Co., Independence, Ohio
Wilmer Mfg. Co., Beltsville, Md.
Zero Mfg. Co., Burbank, Cal.

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Tubes, Glow Or Discharge—See Tubes, Gas—Vol 2

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Tubes, Magnetron—See Vol 2

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Tubes, Voltage Reference Or Regulating—See Vol 2

Tubes, X-Ray—See Vol 2

Tubing, Aluminum

Uniform Tubes, Collegeville, Pa.
Aluminum Co. America, Pittsburgh, Pa.
American Metal Climax, Inc., New York, N.Y.
Blum, Julius & Co., Inc., Carlstadt, N.J.
K & S Engrg. Co., Chicago, Ill.
La Pointe Inds., Inc., Rockville, Conn.
Precision Extrusions, Bensenville, Ill.
Precision Tube, No. Wales, Pa.
Reynolds Metals Co., Richmond, Va.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Smith, Judson A. Co., Boyertown, Pa.
Whittaker Corp., Los Angeles, Cal.

Tubing, Asbestos

Abesto Corp., Bloomfield, N.J.
Brandywine Fibre Prods. Co., Wilmington, Del.
Franklin Fibre-Lamitex, Wilmington, Del.
General Plastics Corp., Bloomfield, N.J.
Johns-Manville Sls. Corp., New York, N.Y.
Paramount Inds., Inc., Ft. Wayne, Ind.
Precision Paper Tube Co., Wheeling, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Resinite Corp. Div., Wheeling , Ill
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Stone Ind'l. Corp., Washington, D.C.
Zippertubing Co., Los Angeles, Calif.

Tubing, Brass

Uniform Tubes, Collegeville, Pa.
Acme Model Engrg. Co., Ridgefield, N.J.
Anaconda American Brass Co., Waterbury, Conn.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Electrotools, Inc., Broadview, Ill.
Helenor Metals Corp., Tuckahoe, N.Y.
Janney Cylinder Co, Philadelphia, Pa.
K & S Engrg. Co., Chicago, Ill.
Norelcom Inds., Inc., Farmingdale, N.Y.
Precision Tube, No. Wales, Pa.
Revere Copper & Brass, Inc., New York, N.Y.
Smith, Judson A. Co., Boyertown, Pa.

Tubing, Ceramic

American Lava Corp., Chattanooga, Teng. ..... **p 2810**
Carborundum Co., Niagara Falls, N.Y.
Centralab, Elctrns., Milwaukee, Wisc.
General Elec., Richmond Hgts., Ohio **p 2811**
Aremco Prods., Inc., Briarcliff Manor, N.Y.
Atomergic Chemetals, Carle Place, N.Y.
Basic Ceramics Inc., Hawthorne, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Brush Beryllium Co., Cleveland, Ohio
Ceramic Magnetics, Inc., Fairfield, N.J.
Consolidated Ceramics & Metalizing, Flemington, N.J.
Coors Porcelain Co., Golden, Colo.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Diamonite Prods. Mfg. Co., Shreve, Ohio
Du-Co Ceramics Co., Saxonburg, Pa.
Duramic Prods., Inc., Palisades Park, N.J.
Electrical Refractories Co., E. Palestine, Ohio
Ferro Corp., E. Liverpool, Ohio
Kirchberger, M & Co., Inc., Englewood, N.J.
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Maryland Lava Co., Bel Air, Md.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Nat'l. Ceramic Co., Trenton, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Norton Co., Worcester, Mass.
Omega Engrg., Inc., Stamford, Conn.
Paul, F.H. & Stein Bros., New York, N.Y.
Porcelain Prods. Co., Carey, Ohio
Quartzite Processing, Inc., Malden, Mass.
Rosenthal China Corp., New York, N.Y.
Star Porcelain Co., Trenton, N.J.
Steward, D.M. Mfg., Chattanooga, Tenn.
Thermal Amer. Fused Quartz, Montville, N.J.
3M Co., St. Paul, Minn.
Union Carbide, Carbon Prods. Div., New York, N.Y.
Western Gold & Platinum Co., Belmont, Cal.
Zirconium Corp. of Amer., Solon, Ohio

Tubing, Columbium

Uniform Tubes, Collegeville, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Fansteel Inc., N Chicago, Ill.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Tubing, Copper

Uniform Tubes, Collegeville, Pa.
Anaconda American Brass Co., Waterbury, Conn.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Electrotools, Inc., Broadview, Ill.
K & S Engrg. Co., Chicago, Ill.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Mueller Brass Co., Port Huron, Mich.
Norelcom Inds., Inc., Farmingdale, N.Y.
Okonite Co., Ramsey, N.J.
Precision Paper Tube Co., Wheeling, Ill.
Precision Tube, No. Wales, Pa.
Revere Copper & Brass, Inc., New York, N.Y.
Smith, Judson A. Co., Boyertown, Pa.

Tubing, Fabric-Also See Tubing, Spaghetti

Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... **p 2812**
Varflex Corp., Rome, N.Y. ..... **p 2813**
Automatic Die Cutting Mach. Co., New York, N.Y.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Dielectric Materials Co., Chicago, Ill.
General Plastics Corp., Bloomfield, N.J.
Ico/Rally, Palo Alto, Cal.
Natvar Corp., Rahway, N.J.
Port Plastics, Inc., Montebello, Cal.

Tubing, Fiber

Carborundum Co., Niagara Falls, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Abesto Corp., Bloomfield, N.J.
Acme Model Engrg. Co., Ridgefield, N.J.
Brandywine Fibre Prods. Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Insulating Fabricators, E. Rutherford, N.J.
Laminated Sheet Prods., Millbury, Mass.
NVF Co., Yorklyn, Del.
Paramount Inds., Inc., Ft. Wayne, Ind.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Stone Ind'l. Corp., Washington, D.C.
Whitaker Cable Corp., N. Kansas City, Mo.
Zippertubing Co., Los Angeles, Calif.

Tubing, Fluorocarbon, Flexible

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Smith, Herman H., Inc., Bklyn., N.Y.
Transcon Mfg. Co., Dallas, Tex.
Adam Spence Corp., Edison, N.J.
Aeroquip Corp., Jackson, Mich.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Bram Metallurgical-Chem., Phila., Pa.
Brand-Rex Co., Willimantic, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Co-Operative Inds., Inc., Chester, N.J.
Fluoro Plastics, Phila., Pa.
General Plastics Corp., Bloomfield, N.J.

Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Pelmor Labs., Inc., Newtown, Pa.
Port Plastics, Inc., Montebello, Cal.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Tri-Point Inds., Inc., Commack, N.Y.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Tubing, Fused Quartz

Amersil, Inc., Hillside, N.J. ..... p 2816
General Elec., Richmond Hgts., Ohio p 2811
American Ultraviolet Co., Chatham, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Dell Optics Co., Inc., N. Bergen, N.J.
Esco Products, Oak Ridge, NJ
Garner Glass Co., Claremont, Calif.
Mackay, A.D., Inc., New York, N.Y.
Quartz & Silice, Paris 8e, France
Quartzite Processing, Inc., Malden, Mass.
Syncor Prods. Co., Inc., Malden, Mass.
Thermal Amer. Fused Quartz, Montville, N.J.
Westinghouse Elec., Bloomfield, N. J.

Tubing, Glass Fiber Insulation

Alpha Wire Corp., Elizabeth, N.J.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Varflex Corp., Rome, N.Y. ..... p 2813
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Dielectric Materials Co., Chicago, Ill.
Electrical Insulation Co., Inc., Copiague, N.Y.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Int'l. Wire & Cable, Chicago, Ill.
Johns-Manville Sls. Corp., New York, N.Y.
Laminated Fabricators, San Bruno, Calif.
Laminated Sheet Prods., Millbury, Mass.
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Port Plastics, Inc., Montebello, Cal.
Stevens Prods., Inc., E. Orange, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Thiokol Chemical Div., Trenton, N.J.
Zippertubing Co., Los Angeles, Calif.

Tubing, Glass, Precision

General Elec., Richmond Hgts., Ohio p 2811
Celluplastics, Inc., Brockway, Pa.
Corning Glass Works, Lab. Prods. Dept., Corning, N.Y.
Corning Glass Works, Tech. Prods. Div., Corning, N.Y.
Corning Glass Works, Television Prods. Div., Corning, N.Y.
Dell Optics Co., Inc., N. Bergen, N.J.
Esco Products, Oak Ridge, NJ
Fischer & Porter Co., Warminster, Pa.
Garner Glass Co., Claremont, Calif.
Jenaer Glaswerk Schott & Gen. Inc., New York, N.Y.
Owens-Illinois, Consumer & Tech. Prods., Toledo, Ohio
Richland Glass Co., Inc., Richland, N.J.
Syncor Prods. Co., Inc., Malden, Mass.
Wilmad Glass Co., Inc., Buena, N.J.

Tubing, Heat Shrinkable-Also See Caps, Forms & Tapes, Heat Shrinkable

Alpha Wire Corp., Elizabeth, N.J. p 2995
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3029
GC Elctrns., Rockford, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Nat'l. Wire & Cable, Los Angeles, Cal.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Transcon Mfg. Co., Dallas, Tex... p 3063
Abesto Corp., Bloomfield, N.J.
American Pamcor, Inc., Paoli, Pa
Automatic Die Cutting Mach. Co., New York, N.Y.
Birnbach Co., Inc., Freeport, N.Y.
Brady, W.H. Co., Milwaukee, Wisc.
Brand Dielectrics, Inc., N. Windham, Conn.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chemelec Prods., Inc., Cherry Hill, N.J.
Chemplast, Inc., Wayne, N.J.
Chomerics, Inc., Woburn, Mass.
Dielectric Materials Co., Chicago, Ill.
Dow Corning Corp., Midland, Mich.
E.I. DuPont DeNemours & Co., Wilmington, Del.
Franklin Fibre-Lamitex, Wilmington, Del.
General Plastics Corp., Bloomfield, N.J.
High Voltage Engrg. Corp., Burlington, Mass.
Ico/Rally, Palo Alto, Cal.
Icore, Inc., Santa Clara, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Int'l. Wire & Cable, Chicago, Ill.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Rehau Plastiks, Inc., Woodside, N.Y.
Resin Formulators Co., Culver City, Cal.
Resinite Corp. Div., Wheeling , Ill
Royal Inds, El Segundo, Calif
Russell Inds., Inc., Lynbrook, N.Y.
Shamban, W.S. & Co., Los Angeles, Calif.
Stone Ind'l. Corp., Washington, D.C.
3M Co., St. Paul, Minn.
Whitaker Cable Corp., N. Kansas City, Mo.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Tubing, Magnesium

Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Dow Chemical Co., Midland, Mich.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Tubing, Metal—See Tubing, Brass; Tubing, Copper, etc.

Tubing, Metal Alloy

Engelhard Minerals & Chem., Murray Hill, N.J.
Uniform Tubes, Collegeville, Pa.
Aluminum Co. America, Pittsburgh, Pa.
Anaconda American Brass Co., Waterbury, Conn.
Armco Steel Corp., Middletown, Ohio
Bram Metallurgical-Chem., Phila., Pa.
Brush Beryllium Co., Cleveland, Ohio
Cerro Corp., New York, N.Y.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Cleveland Refractory Metals Div., Solon, Ohio
Division Lead Co., Summit, Ill.
Dow Chemical Co., Midland, Mich.
Extrudonics Co., New Brunswick, N.J.
Higbie Mfg. Co., Rochester, Mich.
Huntington Alloy Products Div., Huntington, W. Va.
Janney Cylinder Co, Philadelphia, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Ohio Steel Tube Div., Shelby, Ohio
Omega Engrg., Inc., Stamford, Conn.
Precision Tube, No. Wales, Pa.
Republic Steel Corp, Cleveland, Ohio
Revere Copper & Brass, Inc., New York, N.Y.
Russell Inds., Inc., Lynbrook, N.Y.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Superior Tube Co., Norristown, Pa.
Whittaker Corp., Los Angeles, Cal.

Tubing, Metal Hose, Flexible

Aeroquip Corp., Jackson, Mich.
Co-Operative Inds., Inc., Chester, N.J.
Estes Engrg. Co., Gardena, Calif.
Flexaust Co., New York, N.Y.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Russell Inds., Inc., Lynbrook, N.Y.
Varian Assocs., Vacuum Div., Palo Alto, Cal.

Tubing, Mica

Perfection Mica Co., Bensenville, Ill. p 2764
Asheville-Schoonmaker Mica, Newport News, Va.
Cleveland Mica Co., Lakewood, Ohio
Mica Fabricating Co., Rochelle Park, N.J.
Stevens Prods., Inc., E. Orange, N.J.
3M Co., St. Paul, Minn.

Tubing, Molybdenum

Engelhard Minerals & Chem., Murray Hill, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Cleveland Refractory Metals Div., Solon, Ohio
Electrotools, Inc., Broadview, Ill.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Whittaker Corp., Los Angeles, Cal.

Tubing, Monel

Uniform Tubes, Collegeville, Pa.
Bram Metallurgical-Chem., Phila., Pa.
Huntington Alloy Products Div., Huntington, W. Va.
Janney Cylinder Co, Philadelphia, Pa.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Tubing, Mylar

Dearborn Wire & Cable Co., Rosemont, Ill.
Brandywine Fibre Prods. Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Franklin Fibre-Lamitex, Wilmington, Del.
Laminated Sheet Prods., Millbury, Mass.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Stone Ind'l. Corp., Washington, D.C.
3M Co., St. Paul, Minn.
Zippertubing Co., Los Angeles, Calif.

Tubing, Nickel

Tohoku Metal Inds., Ltd., Tokyo, Japan
Uniform Tubes, Collegeville, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Huntington Alloy Products Div., Huntington, W. Va.
Janney Cylinder Co, Philadelphia, Pa.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Precision Tube, No. Wales, Pa.
Russell Inds., Inc., Lynbrook, N.Y.
Smith, Judson A. Co., Boyertown, Pa.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Whittaker Corp., Los Angeles, Cal.

Tubing, Nylon-Also See Tubing, Spaghetti

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
GC Elctrns., Rockford, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Transcon Mfg. Co., Dallas, Tex.
Varflex Corp., Rome, N.Y. ..... p 2813
Abesto Corp., Bloomfield, N.J.
Adam Spence Corp., Edison, N.J.
Aeroquip Corp., Jackson, Mich.
Anchor Plastics Co Inc., Long Island City, N. Y.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Brandywine Fibre Prods. Co., Wilmington, Del.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Budd Co., Philadelphia, Pa.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Franklin Fibre-Lamitex, Wilmington, Del.
General Sci. Equip., Phila., Pa.
Hudson Wire Co, Ossining, N Y
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Moore, Samuel & Co., Mantua, Ohio
Norelcom Inds., Inc., Farmingdale, N.Y.
Nyltite Corp. America, S. Plainfield, N.J.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.

Tubing, Paper

Brandywine Fibre Prods. Co., Wilmington, Del.
Electrical Insulation Co., Inc., Copiague, N.Y.
Jonesville Paper Tube Corp., Jonesville, Mich.
Paramount Inds., Inc., Ft. Wayne, Ind.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Stone Ind'l. Corp., Washington, D.C.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.

Tubing, Phenolic

Abesto Corp., Bloomfield, N.J.
Acme Model Engrg. Co., Ridgefield, N.J.
Brandywine Fibre Prods. Co., Wilmington, Del.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Edal Inds., Inc., E. Haven, Conn.
Electrical Insulation Co., Inc., Copiague, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Franklin Fibre-Lamitex, Wilmington, Del.
General Elec., Coshocton, Ohio
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
NVF Co., Yorklyn, Del.
Paramount Inds., Inc., Ft. Wayne, Ind.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Red Seal Elec. Co., Cleveland, Ohio
Resinite Corp. Div., Wheeling , Ill
Richardson Co., Des Plaines, Ill.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Spaulding Fibre Co., Inc., Tonawanda, N.Y.
Stevens Prods., Inc., E. Orange, N.J.
Stone Ind'l. Corp., Washington, D.C.
Synthane Taylor Corp., Valley Forge, Pa.
Thiokol Chemical Div., Trenton, N.J.
Westinghouse Elec., W. Mifflin, Pa.

Tubing, Plastic-Also See Tubing, Spaghetti

Alpha Wire Corp., Elizabeth, N.J.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill.
GC Elctrns., Rockford, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Nat'l. Wire & Cable, Los Angeles, Cal.
Rye Inds., Inc., Mamaroneck, N.Y.
Spectra-Strip Corp., Garden Grove, Cal. p 3054
Transcon Mfg. Co., Dallas, Tex. p 3061,3062
Varflex Corp., Rome, N.Y. ..... p 2813
Abesto Corp., Bloomfield, N.J.

Ace Plastic Co., Inc., Jamacia, N.Y.
Acme Model Engrg. Co., Ridgefield, N.J.
Adam Spence Corp., Edison, N.J.
Anchor Plastics Co Inc., Long Island City, N. Y.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Blum, Julius & Co., Inc., Carlstadt, N.J.
Brand Dielectrics, Inc., N. Windham, Conn.
Brand-Rex Co., Willimantic, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Celanese Plastics Co., Newark, N.J.
Celluplastics, Inc., Brockway, Pa.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Continental Rubber Works, Erie, Pa.
Dielectric Materials Co., Chicago, Ill.
Electric Parts Corp., Georgetown, Ky.
Electrical Insulation Co., Inc., Copiague, N.Y.
Engineered Plastics, Inc., Gibsonville, N.C.
Franklin Fibre-Lamitex, Wilmington, Del.
General Plastics Corp., Bloomfield, N.J.
General Sci. Equip., Phila., Pa.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Hecht Rubber Corp., Jacksonville, Fla.
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Insulating Fabricators, E. Rutherford, N.J.
Int'l. Wire & Cable, Chicago, Ill.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Moore, Samuel & Co., Mantua, Ohio
Natvar Corp., Rahway, N.J.
Norelcom Inds., Inc., Farmingdale, N.Y.
Okonite Co., Ramsey, N.J.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Puritan-Zep, El Segundo, Cal.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Rehau Plastiks, Inc., Woodside, N.Y.
Resdel Corp., Rio Grande, N.J.
Resinite Corp. Div., Wheeling , Ill
Royal Inds, El Segundo, Calif
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Shamban, W.S. & Co., Los Angeles, Calif.
Stevens Prods., Inc., E. Orange, N.J.
Stone Ind'l. Corp., Washington, D.C.
Superior Continental Corp., Hickory, N.C.
Synthane Taylor Corp., Valley Forge, Pa.
Taylor Elec., Howell, Mich.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Uniroyal, Inc., New York, N.Y.
Whitaker Cable Corp., N. Kansas City, Mo.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Tubing, Platinum

Engelhard Minerals & Chem., Murray Hill, N.J.
Uniform Tubes, Collegeville, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Improved Laminated Metal Co., Providence, R.I.
Mackay, A.D., Inc., New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Omega Engrg., Inc., Stamford, Conn.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Wilkinson Co., Westlake Village, Cal.

Tubing, Porcelain

Bram Metallurgical-Chem., Phila., Pa.
Du-Co Ceramics Co., Saxonburg, Pa.
Ferro Corp., E. Liverpool, Ohio
Lapp Insulator Div., Interpace Corp., LeRoy, N.Y.
Maryland Lava Co., Bel Air, Md.
Porcelain Prods. Co., Carey, Ohio
Star Porcelain Co., Trenton, N.J.
3M Co., St. Paul, Minn.

Tubing, Precious Metal

Engelhard Minerals & Chem., Murray Hill, N.J.
Uniform Tubes, Collegeville, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Handy & Harman, New York, N.Y.
Improved Laminated Metal Co., Providence, R.I.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Omega Engrg., Inc., Stamford, Conn.
Smith, Judson A. Co., Boyertown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Wilkinson Co., Westlake Village, Cal.

Tubing, Refractory Metal

Uniform Tubes, Collegeville, Pa.
Cleveland Refractory Metals Div., Solon, Ohio
Electrotools, Inc., Broadview, Ill.
Fansteel Inc., N Chicago, Ill.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Whittaker Corp., Los Angeles, Cal.

Tubing, Rubber, Natural & Synthetic

Markel, L. Frank & Sons, Norristown, Pa.
Rye Inds., Inc., Mamaroneck, N.Y.
Varflex Corp., Rome, N.Y. ..... p 2813
Abesto Corp., Bloomfield, N.J.
Aeroquip Corp., Jackson, Mich.
Anchor Plastics Co Inc., Long Island City, N. Y.
Atlantic India Rubber Co., Chicago, Ill.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Continental Rubber Works, Erie, Pa.
Darling, R.E. Co., Inc., Tucson, Ariz.
General Elec. Co., Cleveland, Ohio
General Sci. Equip., Phila., Pa.
Goodrich, B.F. Ind'l. Prods. Co., Akron, Ohio
Groendyk Mfg. Co., Inc., Buchanan, Va.
Hecht Rubber Corp., Jacksonville, Fla.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Kirkhill Rubber Co., Brea, Calif.
Minisink Rubber Co., Inc., Unionville, N.Y.
Minor Rubber Co., Inc., Bloomfield, N.J.
Natvar Corp., Rahway, N.J.
Pelmor Labs., Inc., Newtown, Pa.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Puritan-Zep, El Segundo, Cal.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Uniroyal, Inc., New York, N.Y.
VWR Scientific, San Francisco, Cal.

Tubing, Shrinkable—See Tubing, Heat Shrinkable

Tubing, Spaghetti

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J. p 2996
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill.
GC Elctrns., Rockford, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Transcon Mfg. Co., Dallas, Tex. p 3061,3062
Varflex Corp., Rome, N.Y. ..... p 2813
Abesto Corp., Bloomfield, N.J.
Adam Spence Corp., Edison, N.J.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Brand Dielectrics, Inc., N. Windham, Conn.
Brand-Rex Co., Willimantic, Conn.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Crane Packing Co., Morton Grove, Ill.
Dielectric Materials Co., Chicago, Ill.
Fluoro Plastics, Phila., Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
Ico/Rally, Palo Alto, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Maryland Lava Co., Bel Air, Md.
Natvar Corp., Rahway, N.J.
Omega Engrg., Inc., Stamford, Conn.
Philmore Mfg. Co., Richmond Hill, N.Y.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Sparta Mfg. Co., Dover, Ohio
Stone Ind'l. Corp., Washington, D.C.
Superior Continental Corp., Hickory, N.C.
Thermax Wire Corp., Flushing, N.Y.
3M Co., St. Paul, Minn.
Whitaker Cable Corp., N. Kansas City, Mo.
Zeus Ind'l. Prods., Raritan, N.J.

Tubing, Spiral Wrap

Amp Inc., Harrisburg, Pa.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa.
Panduit Corp., Tinley Pk., Ill.
Perfection Mica Co., Bensenville, Ill.
Transcon Mfg. Co., Dallas, Tex... p 3060
Abesto Corp., Bloomfield, N.J.
Aeroquip Corp., Jackson, Mich.
Birnbach Co., Inc., Freeport, N.Y.
Brandywine Fibre Prods. Co., Wilmington, Del.
Budd Co., Philadelphia, Pa.
Chemplast, Inc., Wayne, N.J.
Co-Operative Inds., Inc., Chester, N.J.
Franklin Fibre-Lamitex, Wilmington, Del.
Higbie Mfg. Co., Rochester, Mich.
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Insulating Fabricators, E. Rutherford, N.J.
Newman, M.M. Corp., Marblehead, Mass.
Paramount Inds., Inc., Ft. Wayne, Ind.
Port Plastics, Inc., Montebello, Cal.
Precision Paper Tube Co., Wheeling, Ill.
Resinite Corp. Div., Wheeling , Ill
Shamban, W.S. & Co., Los Angeles, Calif.
Stone Ind'l. Corp., Washington, D.C.
Thermax Wire Corp., Flushing, N.Y.
Zeus Ind'l. Prods., Raritan, N.J.

Tubing, Tantalum

Uniform Tubes, Collegeville, Pa.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Electrotools, Inc., Broadview, Ill.
Fansteel Inc., N Chicago, Ill.
Kawecki Berylco Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Norton Co., Newton, Mass.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Tubing, TFE-Also See Tubing, Spaghetti

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J. p 2996
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 2812
Nat'l. Wire & Cable, Los Angeles, Cal.
Severna Operation, East Orange, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Transcon Mfg. Co., Dallas, Tex... p 3061
Abesto Corp., Bloomfield, N.J.
Aeroquip Corp., Jackson, Mich.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Brand Dielectrics, Inc., N. Windham, Conn.
Brand-Rex Co., Willimantic, Conn.
Brandywine Fibre Prods. Co., Wilmington, Del.
Burlington Opers. Div., Burlington, Mass.
Cadilac Plastics & Chems., Detroit, Mich.
Central Plastics Dists., Chicago, Ill.
Chemplast, Inc., Wayne, N.J.
Crane Packing Co., Morton Grove, Ill.
Dilectrix Corp., Farmingdale, N.Y.
Dixon Corp., Bristol, R.I.
Electrical Insulation Co., Inc., Copiague, N.Y.
Fluoro Plastics, Phila., Pa.
Franklin Fibre-Lamitex, Wilmington, Del.
General Plastics Corp., Bloomfield, N.J.
General Sci. Equip., Phila., Pa.
Ico/Rally, Palo Alto, Cal.
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
Insulating Fabricators, E. Rutherford, N.J.
Jodee Plastics, Inc., Brooklyn, N.Y.
Laminated Sheet Prods., Millbury, Mass.
Long, T.J., Inc., Carle Pl., N.Y.
Norelcom Inds., Inc., Farmingdale, N.Y.
Plastic Assocs., Inc., Inwood, N.Y.
Polymer Corp., Reading, Pa.
Port Plastics, Inc., Montebello, Cal.
Raybestos-Manhattan, Inc., Bridgeport, Conn.
Royal Inds, El Segundo, Calif
Shamban, W.S. & Co., Los Angeles, Calif.
Sparta Mfg. Co., Dover, Ohio
Thermax Wire Corp., Flushing, N.Y.
3M Co., St. Paul, Minn.
Tri-Point Inds., Inc., Commack, N.Y.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Tubing, Titanium

Uniform Tubes, Collegeville, Pa.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Electrotools, Inc., Broadview, Ill.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Superior Tube Co., Norristown, Pa.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Whittaker Corp., Los Angeles, Cal.

Tubing, Tungsten

Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Electrotools, Inc., Broadview, Ill.
Fansteel Inc., N Chicago, Ill.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Ryerson, J.T. & Son, Inc., Chicago, Ill.
3M Co., St. Paul, Minn.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Tubing, Varnished Cambric Insulation-Also See Tubing, Spaghetti

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
GC Elctrns., Rockford, Ill.
Nat'l. Wire & Cable, Los Angeles, Cal.
Varflex Corp., Rome, N.Y. ..... p 2813
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Birnbach Co., Inc., Freeport, N.Y.
Brand Dielectrics, Inc., N. Windham, Conn.
Brand-Rex Co., Willimantic, Conn.
3M Co., St. Paul, Minn.

Tubing, Waveguide—See Vol 2

Tubing, Zipper

Alpha Wire Corp., Elizabeth, N.J. p 2995
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Brand Dielectrics, Inc., N. Windham, Conn.
Ico/Rally, Palo Alto, Cal.
Metex Corp., Edison, N.J.
Shamban, W.S. & Co., Los Angeles, Calif.
Zippertubing Co., Los Angeles, Calif.
Corning Glass Works, Lab. Prods. Dept., Corning, N.Y.

Tuners, Microwave—See Vol 1

Tuners, TV & FM—See Vol 1

Tuning Forks—See Vol 1

Turntables, Recording & Transcription—See Vol 1

Tweezers, Hand & Vacuum
Circon Corp., Goleta, Cal.
Clauss Cutlery Co., Fremont, Ohio p 2934,2935
GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y. .. p 2941
Air-Vac Engrg. Co., Milford, Conn.
Elctrn. Space Prods., Los Angeles, Cal.
E.T.M. Corp., Monrovia, Calif.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Hunter Tools, El Monte, Calif
Janel, Inc., Stirling, N.J.
Keller, Hugo P., Inc., New York, N.Y.
Larsen Importing Co., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Micro Tech. Mfg., Inc., Worcester, Mass.
Orbit Inds., San Luis Obispo, Calif.
Scientific Inds., Inc., Mineola, N.Y.
Techni-Tool, Inc., Philadelphia, Pa.
Telvac Instr. Co., Van Nuys, Cal.
Vigor Tool Co., New York, N.Y.

Twisters, Wire—See Wire Twisters

Twists, Waveguide—See Bends & Twists, Microwave—Vol 1

Typewriters, Input-Output (All Types)—See Vol 1

Ultrasonic Bonding Machines—See Machines, Ultrasonic Bonding—Vol 1

Ultrasonic Cleaners—See Cleaners, Ultrasonic—Vol 1

Ultrasonic Equip.—See Amplifiers; Analyzers; Controls, Indicators; Soldering Equip., etc.—Vol 1

Ultrasonic Guns—See Vol 1

Ultraviolet Inspection Lighting-Also See Microscopes, Ultraviolet—See Vol 1

Ultraviolet Spectrophotometers—See Spectrophotometers—Vol 1

Underwater Communication, Detection, Navigation, etc. Equipment—See Vol 1

Urea Formaldehyde—See Plastic Raw Materials

Vacuum Equip., Deposition—See Depositiion Equip., Vacuum—Vol 1

Vacuum Fluorescent Readout Tubes—See Tubes, Readout—Vol 2

Vacuum Indicators—See Indicators, Vacuum—Vol 1

Vacuum Parts-Handling Tools—See Tools, Parts-Handling, Vacuum Operated

Vacuum-Tube Voltmeters—See Meters, Vacuum-Tube Volt—Vol 1

Valves, Cryogenic—See Vol 1

Valves, Epitaxial Reactor—See Vol 1

Valves, Nonmetallic
Fluorocarbon Co., Anaheim, Cal.
Fox Valve Dev. Co., Inc., Hanover, N.J.
Lunkenheimer Co., Cincinnati, Ohio
Pennwalt Corp., Phila., Pa.
Sethco Mfg. Corp., Freeport, N.Y.
Uniroyal, Inc., New York, N.Y.
Valcor Engrg. Corp., Kenilworth, N.J.
Vanton Pump & Equip. Corp., Hillside, N.J.
Vernay Labs., Yellow Springs, Ohio

Valves, Servo—See Vol 2

Valves, Solenoid—See Vol 2

Valves, Vacuum—See Vol 1

Vapor Cooling Systems, Vacuum Tube—See Vol 2

Vapor Degreasers—See Machines, Vapor-Degreasing—Vol 1

Varactors—See Diodes, Varactor—Vol 2

Varistors—See Resistors, Voltage Sensitive

Varnish—See Insulating Compounds, Varnish

Vehicle Guidance Systems (Industrial)—See Machines, Material Handling (Electronic Control)—Vol 1

Verification Systems, Tape—See Vol 1

VHF Equipment—See Generators; Receivers; etc.—Vol 1

Vibration Analyzers—See Analyzers, Vibration—Vol 1

Vibration Measurement Instruments—See Meters, Vibration—Vol 1

Vibration Mounts—See Mounts, Shock & Vibration

Vibration Test Systems-Also See Services, Environmental Test—See Vol 1

Vibrating Capacitors—See Vol 2

Vibrators (Frequency Converting)—See Vol 2

Video Analyzers—See Analyzers, Video—Vol 1

Vidicon Tubes—See Tubes, TV Camera Pickup—Vol 2

Viewing Hoods, Cathode Ray Tube
Hewlett-Packard, Palo Alto, Cal.
Tektronix, Inc., Beaverton, Ore.
Jan Hardware Mfg. Co., Inc., Long Island City, N.Y.

Vinyl Compounds—See Plastic Raw Materials

Viscosity Indicators—See Indicators, Viscosity—Vol 2

Visual Control Boards, Charts & Graphs—See Boards, Graphic,Visual Control—Vol 1

VLF Equipment—See Receivers; Transmitters; etc.—Vol 1

Voltage Comparators—See Comparators, Voltage—Vol 1

Voltage Regulators—See Regulators & Stabilizers, Voltage—Vol 1

Voltage Source—See Vol 1

Voltmeters—See Meters, Volt—Vol 1

Wafer Fabrication, Semiconductor—See Semiconductor Wafer Fabrication—Vol 2

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Water Coils, Tube Cooling—See Vol 2

Wave Soldering Equipment—See Soldering Equip, Printed Circuit

Waveform Analyzers—See Analyzers, Waveform—Vol 1

Waveguide-Coax Adapters—See Vol 2

Waveguides, Circular—See Vol 2

Waveguides, Flexible—See Vol 2

Waveguides, Rectangular—See Vol 2

Waveguides, Rigid—See Vol 2

Wave Traps—See Filters, Antenna; Filters, Microwave; etc.—Vol 2

Wax—See Insulating Compounds, Wax

Weatherstrip, Electronic
Chomerics, Inc., Woburn, Mass.
Hecht Rubber Corp., Jacksonville, Fla.
Metex Corp., Edison, N.J.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.

Welding Equip. & Access.-Also See Controls, Welding; Timers,Welding—See Vol 1

Welding Equip., Semiconductor Devices—See Vol 1

Welding & Refining Equip., Electron Beam—See Vol 1

Whip Antennas—See Antennas, Mobile—Vol 1

Whiteprint Machines
Blu-Ray Inc., Essex, Conn.
HJS Engrg. Co., Park Ridge, Ill.
Rotolite, Teledyne Co., Stirling, N.J.

Wind Direction Indicators—See Indicators, Wind Direction—Vol 1

Wind Speed Indicators—See Indicators, Wind Speed—Vol 1

Windings, Transformer
Automatic Coil, New Hyde Pk., N.Y.
Dale Elctrns., Inc., Yankton, S.D.
Del Elctrns. Corp., Mt. Vernon, N.Y.
Douglas Randall Div., Pawcatuck, Conn.
Solid State Elctrns., Sepulveda, Cal.
A.P.W. Co., Inc., Rockaway, N.J.
Bicron Elctrns. Co., Canaan, Conn.
Device Seals, Inc., Sun Valley, Calif.
Electro-Pacific, Inc., Goleta, Calif.
Electrocom Inds., So. Bend, Indiana
Elctrn. Coils, Springfield, Mass.
Forbes & Wagner, Inc., Silver Creek, N.Y.
Hughes Aircraft Co, Culver City, Cal.
Keiser's Inds., Inc., Mt. Holly Springs, Pa.
Nat'l. Coil Co., Douglas, Ariz.
Piconics Inc., Tyngsboro, Mass.
Precision Inc., Minneapolis, Minn
Ramm Rectifier Co., Inc., Bronx, N.Y.
Raytheon Co., Waltham, Mass.
Rho Engrg. Co., Los Angeles, Calif
SKG Assocs., Inc., Boston, Mass.
Topper Mfg. Co., Inc., Great Neck, N.Y.
Trindl Prods., Inc., Chicago, Ill.
Tur-Bo Jet Prods. Co., Inc., Rosemead, Calif.

Windows, Infrared—See Vol 1

Windows, Pressure Type—See Vol 1

Windows, Shieled
Franklin Fibre-Lamitex, Wilmington, Del.
Herley Inds., Inc., Syosset, N.Y.
Metex Corp., Edison, N.J.
Nuclear Equip. Chem. Corp., Farmingdale, N.Y.
O & S Research, Inc., Riverton, N.J.
Penberthy Div., Seattle, Wash.
Technical Wire Prods., Inc., Cranford, NJ

Windows, Waveguide—See Vol 2

Wire, Antenna (All Types)
Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y. ..... p 2997
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
GC Elctrns., Rockford, Ill.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
American Elec. Cable Co., Holyoke, Mass.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Copperweld Steel Co., Glassport, Pa.
Finney Co., Bedford, Ohio
Hackensack Cable Corp., Hackensack, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
IE Mfg. Co., Chicago, Ill.
Miller Elec. Co., Woonsocket, R.I.
New England Elec. Wire, Lisbon, N.H.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Rohn Mfg. Co., Peoria, Ill.
Siemens Corp., Comps. Div., Iselin, N.J.
Superior Insulated Wire Corp., Stony Point, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.

Wire, Asbestos Insulated
Alpha Wire Corp., Elizabeth, N.J.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Dearborn Wire & Cable Co., Rosemont, Ill.
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Anaconda Wire and Cable Co., New York, N.Y.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Continental Wire & Cable, York, Pa.
Driver, Wilbur B. Co., Newark, N.J.
General Elec., Bridgeport, Conn
Hatfield Wire & Cable Div., Linden, N.J.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Miller Elec. Co., Woonsocket, R.I.
Pyco, Inc., Penndel, Pa.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Richards Arklay S., Newton Highlands, Mass.
Teledyne Western Wire & Cable, Los Angeles, Cal.

Thermotronic Devices, Inc., Conshohocken, Pa.
United States Steel Corp., Pittsburgh, Pa.

Wire, Bare, Aluminum

Consolidated Reactive Metals, Mamaroneck, N.Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Saxton Prods., Congers, N.Y.
Victor Wire & Cable, L.A., Cal.
Alloys Unlimited, Inc., Encino, Calif.
Aluminum Co. America, Pittsburgh, Pa.
Anaconda Wire and Cable Co., New York, N.Y.
ARC Prods. Div., Chicago, Ill.
Asco Wire & Cable Co., Bridgeport, Conn.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Chase Metal Service Div., Cleveland, Ohio
City Chemical Corp., New York, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Essex Int'l., Inc., Fort Wayne, Ind.
Essex Int'l., Inc., Marion, Ind.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Leico Inds., Inc., New York, N.Y.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
Permaluster, Inc., Burbank, Calif.
REA Magnet Wire Co., Ft. Wayne, Ind.
Rome Cable, Rome, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Technical Wire Prods., Inc., Santa Barbara, Cal.
Unibraze Corp, White Plains, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Wilkinson Co., Westlake Village, Cal.
York, Otto H. Co., Inc., W. Orange, N.J.
York Wire Co., Clifton, N.J.

Wire, Bare, Beryllium Copper

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Brush Beryllium Co., Cleveland, Ohio
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nesor Alloy Corp., W. Caldwell, N.J.
Unibraze Corp, White Plains, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Wilkinson Co., Westlake Village, Cal.

Wire, Bare, Brass

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Anaconda American Brass Co., Waterbury, Conn.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cerro Corp., New York, N.Y.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Helenor Metals Corp., Tuckahoe, N.Y.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Revere Copper & Brass, Inc., New York, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Unibraze Corp, White Plains, N.Y.
Wilkinson Co., Westlake Village, Cal.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Bare, Columbium

Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
City Chemical Corp., New York, N.Y.
Cross, H. Co., Weehawken, N.J.
Fansteel Inc., N Chicago, Ill.
Kawecki Berylco Inds., Inc., New York, N.Y.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Wire, Bare, Composite Metals

Consolidated Reactive Metals, Mamaroneck, N.Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
General Elec. Co., Cleveland, Ohio
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kester Solder Co, Chicago, Ill.
Materials Resch. Corp., Orangeburg, N.Y.
Richards Arklay S., Newton Highlands, Mass.
Semi Alloys, Inc., Mt. Vernon, N.Y.

Wire, Bare, Copper

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3023**
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Anaconda Wire and Cable Co., New York, N.Y.
Asco Wire & Cable Co., Bridgeport, Conn.
Atomergic Chemetals, Carle Place, N.Y.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Cerro Corp., New York, N.Y.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
City Chemical Corp., New York, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Elctrn. Space Prods., Los Angeles, Cal.
Essex Int'l, Inc., Sycamore, Ill.
Essex Int'l., Inc., Fort Wayne, Ind.
Essex Int'l., Inc., Marion, Ind.
Helenor Metals Corp., Tuckahoe, N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Omega Engrg., Inc., Stamford, Conn.
Pace Wire & Cable Corp., Oceanside, N.Y.
Philips Elmet Corp., Lewiston, Me.
Prestolite Wire & Cable, Port Huron, Mich.
REA Magnet Wire Co., Ft. Wayne, Ind.
Richards Arklay S., Newton Highlands, Mass.
Rome Cable, Rome, N.Y.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Siemens Corp., Comps. Div., Iselin, N.J.
Spargo Wire Co., Rome, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Transitron Elctrn. Corp., Wakefield, Mass.
Tri-State Elctrns. Corp., Camden, N.J.
Unibraze Corp, White Plains, N.Y.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Viking Wire Co., Inc., Danbury, Conn.
Western Gold & Platinum Co., Belmont, Cal.
Wilkinson Co., Westlake Village, Cal.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Bare, Copper-Clad

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3023**
Engelhard Minerals & Chem., Murray Hill, N.J.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Anaconda Wire and Cable Co., New York, N.Y.
Asco Wire & Cable Co., Bridgeport, Conn.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Columbia Wire Prods. Co., Chicago, Ill.
Copperweld Steel Co., Glassport, Pa.
Crown Metal Products Co., Wyano, Pa.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
GTE Sylvania Inc., Warren, Pa.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Improved Laminated Metal Co., Providence, R.I.
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
United American Metals Div., Brooklyn, N.Y.

Wire, Bare, Fine, Specialties

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... **p 3014**
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cerro Corp., New York, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Colonial Alloys, Phila., Pa.
Columbia Wire Prods. Co., Chicago, Ill.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Copperweld Steel Co., Glassport, Pa.
Driver, Wilbur B. Co., Newark, N.J.
Essex Int'l., Inc., Fort Wayne, Ind.
Gavitt Wire & Cable Div., Brookfield, Mass.
GTE Sylvania Inc., Warren, Pa.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Leico Inds., Inc., New York, N.Y.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Micro Contacts Inc., Hicksville, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Mullard, Inc., Farmingdale, N.Y.
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Ney, J.M. Co., Bloomfield, Conn.
Permaluster, Inc., Burbank, Calif.
Philips Elmet Corp., Lewiston, Me.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Viking Wire Co., Inc., Danbury, Conn.
Wilkinson Co., Westlake Village, Cal.
York, Otto H. Co., Inc., W. Orange, N.J.
York Wire Co., Clifton, N.J.

Wire, Bare, Gold & Gold-Plated

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... **p 3014**
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alloys Unlimited, Inc., Encino, Calif.
Alpha Metals, Inc., Jersey City, N.J.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
GTE Sylvania Inc., Warren, Pa.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Handy & Harman, New York, N.Y.
Hudson Wire Co, Ossining, N Y
Improved Laminated Metal Co., Providence, R.I.
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Ney, J.M. Co., Bloomfield, Conn.
Philips Elmet Corp., Lewiston, Me.
Semi Alloys, Inc., Mt. Vernon, N.Y.

United American Metals Div., Brooklyn, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Western Gold & Platinum Co., Belmont, Cal.
Wilkinson Co., Westlake Village, Cal.
Williams Precious Metal Div., Buffalo, N. Y.
York Wire Co., Clifton, N.J.

Wire, Bare, Molybdenum

Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Cross, H. Co., Weehawken, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Philips Elmet Corp., Lewiston, Me.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec., Bloomfield, N. J.

Wire, Bare, Nickel

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Huntington Alloy Products Div., Huntington, W. Va.
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Leico Inds., Inc., New York, N.Y.
Little Falls Alloys, Inc., Paterson, N.J.
Magnet Wire, Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Montgomery Co, Windsor Locks, Conn
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Richards Arklay S., Newton Highlands, Mass.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec., Blairsville, Pa.
Wilkinson Co., Westlake Village, Cal.
York, Otto H. Co., Inc., W. Orange, N.J.
York Wire Co., Clifton, N.J.

Wire, Bare, Nickel-Chrome

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Huntington Alloy Products Div., Huntington, W. Va.
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nesor Alloy Corp., W. Caldwell, N.J.
Omega Engrg., Inc., Stamford, Conn.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Reliance Div., Massillon, Ohio
Republic Steel Corp, Cleveland, Ohio
Westinghouse Elec., Blairsville, Pa.
York Wire Co., Clifton, N.J.

Wire, Bare, Nickel-Clad Copper

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
GTE Sylvania Inc., Warren, Pa.
Hamilton Watch Co., Lancaster, Pa.
Hudson Wire Co, Ossining, N Y
Improved Laminated Metal Co., Providence, R.I.
International Wire Prods., Wyckoff, N.J.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kentucky Elctrns., Owensboro, Ky.
Little Falls Alloys, Inc., Paterson, N.J.
Magnet Wire, Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.

Wire, Bare, Phosphor Bronze

Alpha Wire Corp., Elizabeth, N.J.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Anaconda American Brass Co., Waterbury, Conn.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Chase Brass & Copper Co., Cleveland, Ohio
Chase Metal Service Div., Cleveland, Ohio
Cohn, Sigmund, Mt. Vernon, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Helenor Metals Corp., Tuckahoe, N.Y.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Reliance Div., Massillon, Ohio
Steel Heddle Mfg. Co., Philadelphia, Pa.
Unibraze Corp, White Plains, N.Y.
Wilkinson Co., Westlake Village, Cal.

Wire, Bare, Platinum

Consolidated Reactive Metals, Mamaroneck, N.Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J. ..... **p 2817**
Engelhard Minerals & Chemicals Corp., Union, N.J. ..... **p 2817**
Victor Wire & Cable, L.A., Cal.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Exotic Materials, Inc., Costa Mesa, Cal.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Handy & Harman, New York, N.Y.
Improved Laminated Metal Co., Providence, R.I.
Kawecki Berylco Inds., Inc., New York, N.Y.
Leico Inds., Inc., New York, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
Mackay, A.D., Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metal Ceram, Inc., Mt. Vernon; N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Ney, J.M. Co., Bloomfield, Conn.
Omega Engrg., Inc., Stamford, Conn.
Pyco, Inc., Penndel, Pa.
Richards Arklay S., Newton Highlands, Mass.
Semi Alloys, Inc., Mt. Vernon, N.Y.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Western Gold & Platinum Co., Belmont, Cal.
Wilkinson Co., Westlake Village, Cal.
Williams Precious Metal Div., Buffalo, N. Y.

Wire, Bare, Silver-Plated

Consolidated Reactive Metals, Mamaroneck, N.Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3023**
Engelhard Minerals & Chem., Murray Hill, N.J.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Alpha Metals, Inc., Jersey City, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Essex Int'l, Inc., Sycamore, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
GTE Sylvania Inc., Warren, Pa.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Improved Laminated Metal Co., Providence, R.I.
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Philips Elmet Corp., Lewiston, Me.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Steel Heddle Mfg. Co., Philadelphia, Pa.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Bare, Stainless-Steel

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Victor Wire & Cable, L.A., Cal.
Armco Steel Corp., Baltimore, Md.
Berkley & Co., Spirit Lake, Iowa
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Chase Metal Service Div., Cleveland, Ohio
Driver, Wilbur B. Co., Newark, N.J.
Essex Int'l., Inc., Fort Wayne, Ind.
GTE Sylvania Inc., Warren, Pa.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
Porter, H.K. Co., Inc., Pittsburgh, Pa.
Reliance Div., Massillon, Ohio
Republic Steel Corp, Cleveland, Ohio
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Techni-Tool, Inc., Philadelphia, Pa.
Unibraze Corp, White Plains, N.Y.
York, Otto H. Co., Inc., W. Orange, N.J.
York Wire Co., Clifton, N.J.

Wire, Bare, Steel (Excluding Guy Wire)

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Saxton Prods., Congers, N.Y.
Armco Steel Corp., Middletown, Ohio
Brookfield Wire Co., Inc., Brookfield, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Mackay, A.D., Inc., New York, N.Y.
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
Reliance Div., Massillon, Ohio
Republic Steel Corp, Cleveland, Ohio
Ryerson, J.T. & Son, Inc., Chicago, Ill.
Steel Heddle Mfg. Co., Philadelphia, Pa.
United States Steel Corp., Pittsburgh, Pa.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Bare, Tantalum

Victor Wire & Cable, L.A., Cal.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Cross, H. Co., Weehawken, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
Kawecki Berylco Inds., Inc., New York, N.Y.
Kennametal Inc., Latrobe, Pa.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Norton Co., Newton, Mass.
Semi Alloys, Inc., Mt. Vernon, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Bare, Titanium

Victor Wire & Cable, L.A., Cal.
Armco Steel Corp., Baltimore, Md.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Cohn, Sigmund, Mt. Vernon, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Haas Precision Industries, Grosse Pointe Woods,, Mich.
Hamilton Watch Co., Lancaster, Pa.
Kawecki Berylco Inds., Inc., New York, N.Y.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nat'l-Standard Co., Niles, Mich.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
York, Otto H. Co., Inc., W. Orange, N.J.
York Wire Co., Clifton, N.J.

Wire, Bare, Tungsten

Victor Wire & Cable, L.A., Cal.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Cross, H. Co., Weehawken, N.J.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Hamilton Watch Co., Lancaster, Pa.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Omega Engrg., Inc., Stamford, Conn.
Philips Elmet Corp., Lewiston, Me.
Pyco, Inc., Penndel, Pa.
Richards Arklay S., Newton Highlands, Mass.
Semi Alloys, Inc., Mt. Vernon, N.Y.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec., Bloomfield, N. J.

Wire, Bare, Zirconium

Victor Wire & Cable, L.A., Cal.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
City Chemical Corp., New York, N.Y.
Elctrn. Space Prods., Los Angeles, Cal.
Hamilton Watch Co., Lancaster, Pa.
International Wire Prods., Wyckoff, N.J.
Leico Inds., Inc., New York, N.Y.
Mackay, A.D., Inc., New York, N.Y.
Materials Resch. Corp., Orangeburg, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Wire, Braid (Excluding Shielding)

Alpha Wire Corp., Elizabeth, N.J.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3023**
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Aircraft & Elctrn. Spec., Plainfield, Ind.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Cerro Corp., New York, N.Y.
Dielectric Materials Co., Chicago, Ill.
Gavitt Wire & Cable Div., Brookfield, Mass.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Icore Electro-Plastics, Inc., Santa Clara, Cal.
Icore, Inc., Santa Clara, Cal.
International Wire Prods., Wyckoff, N.J.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Metex Corp., Edison, N.J.
Montgomery Co, Windsor Locks, Conn
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Thermotronic Devices, Inc., Conshohocken, Pa.
Tri-State Elctrns. Corp., Camden, N.J.
Whitaker Cable Corp., N. Kansas City, Mo.
Zippertubing Co., Los Angeles, Calif.

Wire, Braid (Shielding)—See Braid, Cable & Wire Shielding

Wire, Bridge

Consolidated Reactive Metals, Mamaroneck, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Alloys Unlimited, Inc., Encino, Calif.
Armco Steel Corp., Middletown, Ohio
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.

Wire, Ceramic Insulated

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Saxton Prods., Congers, N.Y.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
American Standard, Franklin Pk., Ill.
California Fine Wire, Grover City, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Conax Corp., Buffalo, N.Y.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Metal Ceram, Inc., Mt. Vernon, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
National Beryllia Corp., Haskell, N.J.
Omega Engrg., Inc., Stamford, Conn.
Permaluster, Inc., Burbank, Calif.
Physical Sciences, Arcadia,, Cal.
Sensor Dynamics, Inc., Addison, Ill.

Wire, Enamel Insulated—See Wire, Hookup, Pushback (All Types)

Wire, Fiberglass Insulated—See Wire, Glass Insulated

Wire, Fine, Bare Or Insulated—See Wire, Bare, Fine, Specialties

Wire, Flat Strip—See Cable, Flat

Wire, Floor, Insulated

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Standard Wire & Cable, Los Angeles, Cal.
Carol Cable Co. W., Compton, Cal.
General Elec., Bridgeport, Conn
Holyoke Wire & Cable, Holyoke, Mass.
Ideas, Inc., Laramie, Wyo.
Judd Wire Div., Burlington, Mass.

Wire, Fuse

Bussmann Mfg., St. Louis, Mo.
Consolidated Reactive Metals, Mamaroneck, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Indium Corp. America, Utica, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nat'l-Standard Co., Niles, Mich.
Transitron Elctrn. Corp., Wakefield, Mass.
United American Metals Div., Brooklyn, N.Y.
United Mineral & Chem. Corp., New York, N.Y.

Wire, Gear Measuring—See Gear Measuring Wire

Wire, Glass Insulated

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y. ..... **p 3059**
Varflex Corp., Rome, N.Y. ..... **p 2813**
Victor Wire & Cable, L.A., Cal. .... **p 3069**
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
California Fine Wire, Grover City, Cal.
Cerro Wire & Cable Co., New Haven, Conn.
Chem Aero, Inc., Wilmington, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Driver, Wilbur B. Co., Newark, N.J.
Essex Int'l., Inc., Fort Wayne, Ind.
General Elec., Bridgeport, Conn
Holyoke Wire & Cable, Holyoke, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
New England Elec. Wire, Lisbon, N.H.
Omega Engrg., Inc., Stamford, Conn.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Pyco, Inc., Penndel, Pa.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Richards Arklay S., Newton Highlands, Mass.
Thermotronic Devices, Inc., Conshohocken, Pa.

Wire, Guy

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Saxton Prods., Congers, N.Y.
Tensolite, Tarrytown, N.Y.
Armco Steel Corp., Middletown, Ohio
Birnbach Co., Inc., Freeport, N.Y.
Brookfield Wire Co., Inc., Brookfield, Mass.
Copperweld Steel Co., Glassport, Pa.
Crown Metal Products Co., Wyano, Pa.
Hackensack Cable Corp., Hackensack, N.J.
IE Mfg. Co., Chicago, Ill.
Int'l. Wire & Cable, Chicago, Ill.
Lance Inds., Sylmar, Calif.
Magnet Wire, Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nat'l-Standard Co., Niles, Mich.
Rohn Mfg. Co., Peoria, Ill.
Wright, G.F. Steel & Wire Co., Worcester, Mass.

Wire, Heater—See Cable, Heater

Wire, High Temperature

Alpha Wire Corp., Elizabeth, N.J.
Amperex Electronic Corp., Hicksville, N.Y.
Cimco Wire & Cable, Allendale, N.J. ..... **p 2996**
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... **p 3033**
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3019,3027**
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Markel, L. Frank & Sons, Norristown, Pa. ..... **p 3035**
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal: ..... **p 3057**
Tensolite, Tarrytown, N.Y. ..... **p 3059**
Victor Wire & Cable, L.A., Cal. .... **p 3069**
American Elec. Cable Co., Holyoke, Mass.
American Standard, Franklin Pk., Ill.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
Brand-Rex Co., Willimantic, Conn.
Cable Elec. Prods., Inc., Providence, R.I.
Cabot Corp., Kokomo, Ind.
California Fine Wire, Grover City, Cal.
Carol Cable Co. W., Compton, Cal.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Cleveland Refractory Metals Div., Solon, Ohio
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Driver, Wilbur B. Co., Newark, N.J.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec. Co., Cleveland, Ohio
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania Inc., Warren, Pa.
GTE Sylvania, Inc., Moorestown, N.J.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
International Wire Prods., Wyckoff, N.J.
Judd Wire Div., Burlington, Mass.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
Nat'l-Standard Co., Niles, Mich.
New England Elec. Wire, Lisbon, N.H.
Omega Engrg., Inc., Stamford, Conn.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Permaluster, Inc., Burbank, Calif.
Phoenix Wire, Inc., S. Hero, Vt.
Physical Sciences, Arcadia,, Cal.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Pyco, Inc., Penndel, Pa.
Raychem Corp., Menlo Park, Calif.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Richards Arklay S., Newton Highlands, Mass.
Sensor Dynamics, Inc., Addison, Ill.
Siemens Corp., Comps. Div., Iselin, N.J.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Thermax Wire Corp., Flushing, N.Y.
Thermotronic Devices, Inc., Conshohocken, Pa.
Transitron Elctrn. Corp., Wakefield, Mass.
Viking Wire Co., Inc., Danbury, Conn.
Westinghouse Elec., Blairsville, Pa.
Whitaker Cable Corp., N. Kansas City, Mo.
Wilkinson Co., Westlake Village, Cal.

Wire, High Voltage

Alpha Wire Corp., Elizabeth, N.J.
Amp Inc., Elizabethtown, Pa.
Cities Svc. Co., Chester, N.Y. ..... **p 2997**
Columbia Eletrn. Cables, New Bedford, Mass. ..... **p 3005**
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... **p 3033**
Dearborn Wire & Cable Co., Rosemont, Ill. ..... **p 3016-3027**
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... **p 3034**
Markel, L. Frank & Sons, Norristown, Pa. ..... **p 3035**
Nat'l. Wire & Cable, Los Angeles, Cal. **p 3036**
Rowe Inds., Div., Toledo, Ohio
Saxton Prods., Congers, N.Y. ..... **p 3052**
Standard Wire & Cable, Los Angeles, Cal. ..... **p 3057**
Tensolite, Tarrytown, N.Y. ..... **p 3059**
Victor Wire & Cable, L.A., Cal.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.

Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Copperweld Steel Co., Glassport, Pa.
Dielectric Materials Co., Chicago, Ill.
Dielectric Sciences, Burlington, Mass
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Mohawk Wire & Cable, Leominster, Mass.
Okonite Co., Ramsey, N.J.
Pacific Electricord, Gardena, Cal.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Reynolds Metals Co., Richmond, Va.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rome Cable, Rome, N.Y.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Hookup-Pushback (All Types)

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cities Svc. Co., Chester, N.Y..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass. ..... p 3005
Consolidated Wire & Assoc. Corps., Chicago, Ill. ..... p 3008
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill..... p 3016,3017,3019,3020,3025-3027
Jonard Inds. Corp., Bronx, N.Y.
Nat'l. Wire & Cable, Los Angeles, Cal. p 3036
Saxton Prods., Congers, N.Y. p 3048,3051,3052
Standard Wire & Cable, Los Angeles, Cal. ..... p 3057
Tensolite, Tarrytown, N.Y. ..... p 3059
Victor Wire & Cable, L.A., Cal. .... p 3069
Whitmor Wire & Cable, No. Hollywood, Cal.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Consolidated Prods., Gardena, Calif.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Eagle Elec. Mfg. Co., L. I. C., N.Y.
Electric Parts Corp., Georgetown, Ky.
Essex Int'l, Inc., Sycamore, Ill.
Essex Int'l., Inc., Fort Wayne, Ind.
Essex Int'l., Inc., Marion, Ind.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Magnet Wire, Inc., New York, N.Y.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Mohawk Wire & Cable, Leominster, Mass.
New England Elec. Wire, Lisbon, N.H.
Pacific Electricord, Gardena, Cal.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rome Cable, Rome, N.Y.
Sag Harbor Inds., Inc., Sag Harbor, N.Y.
Superior Insulated Wire Corp., Stony Point, N.Y.
Thermax Wire Corp., Flushing, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.
Triple-A Specialty Co., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.

Wire, Irradiated

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y..... p 2997
Dearborn Wire & Cable Co., Rosemont, Ill..... p 3017
Standard Wire & Cable, Los Angeles, Cal.
Belden Corp., Chicago, Ill.
Coleman Cable & Wire Co., River Grove, Ill.
Judd Wire Div., Burlington, Mass.
Permaluster, Inc., Burbank, Calif.
Raychem Corp., Menlo Park, Calif.

Wire, Lead-In & Ground

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y..... p 2997
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill..... p 3017,3025
GC Elctrns., Rockford, Ill.
Nat'l. Wire & Cable, Los Angeles, Cal. p 3037
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Copperweld Steel Co., Glassport, Pa.
Essex Int'l., Inc., Marion, Ind.
General Elec. Co., Cleveland, Ohio
General Elec., Bridgeport, Conn
GTE Sylvania Inc., Warren, Pa.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Jersey Specialty Co., Inc., Wayne, N.J.
Judd Wire Div., Burlington, Mass.
Lance Inds., Sylmar, Calif.
Lenz Elec. Mfg. Co., Chicago, Ill.
Mohawk Wire & Cable, Leominster, Mass.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Rohn Mfg. Co., Peoria, Ill.
Rome Cable, Rome, N.Y.
Superior Continental Corp., Hickory, N.C.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Litz

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Saxton Prods., Congers, N.Y..... p 3052
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Asco Wire & Cable Co., Bridgeport, Conn.
Belden Corp., Chicago, Ill.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Hudson Wire Co, Ossining, N Y
Magnet Wire, Inc., New York, N.Y.
Montgomery Co, Windsor Locks, Conn
New England Elec. Wire, Lisbon, N.H.
Siemens Corp., Comps. Div., Iselin, N.J.
Slepian, Arthur & Co., Bridgeport, Conn.

Wire, Magnet

Caddel-Burns Mfg. Co., Inc., Mineola, N. Y.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Saxton Prods., Congers, N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Aluminum Co. America, Pittsburgh, Pa.
Anaconda Wire and Cable Co., New York, N.Y.
Asco Wire & Cable Co., Bridgeport, Conn.
Barker Elec. Sls., Ship Bottom, NJ
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Essex Int'l., Inc., Fort Wayne, Ind.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
Magnet Wire, Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Montgomery Co, Windsor Locks, Conn
New England Elec. Wire, Lisbon, N.H.
New Haven Wire & Cable, Inc., New Haven, Ind.
Permaluster, Inc., Burbank, Calif.
Philips Elmet Corp., Lewiston, Me.
Phoenix Wire, Inc., S. Hero, Vt.
REA Magnet Wire Co., Ft. Wayne, Ind.
Reynolds Metals Co., Richmond, Va.
Siemens Corp., Comps. Div., Iselin, N.J.
Slepian, Arthur & Co., Bridgeport, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
United Mineral & Chem. Corp., New York, N.Y.
Viking Wire Co., Inc., Danbury, Conn.

Wire, Mesh

Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Albany Int'l. Corp., Albany, NY
Bram Metallurgical-Chem., Phila., Pa.
Brookfield Wire Co., Inc., Brookfield, Mass.
Chase Metal Service Div., Cleveland, Ohio
Copperweld Steel Co., Glassport, Pa.
Flock Process Corp., S. Norwalk, Conn.
Gencom Div., Plainview, N.Y.
Lenz Elec. Mfg. Co., Chicago, Ill.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Metex Corp., Edison, N.J.
Nat'l-Standard Co., Niles, Mich.
Pall Trinity Micro Corp., Cortland, N.Y.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
W. S. Tyler Inc., Mentor, Ohio
Unique Wire Weaving Co., Hillside, N.J.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Wire Cloth Mfrs., Parsippany, N.J.
Wright, G.F. Steel & Wire Co., Worcester, Mass.
York, Otto H. Co., Inc., W. Orange, N.J.

Wire, Multiconductor—See Cable, Multiconductor

Wire, Plastic Insulated—See Wire, Hookup-Pushback

Wire, Potentiometer Winding

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Standard Wire & Cable, Los Angeles, Cal.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Hudson Wire Co, Ossining, N Y
Molecu-Wire Corp., Farmingdale, N.J.
Ney, J.M. Co., Bloomfield, Conn.

Wire, Radiation-Resistant

Cities Svc. Co., Chester, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
American Standard, Franklin Pk., Ill.
Brand-Rex Co., Willimantic, Conn.
California Fine Wire, Grover City, Cal.
Cerro Wire & Cable Co., New Haven, Conn.
Continental Wire & Cable, York, Pa.
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
Hudson Wire Co, Ossining, N Y
Judd Wire Div., Burlington, Mass.
Lewis Engrg. Co., Naugatuck, Conn.
Molecu-Wire Corp., Farmingdale, N.J.
New England Elec. Wire, Lisbon, N.H.
Permaluster, Inc., Burbank, Calif.
Raychem Corp., Menlo Park, Calif.
Thermax Wire Corp., Flushing, N.Y.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Recording

California Fine Wire, Grover City, Cal.
Essex Int'l., Inc., Fort Wayne, Ind.
Mohawk Wire & Cable, Leominster, Mass.
Molecu-Wire Corp., Farmingdale, N.J.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Refractory Metal

Cleveland Refractory Metals Div., Solon, Ohio
Cross, H. Co., Weehawken, N.J.
Fansteel Inc., N Chicago, Ill.
Norton Co., Newton, Mass.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.

Wire, Resistance & Filament

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Anaconda Wire and Cable Co., New York, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Bram Metallurgical-Chem., Phila., Pa.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Continental Wire & Cable, York, Pa.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Electric Parts Corp., Georgetown, Ky.
General Elec. Co., Cleveland, Ohio
General Elec., Bridgeport, Conn
GTE Sylvania, Inc., Towanda, Pa.
Hudson Wire Co, Ossining, N Y
International Wire Prods., Wyckoff, N.J.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Materials for Elctrns., Inc., Jamaica, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Porter, H.K. Co., Inc., Pittsburgh, Pa.

Wire, Resistance Thermometer

Consolidated Reactive Metals, Mamaroneck, N.Y.
Engelhard Minerals & Chem., Murray Hill, N.J.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
General Elec., Bridgeport, Conn
Hudson Wire Co, Ossining, N Y
Lewis Engrg. Co., Naugatuck, Conn.
Matthey Bishop Inc., Malvern, Pa.
Molecu-Wire Corp., Farmingdale, N.J.
Omega Engrg., Inc., Stamford, Conn.
Porter, H.K. Co., Inc., Pittsburgh, Pa.

Wire, Resistor Winding

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Engelhard Minerals & Chem., Murray Hill, N.J.
California Fine Wire, Grover City, Cal.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
General Elec., Bridgeport, Conn
Hudson Wire Co, Ossining, N Y

Materials for Elctrns., Inc., Jamaica, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Precision Resistor Co., Hillside, N.J.
York Wire Co., Clifton, N.J.

Wire, Ribbon

Consolidated Reactive Metals, Mamaroneck, N.Y.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
American Elec. Cable Co., Holyoke, Mass.
American Silver Co. Div., Flushing, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Berkshire Elec. Cable Co., Leeds, Mass.
Bram Metallurgical-Chem., Phila., Pa.
Brand-Rex Co., Willimantic, Conn.
Brookfield Wire Co., Inc., Brookfield, Mass.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Colonial Alloys, Phila., Pa.
Columbia Wire Prods. Co., Chicago, Ill.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Cross, H. Co., Weehawken, N.J.
Driver, Wilbur B. Co., Newark, N.J.
Flexible Circuits, Inc., Warrington, Pa.
Gavitt Wire & Cable Div., Brookfield, Mass.
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania, Inc., Towanda, Pa.
GTE Sylvania Inc., Warren, Pa.
Hudson Wire Co, Ossining, N Y
Improved Laminated Metal Co., Providence, R.I.
Indium Corp. America, Utica, N.Y.
International Wire Prods., Wyckoff, N.J.
Judd Wire Div., Burlington, Mass.
Lance Inds., Sylmar, Calif.
Little Falls Alloys, Inc., Paterson, N.J.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Matthey Bishop Inc., Malvern, Pa.
Mohawk Wire & Cable, Leominster, Mass.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
Permaluster, Inc., Burbank, Calif.
Steel Heddle Mfg. Co., Philadelphia, Pa.
Wilkinson Co., Westlake Village, Cal.
Zippertubing Co., Los Angeles, Calif.

Wire, Semiconductor Lead

Art Wire & Stamping Co., Cedar Knolls, N.J.
Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Anaconda Wire and Cable Co., New York, N.Y.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Berkshire Elec. Cable Co., Leeds, Mass.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania Inc., Warren, Pa.
Haydu Prods., Inc., Opa Locka, Fla.
Henes Mfg. Co., Phoenix, Ariz.
International Wire Prods., Wyckoff, N.J.
Kentucky Elctrns., Owensboro, Ky.
Leico Inds., Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Nat'l-Standard Co., Niles, Mich.
Nesor Alloy Corp., W. Caldwell, N.J.
Revere Elctrn. Div., Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Vernitron, Norwalk, Conn.
Westinghouse Elec., Blairsville, Pa.

Wire, Shielded

Alpha Wire Corp., Elizabeth, N.J.
Cimco Wire & Cable, Allendale, N.J. p 2996
Cities Svc. Co., Chester, N.Y. ..... p 2997
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3016,3019
Manhattan Elec. Cable Corp., Brooklyn, N.Y. ..... p 3034
Markel, L. Frank & Sons, Norristown, Pa. ..... p 3035
Nat'l. Wire & Cable, Los Angeles, Cal.
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y. ..... p 3051
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal. .... p 3069
Whitmor Wire & Cable, No. Hollywood, Cal.
American Elec. Cable Co., Holyoke, Mass.
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Cable Elec. Prods., Inc., Providence, R.I.
Carol Cable Co. W., Compton, Cal.
Cerro Wire & Cable Co., New Haven, Conn.
Coleman Cable & Wire Co., River Grove, Ill.
Columbia Wire Prods. Co., Chicago, Ill.
Continental Wire & Cable, York, Pa.
Dielectric Materials Co., Chicago, Ill.
Essex Int'l., Inc., Marion, Ind.
Estes Engrg. Co., Gardena, Calif.
Gavitt Wire & Cable Div., Brookfield, Mass.
General Elec., Bridgeport, Conn
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania, Inc., Moorestown, N.J.
Hatfield Wire & Cable Div., Linden, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Hudson Wire Co, Ossining, N Y
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Microdot Inc., S. Pasadena, Calif.
Miller Elec. Co., Woonsocket, R.I.
Mohawk Wire & Cable, Leominster, Mass.
Montgomery Co, Windsor Locks, Conn
Nesor Alloy Corp., W. Caldwell, N.J.
New England Elec. Wire, Lisbon, N.H.
Okonite Co., Ramsey, N.J.
Pace Wire & Cable Corp., Oceanside, N.Y.
Permaluster, Inc., Burbank, Calif.
Plastic Wire & Cable Corp., Jewett City, Conn.
Plastoid Corp., Long Island City, N.Y.
Prestolite Wire & Cable, Port Huron, Mich.
Raychem Corp., Menlo Park, Calif.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Rockland Insulated Wire & Cable, Haverstraw, N.Y.
Rome Cable, Rome, N.Y.
Superior Continental Corp., Hickory, N.C.
Teledyne Western Wire & Cable, Los Angeles, Cal.
Thermax Wire Corp., Flushing, N.Y.
Times Wire & Cable, Wallingford, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.
Wiegand, Edwin L. Co., Pittsburgh, Pa.
Zippertubing Co., Los Angeles, Calif.

Wire, Strain Gauge

Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Dearborn Wire & Cable Co., Rosemont, Ill.
Spectra-Strip Corp., Garden Grove, Cal.
Tensolite, Tarrytown, N.Y.
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Cooper, Joseph B. & Sons, Inc., New York, N.Y.
Driver, Wilbur B. Co., Newark, N.J.
Judd Wire Div., Burlington, Mass.
Molecu-Wire Corp., Farmingdale, N.J.
Thermax Wire Corp., Flushing, N.Y.

Wire, TFE Insulated

Alpha Wire Corp., Elizabeth, N.J. p 2995
Cimco Wire & Cable, Allendale, N.J. p 2996
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3019,3020
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Markel, L. Frank & Sons, Norristown, Pa. ..... p 3035
Nat'l. Wire & Cable, Los Angeles, Cal.
Saxton Prods., Congers, N.Y. ..... p 3052
Spectra-Strip Corp., Garden Grove, Cal.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y. ..... p 3059
Anaconda Wire and Cable Co., New York, N.Y.
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
Cerro Corp., New York, N.Y.
Cerro Wire & Cable Co., New Haven, Conn.
Chemplast, Inc., Wayne, N.J.
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Continental Wire & Cable, York, Pa.
Essex Int'l, Inc., Sycamore, Ill.
Gore, W.L. & Assocs., Inc., Newark, Del.
GTE Sylvania, Inc., Moorestown, N.J.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Magnet Wire, Inc., New York, N.Y.
Molecu-Wire Corp., Farmingdale, N.J.
Omega Engrg., Inc., Stamford, Conn.
Phoenix Wire, Inc., S. Hero, Vt.
Prestolite Wire & Cable, Port Huron, Mich.
Pyco, Inc., Penndel, Pa.
Revere Elctrn. Div., Wallingford, Conn.
Sensor Dynamics, Inc., Addison, Ill.
Thermax Wire Corp., Flushing, N.Y.

Wire, Test Lead

Alpha Wire Corp., Elizabeth, N.J.
Cities Svc. Co., Chester, N.Y. ..... p 2997
Columbia Eletrn. Cables, New Bedford, Mass.
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill. ..... p 3030
Manhattan Elec. Cable Corp., Brooklyn, N.Y.
Nat'l. Wire & Cable, Los Angeles, Cal.
Rye Inds., Inc., Mamaroneck, N.Y.
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
American Elec. Cable Co., Holyoke, Mass.
Belden Corp., Chicago, Ill.
Berkshire Elec. Cable Co., Leeds, Mass.
Birnbach Co., Inc., Freeport, N.Y.
Brand-Rex Co., Willimantic, Conn.
Carol Cable Co. W., Compton, Cal.
Coleman Cable & Wire Co., River Grove, Ill.
Consolidated Prods., Gardena, Calif.
Essex Int'l, Inc., Sycamore, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Judd Wire Div., Burlington, Mass.
Mackay, A.D., Inc., New York, N.Y.
Pace Wire & Cable Corp., Oceanside, N.Y.
Pacific Electricord, Gardena, Cal.
Prestolite Wire & Cable, Port Huron, Mich.
Revere Elctrn. Div., Wallingford, Conn.
Rhode Island Insulated Wire Co., Cranston, R.I.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Thermocouple

Amperex Electronic Corp., Hicksville, N.Y.
Cities Svc. Co., Chester, N.Y. ..... p 2997
Consolidated Reactive Metals, Mamaroneck, N.Y. ..... p 3014
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y. ..... p 3033
Dearborn Wire & Cable Co., Rosemont, Ill.
Engelhard Minerals & Chem., Murray Hill, N.J.
Standard Wire & Cable, Los Angeles, Cal. ..... p 3057
Tensolite, Tarrytown, N.Y.
Victor Wire & Cable, L.A., Cal.
Alnor Instr. Co., Chicago, Ill.
American Standard, Franklin Pk., Ill.
Barber-Colman Co., Industrial Instrs. Div., Rockford, Ill.
Berkley & Co., Spirit Lake, Iowa
Berkshire Elec. Cable Co., Leeds, Mass.
Bram Metallurgical-Chem., Phila., Pa.
Bristol Div, Waterbury, Conn
British Insulated Callender's Cables, Ltd., London WC1B 3QN, Eng.
California Fine Wire, Grover City, Cal.
Cohn, Sigmund, Mt. Vernon, N.Y.
Coleman Cable & Wire Co., River Grove, Ill.
Continental Wire & Cable, York, Pa.
Control Prods. Corp., Chicago, Ill.
Driver, Wilbur B. Co., Newark, N.J.
Essex Int'l, Inc., Sycamore, Ill.
Exotic Materials, Inc., Costa Mesa, Cal.
Gavitt Wire & Cable Div., Brookfield, Mass.
Harco Labs., Inc., Branford, Conn.
Holyoke Wire & Cable, Holyoke, Mass.
Honeywell, Ft. Washington, Pa.
International Wire Prods., Wyckoff, N.J.
Leeds & Northrup Corp., No. Wales, Pa.
Leico Inds., Inc., New York, N.Y.
Lenz Elec. Mfg. Co., Chicago, Ill.
Lewis Engrg. Co., Naugatuck, Conn.
Mackay, A.D., Inc., New York, N.Y.
Magnet Wire, Inc., New York, N.Y.
Marlin Mfg. Corp., Cleveland, Ohio
Matthey Bishop Inc., Malvern, Pa.
Molecu-Wire Corp., Farmingdale, N.J.
Moore, Samuel & Co., Mantua, Ohio
Omega Engrg., Inc., Stamford, Conn.
Pyco, Inc., Penndel, Pa.
Revere Elctrn. Div., Wallingford, Conn.
Richards Arklay S., Newton Highlands, Mass.
Sensor Dynamics, Inc., Addison, Ill.
Thermax Wire Corp., Flushing, N.Y.
Thermo Elec. Co., Inc., Saddle Brook, N.J.
Thermotronic Devices, Inc., Conshohocken, Pa.
Transitron Elctrn. Corp., Wakefield, Mass.
West Instr. Div., Schiller Pk., Ill.
Wilkinson Co., Westlake Village, Cal.

Wire, Tinsel

Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Tensolite, Tarrytown, N.Y.
American Elec. Cable Co., Holyoke, Mass.
Columbia Wire Prods. Co., Chicago, Ill.
Gavitt Wire & Cable Div., Brookfield, Mass.
Hudson Wire Co, Ossining, N Y
Magnet Wire, Inc., New York, N.Y.
Montgomery Co, Windsor Locks, Conn
Plastic Wire & Cable Corp., Jewett City, Conn.
Transitron Elctrn. Corp., Wakefield, Mass.

Wire, Transmission—See Cable, Transmission Line

Wire, Tungsten

Engelhard Minerals & Chem., Murray Hill, N.J.
Associated Engrg. & Mfg. Corp., Glen Ridge, N.J.
Atomergic Chemetals, Carle Place, N.Y.
Bram Metallurgical-Chem., Phila., Pa.
California Fine Wire, Grover City, Cal.
Elctrn. Space Prods., Los Angeles, Cal.
Fansteel Inc., N Chicago, Ill.
General Elec. Co., Cleveland, Ohio
GTE Sylvania, Inc., Towanda, Pa.
Magnet Wire, Inc., New York, N.Y.
Omega Engrg., Inc., Stamford, Conn.
Philips Elmet Corp., Lewiston, Me.
Pyco, Inc., Penndel, Pa.
Semi Alloys, Inc., Mt. Vernon, N.Y.
Unique Wire Weaving Co., Hillside, N.J.
United Mineral & Chem. Corp., New York, N.Y.
Var-Lac-Oid Chemical Co., Elizabeth, N.J.
Westinghouse Elec., Bloomfield, N. J.

Wire & Cable Ties

Daburn Elctrns. & Cable Corp., Bronx, N.Y.
GC Elctrns., Rockford, Ill.
Panduit Corp., Tinley Pk., Ill..... p 3047
Saxton Prods., Congers, N.Y.
Transcon Mfg. Co., Dallas, Tex... p 3064
Bergen Wire Rope Co., Lodi, N.J.
Birnbach Co., Inc., Freeport, N.Y.
Copperweld Steel Co., Glassport, Pa.
Dennison Mfg., Framingham, Mass.
E.C.P. Corp., Cleveland, Ohio
Electrovert, Inc., Mt. Vernon, N.Y.
Fastex Div., Des Plaines, Ill.
Gudebrod Bros. Silk Co., Inc., New York, N.Y.
Hanscom, H.F. Co., Inc., Providence, R.I.
Holub Inds., Inc., Sycamore, Ill.
Holyoke Wire & Cable, Holyoke, Mass.
Ico/Rally, Palo Alto, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Kent Corp., Mundelein, Ill.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Thomas & Betts Co., Elizabeth, N.J.
Tyton Corp., Milwaukee, Wisc.
Waldom Elctrns., Inc., Chicago, Ill.
Weckesser Co., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Zeus Ind'l. Prods., Raritan, N.J.
Zippertubing Co., Los Angeles, Calif.

Wire Cutters, Automatic—See Vol 1

Wire Cutters, Hand Operated

Clauss Cutlery Co., Fremont, Ohio p 2934,2936
ETC, Inc., Cleveland, Ohio
GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Vaco Prods. Co., Chicago, Ill..... p 2944
Allied Elctrns. Corp., Chicago, Ill.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Channellock, Inc., Meadville, Pa.
Erikson Specialized Tool Co., Pico-Rivera, Cal.
E.T.M. Corp., Monrovia, Calif.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Henes Mfg. Co., Phoenix, Ariz.
Holub Inds., Inc., Sycamore, Ill.
Hunter Tools, El Monte, Calif
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Ideal Industries, Inc., Sycamore, Ill.
James Elctrn. Tool Co., Palo Alto, Calif.
Janel, Inc., Stirling, N.J.
Klein, Mathias & Sons, Chicago, Ill.
Larsen Importing Co., New York, N.Y.
MacDonald & Co., Glendale, Calif.
Milbar, Chagrin Falls, Ohio
Philmore Mfg. Co., Richmond Hill, N.Y.
Porter, H.K., Inc., Somerville, Mass.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Thomas & Betts Co., Elizabeth, N.J.
Utica Tool Co., Inc., Orangeburg, S.C.
Vigor Tool Co., New York, N.Y.
Waldom Elctrns., Inc., Chicago, Ill.
Whitaker Cable Corp., N. Kansas City, Mo.
Williams J.H. & Co., Buffalo, N.Y.
Xcelite, Inc., Orchard Park, N.Y.

Wire Cutting & Stripping Services—See Services, Wire Cutting & Stripping

Wire Forms—See Forms, Wire

Wire Markers (All Types)-Also See Strips, Marker & Fanning

Aero Devices, Inc., Totowa, N.J. p 2994
Alpha Wire Corp., Elizabeth, N.J.
GC Elctrns., Rockford, Ill.
Markel, L. Frank & Sons, Norristown, Pa.
Panduit Corp., Tinley Pk., Ill..... p 3047
Ackerman Gould Co., Inc., Oceanside, N.Y.
Acromark Co., Berkeley Hts, N.J.
American Pamcor, Inc., Paoli, Pa
Brady, W.H. Co., Milwaukee, Wisc.
Cryptographics, Inc., New York, N.Y.
Duramark, Inc., Port Washington, N.Y.
E.C.P. Corp., Cleveland, Ohio
Electrovert, Inc., Mt. Vernon, N.Y.
Excel Specialty Corp., Chicago, Ill.
Formulabs Ind'l. Inks, Escondido, Cal.
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Ideal Industries, Inc., Sycamore, Ill.
Manger Elec. Co., Inc., Stamford, Conn.
Nat'l. Band & Tag, Newport, Ky.
Plymouth Rubber Co., Inc., Canton, Mass.
Raychem Corp., Menlo Park, Calif.
Rayclad Tubes, Inc., Menlo Park, Calif.
Sjoberg, C. & Son, Inc., Cranston, R.I.
Thomas & Betts Co., Elizabeth, N.J.
Zippertubing Co., Los Angeles, Calif.

Wire-Marking Machines, Automatic—See Vol 1

Wire-Marking Machines, Hand Operated—See Vol 1

Wire Measuring & Cutting Machines—See Vol 1

Wire-Measuring Gauges

Jonard Inds. Corp., Bronx, N.Y.
Multicore Sls. Corp., Westbury, N.Y.
Addison Div., Mountainside, N.J.
Bendix, Dayton, Ohio
Dice, J.W. Co., Englewood, N.J.
Dynamic Data Corp., Columbus, Ohio
Electron-Machine Corp., Umatilla, Fla.
General Hardware Mfg. Co., New York, N.Y.
Lion Precision Div., Newton, Mass.
Optron Corp., Woodbridge, Conn.
Starrett, L.S. Co., Athol, Mass.

Wire Shielding

Alpha Wire Corp., Elizabeth, N.J. p 2995
Consolidated Wire & Assoc. Corps., Chicago, Ill.
Daburn Elctrns. & Cable Corp., Bronx, N.Y.
Perfection Mica Co., Bensenville, Ill. p 2003
Saxton Prods., Congers, N.Y.
Standard Wire & Cable, Los Angeles, Cal.
Victor Wire & Cable, L.A., Cal.
Aircraft & Elctrn. Spec., Plainfield, Ind.
American Elec. Cable Co., Holyoke, Mass.
Belden Corp., Chicago, Ill.
Birnbach Co., Inc., Freeport, N.Y.
Co-Operative Inds., Inc., Chester, N.J.
Consolidated Prods., Gardena, Calif.
Copperweld Steel Co., Glassport, Pa.
Estes Engrg. Co., Gardena, Calif.
Holyoke Wire & Cable, Holyoke, Mass.
Int'l. Wire & Cable, Chicago, Ill.
Lenz Elec. Mfg. Co., Chicago, Ill.
Metex Corp., Edison, N.J.
Montgomery Co, Windsor Locks, Conn
New England Elec. Wire, Lisbon, N.H.
Technical Wire Prods., Inc., Cranford, NJ
Technical Wire Prods., Inc., Santa Barbara, Cal.
Templet Ind., Inc., Plainview, N.Y.
Thermax Wire Corp., Flushing, N.Y.
Westinghouse Elec., Blairsville, Pa.
Zippertubing Co., Los Angeles, Calif.

Wire Strippers, Automatic—See Vol 1

Wire Strippers, Hand Operated

Clauss Cutlery Co., Fremont, Ohio p 2936
ETC, Inc., Cleveland, Ohio
GC Elctrns., Rockford, Ill.
Jonard Inds. Corp., Bronx, N.Y.
Vaco Prods. Co., Chicago, Ill..... p 2944
Allied Elctrns. Corp., Chicago, Ill.
American Elec. Heater, Detroit, Mich.
American Pamcor, Inc., Paoli, Pa
Belden Corp., Chicago, Ill.
Blonder-Tongue Labs., Inc., Old Bridge, N.J.
Carpenter Mfg. Co., Inc., Manlius, N.Y.
Channellock, Inc., Meadville, Pa.
Contact, Inc., Hudson, N.H.
Deutsch Co., Banning, Calif.
Eraser Co., Syracuse, N.Y.
Ewald Instrs. Corp., Kent, Conn.
Gagne Assocs., Inc., Binghamton, N.Y.
Gardner-Denver Co., Quincy, Ill.
General Hardware Mfg. Co., New York, N.Y.
Hammel, Riglander & Co., New York, N.Y.
Helenor Metals Corp., Tuckahoe, N.Y.
Holub Inds., Inc., Sycamore, Ill.
Hunter Tools, El Monte, Calif
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Ideal Industries, Inc., Sycamore, Ill.
James Elctrn. Tool Co., Palo Alto, Calif.
Janel, Inc., Stirling, N.J.
Klein, Mathias & Sons, Chicago, Ill.
MacDonald & Co., Glendale, Calif.
Philmore Mfg. Co., Richmond Hill, N.Y.
Proto Tool Co, Los Angeles, Calif.
Snap-On Tools Corp., Kenosha, Wisc.
Techni-Tool, Inc., Philadelphia, Pa.
Teledyne Kinetics, Solana Beach, Cal.
Telvac Instr. Co., Van Nuys, Cal.
Thomas & Betts Co., Elizabeth, N.J.
Triple-A Specialty Co., Chicago, Ill.
Utica Tool Co., Inc., Orangeburg, S.C.
Waldom Elctrns., Inc., Chicago, Ill.
Western Elctrn. Prods. Co., San Clemente, Cal.
Whitaker Cable Corp., N. Kansas City, Mo.
Wybar Elctrns., Inc., Syracuse, N.Y.

Wire Strippers, Thermal

American Elec. Heater, Detroit, Mich.
Contact, Inc., Hudson, N.H.
Eraser Co., Syracuse, N.Y.
Hunter Tools, El Monte, Calif
Ideal-Hellermann Can., Ltd., Ajax, Ont., Can.
Ideal Industries, Inc., Sycamore, Ill.
Janel, Inc., Stirling, N.J.
MacDonald & Co., Glendale, Calif.
Pioneer Magnetics, Santa Monica, Cal.
Techni-Tool, Inc., Philadelphia, Pa.
Teledyne Kinetics, Solana Beach, Cal.
Thomas & Betts Co., Elizabeth, N.J.
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Wybar Elctrns., Inc., Syracuse, N.Y.

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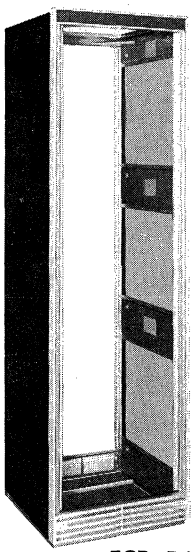

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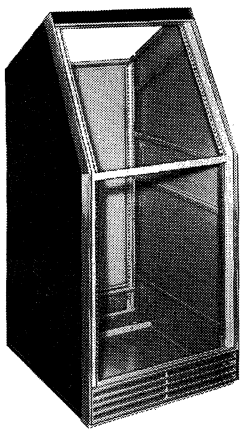

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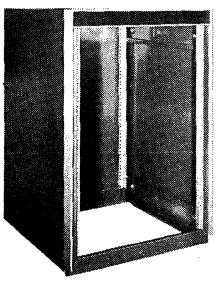

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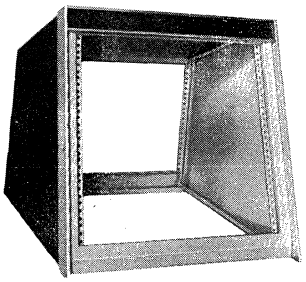

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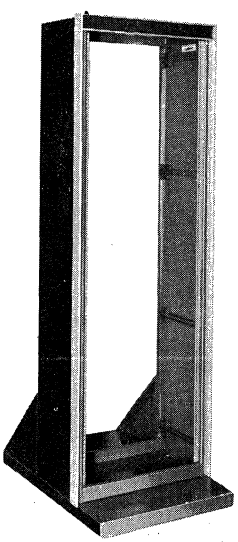

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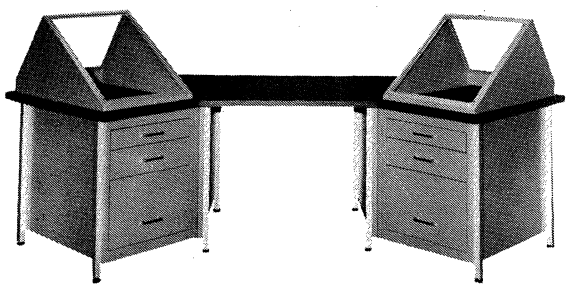

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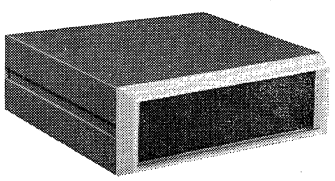

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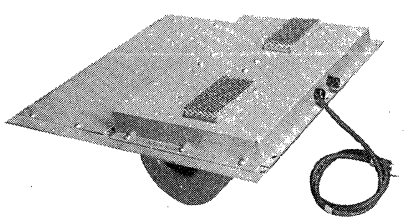

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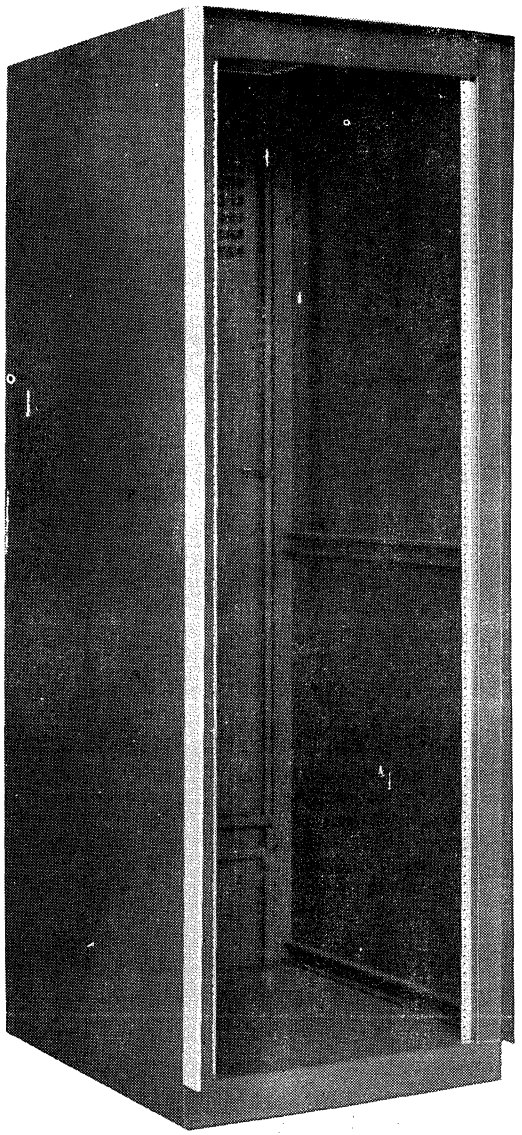

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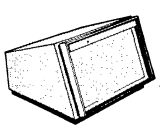

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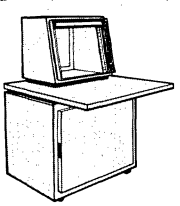

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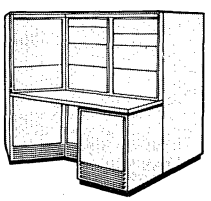

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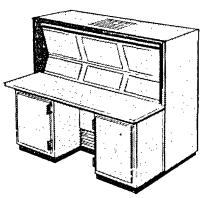

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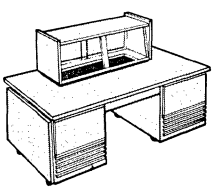

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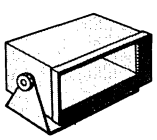

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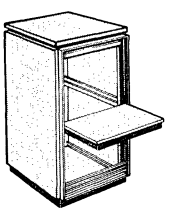

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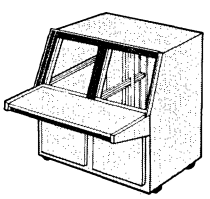

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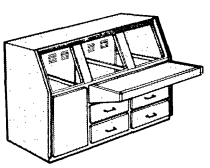

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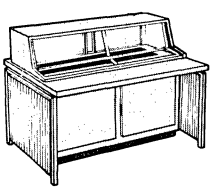

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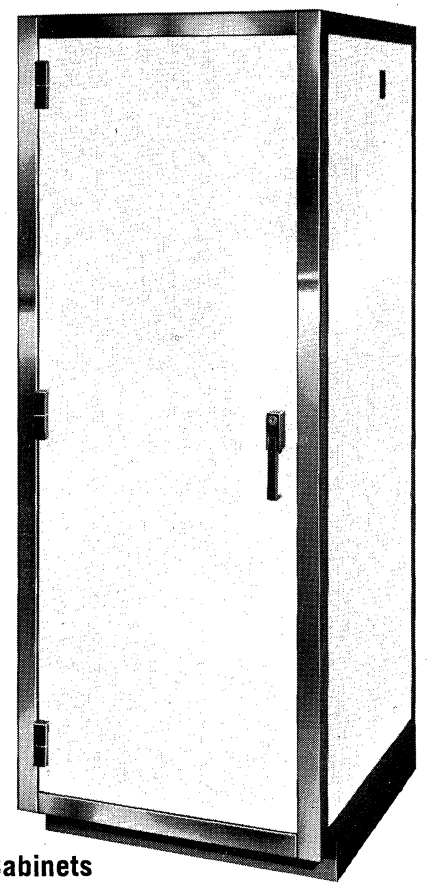

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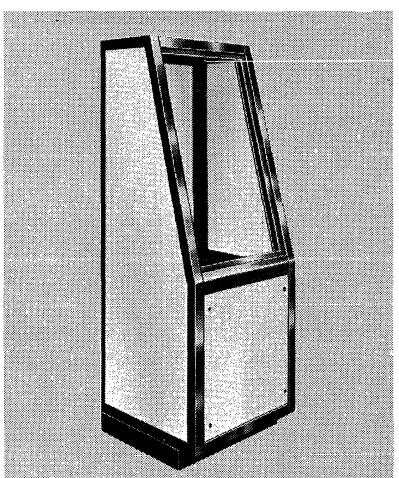
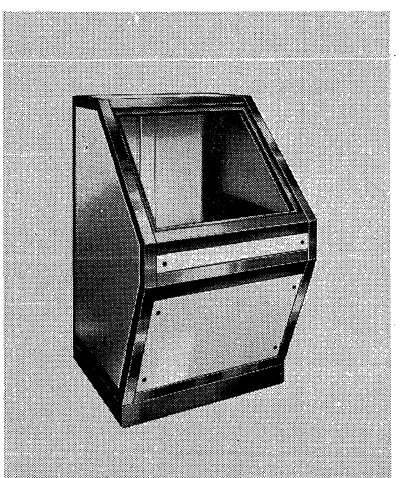
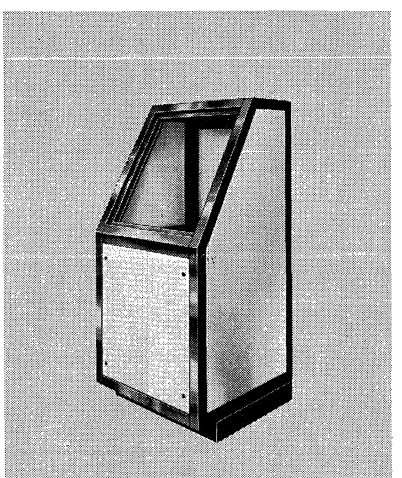


Sloped Front Vertical Racks



Machine Control Consoles



Sloped Front Consoles

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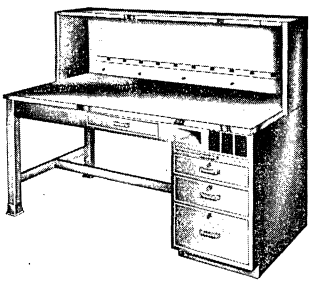

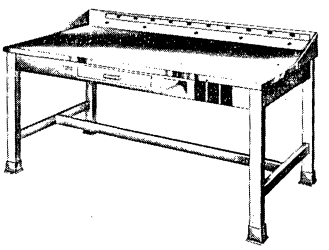

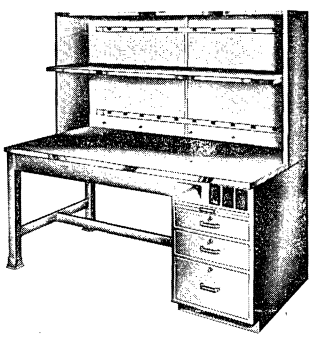

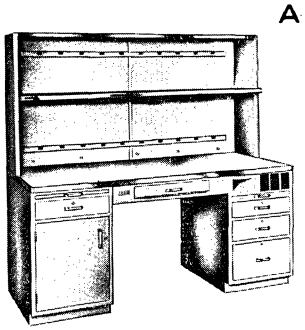

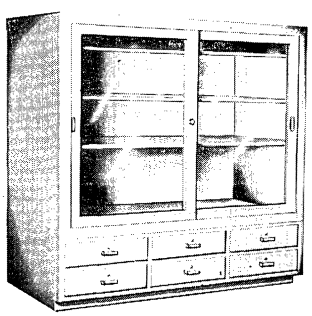

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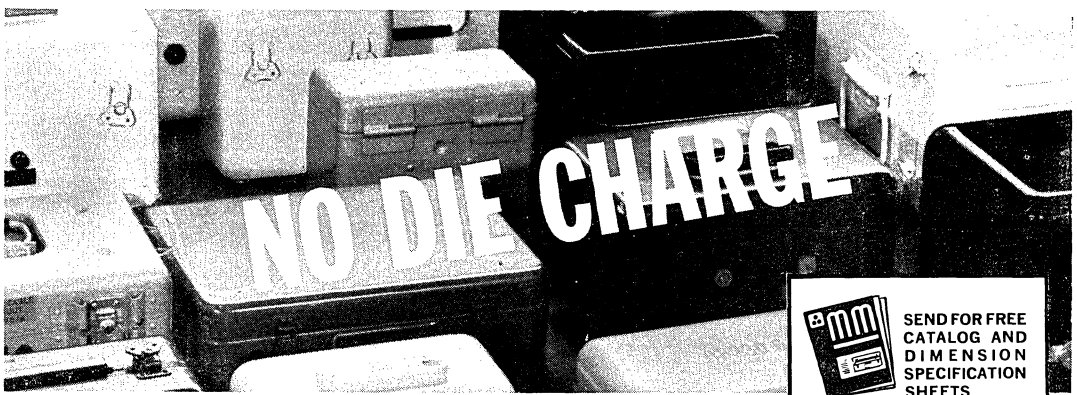

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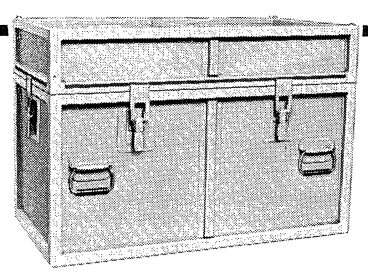

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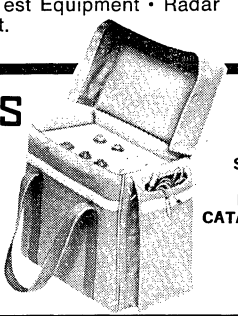

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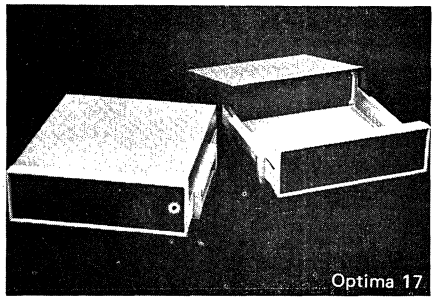
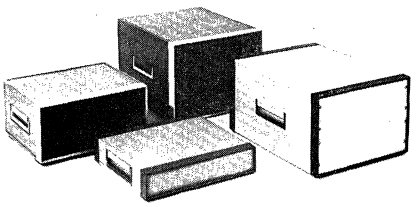
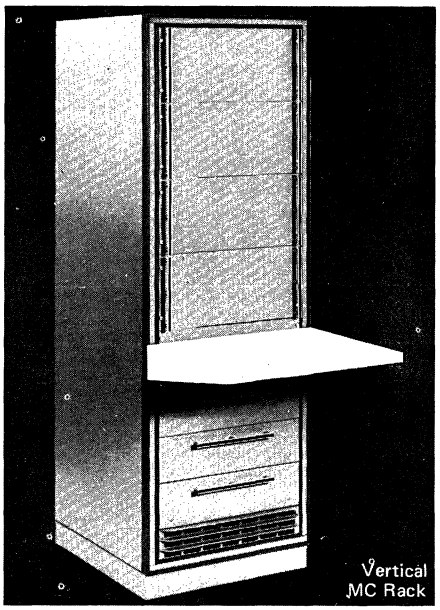
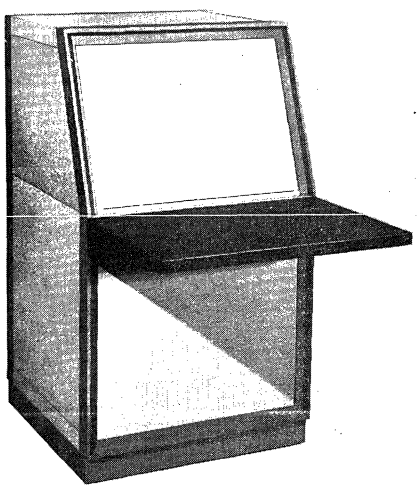


Instrument Cases

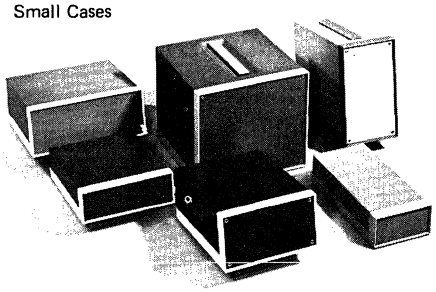


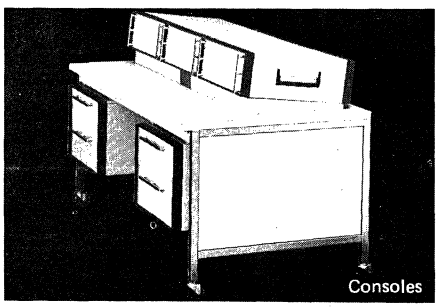


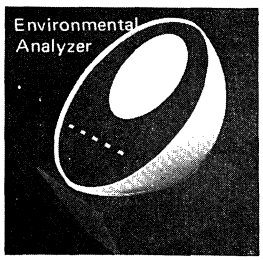
Small Cases

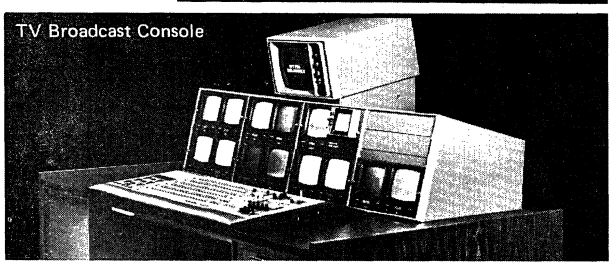


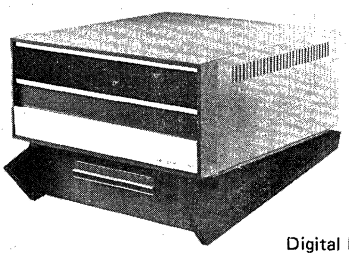
Sloped Rack



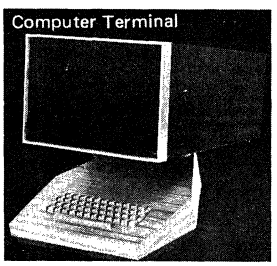








Digital Display Case



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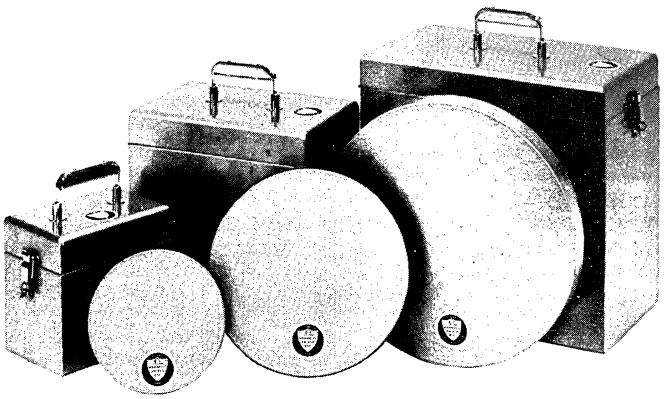
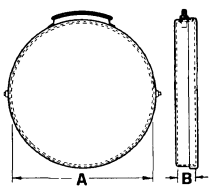
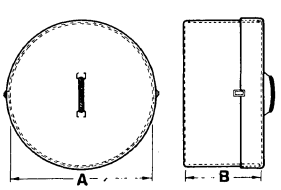
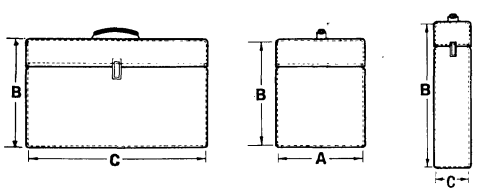


NETIC ROUND AND NETIC RECTANGULAR SINGLE AND MULTIPLE PRESERVERS





PART NUMBER	A	B	CATCH & HANDLE	CONTAINER WEIGHT
TPR 501	7¼	¾	NO	1 lb. - 1 oz.
TPR 501A	7¼	1½	NO	1 lb. - 3 oz.
TPR 502	11	⅝	NO	2 lbs.
TPR 503	11	⅞	NO	2 lbs.- 9 oz.
TPR 504	11	1½	NO	3 lbs.- 3 oz.
TPR 505	11½	5	YES	7 lbs.- 4 oz.
TPR 506	11½	7½	YES	7 lbs.-13 oz.
TPR 507	11½	13	YES	11 lbs.- 3 oz.
TPR 508	12	3½	YES	6 lbs.- 3 oz.
TPR 509	14½	⅝	NO	5 lbs.-11 oz.
TPR 510	14½	1½	YES	4 lbs.-10 oz.
TPR 511	14½	3½	YES	8 lbs.- 5 oz.
TPR 512	15	5	YES	10 lbs.-12 oz.
TPR 513	15	7½	YES	12 lbs.-10 oz.
TPR 514	15	13½	YES	16 lbs.- 7 oz.
TPR 515	20	1½	NO	13 lbs.- 6 oz.
TPR 527	14½	1¼	NO	5 lbs.



PART NUMBER	A	B	C	CONTAINER WEIGHT
TPS 550	6	6	6	4 lbs.- 1½ oz.
TPS 551	7½	7½	5	4 lbs.-13 oz.
TPS 552	7½	7½	8	6 lbs.- 5 oz.
TPS 553	7½	7½	18	10 lbs.-13 oz.
TPS 554	11½	11½	1¾	6 lbs.- 1 oz.
TPS 556	11½	11½	3½	7 lbs.- 9 oz.
TPS 557	11½	11½	7	9 lbs.- 3 oz.
TPS 558	11½	11½	13	9 lbs.- 5½ oz.
TPS 559	11½	11½	25	23 lbs.- 8 oz.
TPS 560	12	12	8	7 lbs.- 6 oz.
TPS 561	15	15	1¾	8 lbs.-14 oz.
TPS 562	15	15	3⅛	11 lbs.
TPS 563	15	15	8½	15 lbs.- 3 oz.
TPS 564	15	15	3½	11 lbs.- 8 oz.
TPS 565	15	15	5	13 lbs.
TPS 566	15	15	7	14 lbs.- 8 oz.
TPS 567	15¼	15¼	3¾	11 lbs.- 9 oz.
TPS 568	16	16	9	16 lbs.
TPS 600	20	20	20	52 lbs.
TPS 570	15	15	10½	15 lbs.-10 oz.
TPS 662	9¾	9¾	36	21 lbs.

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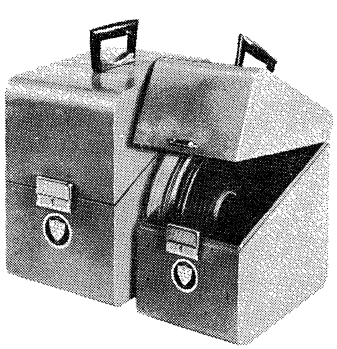
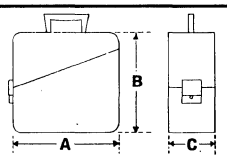
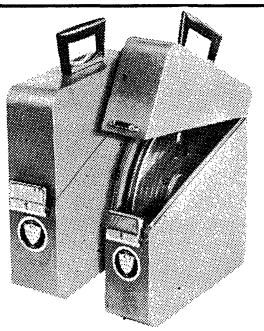


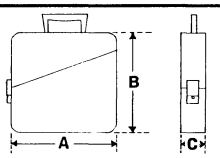
2-4 Week Delivery. Complete price lists and engineering data available on request.



the EXECUTIVE MODEL TPE 702

A compact, sophisticated tape preserver container that complements a data processing environment and features easy access and removal of tapes. Holds 5 of the standard 10½" x ½" E.D.P. tapes in plastic containers. A polyurethane foam lining is included.





the EXECUTIVE MODEL TPE 701

The same engineering and features as the model 702 are combined in the slimmer companion model . . . the 701. Designed to carry 2 of the standard E.D.P. tapes in plastic containers. It is furnished with a polyurethane foam lining as a standard feature.

PART NO.	A	B	C	LOCK	FINISH	LINER	MATERIAL
701	12"	12"	3¼"	YES	Textured Finish Blue/Grey	Polyurethane Foam	Heavy Gauge Netic S3-6 Alloy
702	12"	12"	7¾"	YES	Textured Finish Blue/Grey	Polyurethane Foam	Heavy Gauge Netic S3-6 Alloy

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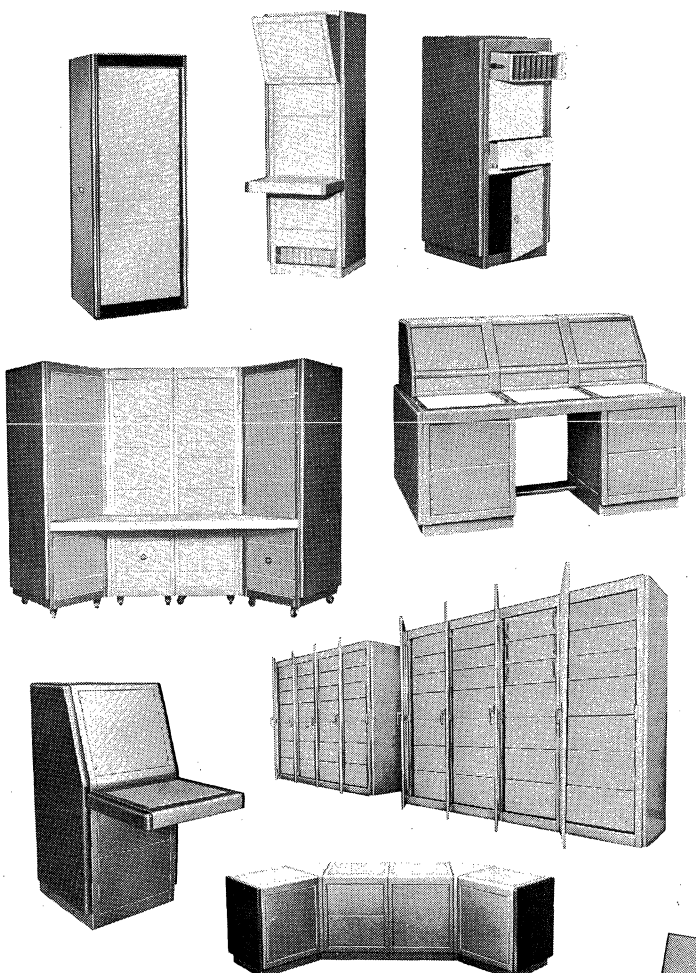
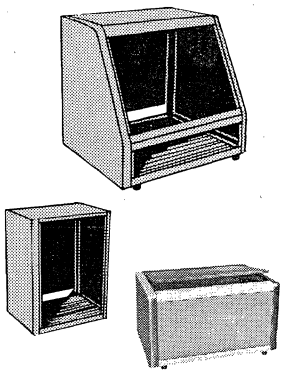
The typical assemblies shown are but a few of an extensive variety of combinations which may be planned to suit your own individual requirements.

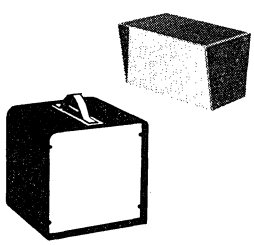
PREMIER features a wide selection of standard contemporary colors available for coordinating, contrasting or harmonizing complete assemblies.



cabinet racks

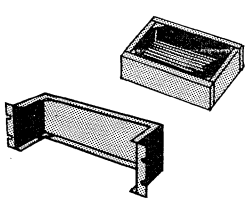


cases

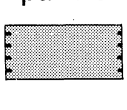


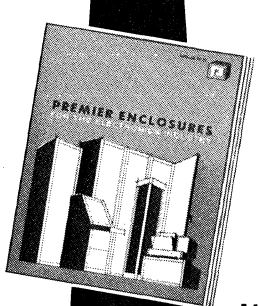
p c card files

chassis



panels





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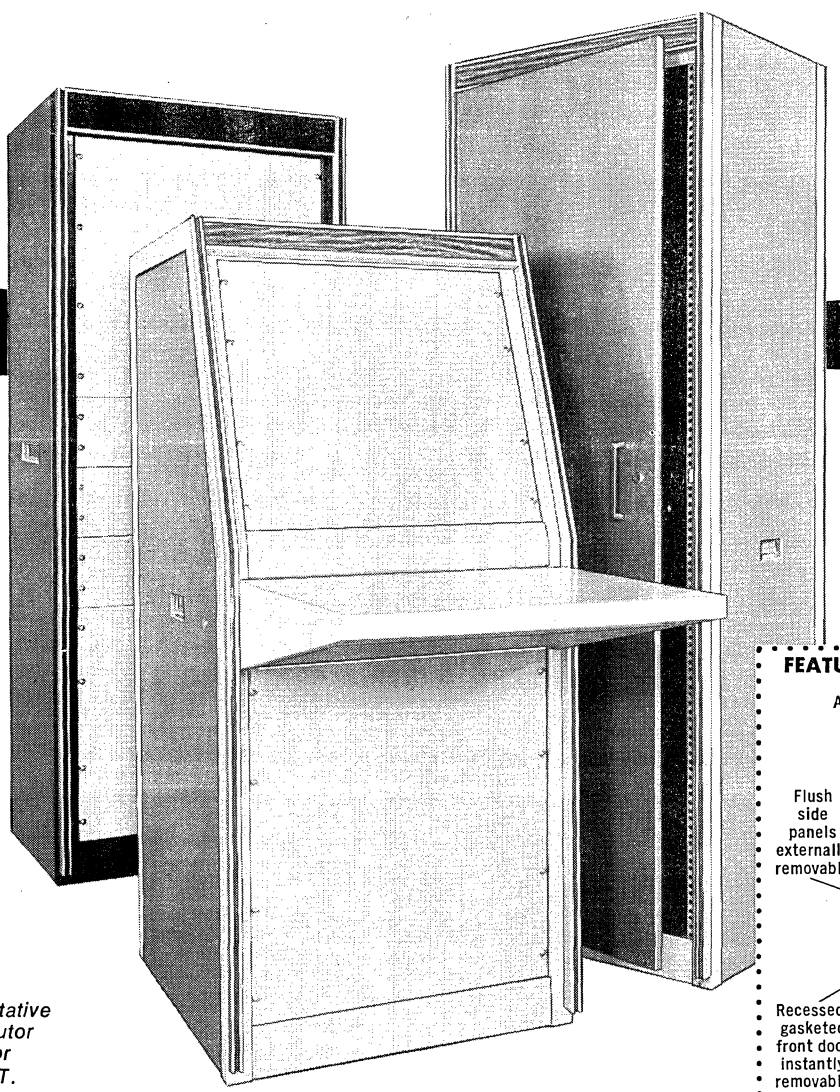

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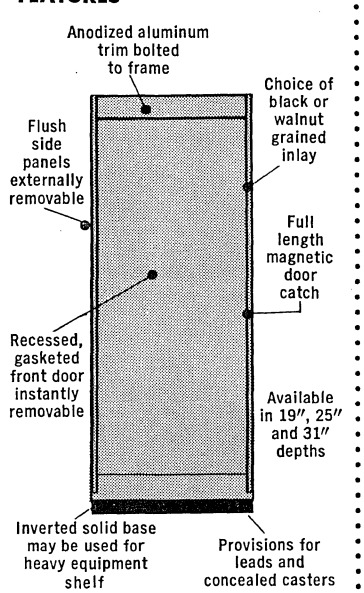
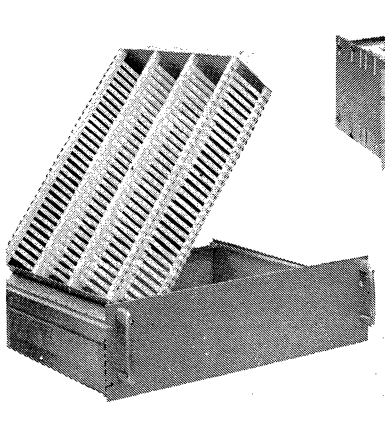
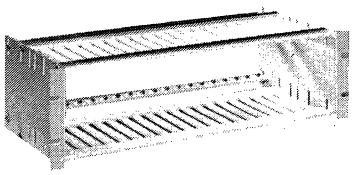
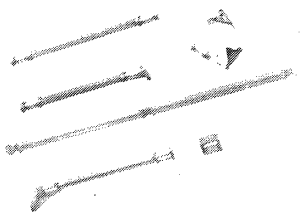
FEATURES



SCANBE PACKAGING HARDWARE







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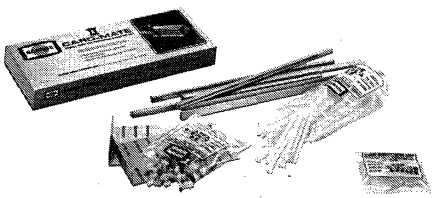
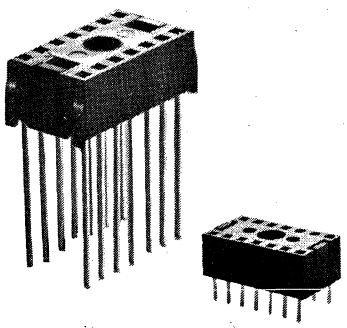
Every size, shape and configuration that's imaginable. Scanbe's packaging design engineers know how to get the job done and have the experience to prove it. We feature quality components, precise card and connector fits, and finished assemblies you will be proud of. If you are packaging P.C. cards please send for our 69 page catalog or give our application engineers a call.



DUAL IN LINE SOCKETS
14 AND 16 PIN



FEATURES: 3 LEVEL WIRE WRAP® • .025 SQUARE POSTS OR SOLDER TERMINALS • .100 x .300 PIN GRID • HIGH DENSITY P.C. BOARD MOUNTING • HIGH RELIABILITY WIPING CONTACTS • ACCEPTS FLAT OR ROUND LEAD PINS UP TO .022 DIAMETER • LOW CONTACT RESISTANCE • ANTI-CAPILLARY ACTION OF SOLDER • .020 SOLDER RELIEF • TWO PIECE BODY DESIGN • U.L. APPROVED GLASS FILLED NYLON • LATCHING CAP • EASY PIN REMOVAL • .275 LOW PROFILE BODY • TAPERED LEAD ENTRY • OPTIONAL SCREW MOUNTING • AND FOUR POST ANTI-ROCK FEATURE

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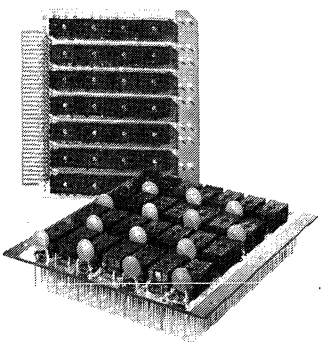
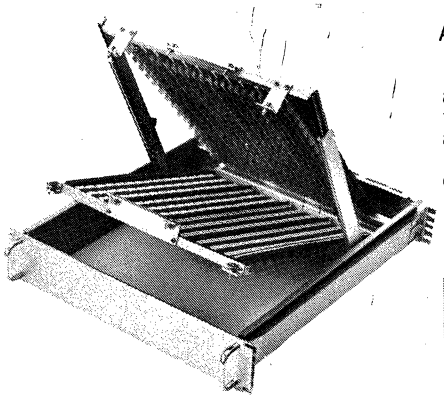
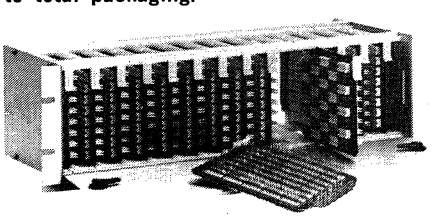


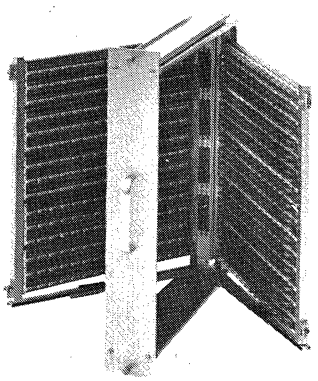
DI PAK™ DUAL INLINE PACKAGING HARDWARE



A complete hardware system for packaging of dual in-lines. Standard size carriers with DIP sockets are utilized in modular fashion to construct complete drawer assemblies in a variety of arrangements. Drawer configurations utilizing 14 and 16 pin sockets are available with up to 900 DIP's per assembly complete with I/O connector panels, power and ground planes and other hardware accessories.

Wrap Rack is an "off the shelf" P.C. Board approach to total packaging.





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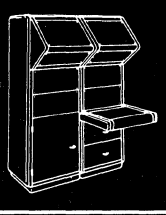

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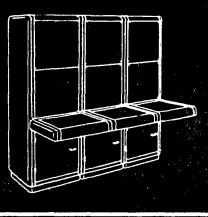

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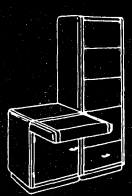

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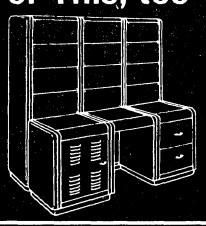

You can Design Your Own Enclosure Package

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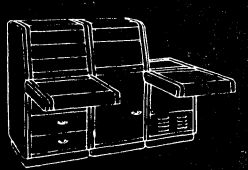

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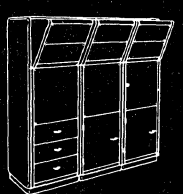
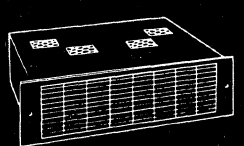
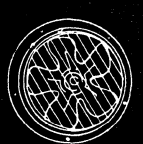


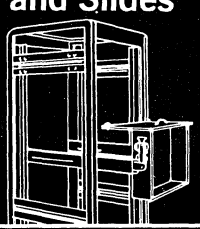
Also Blowers



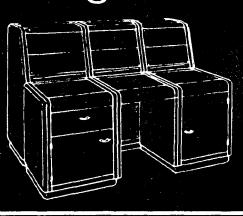
or Fans



and Slides



To go with



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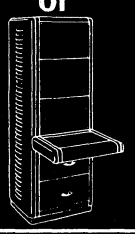

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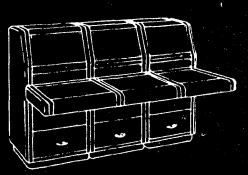

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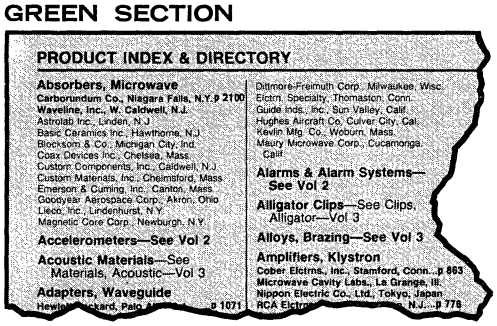
How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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RCA Electron... N.J....p 778

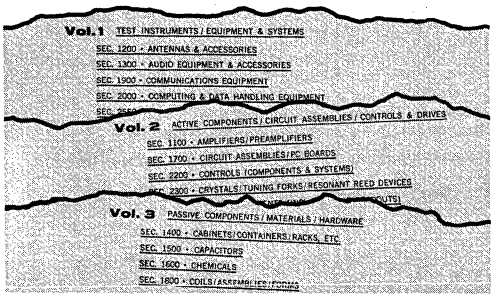
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES
SEC. 2[illegible] ...OUTS)
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

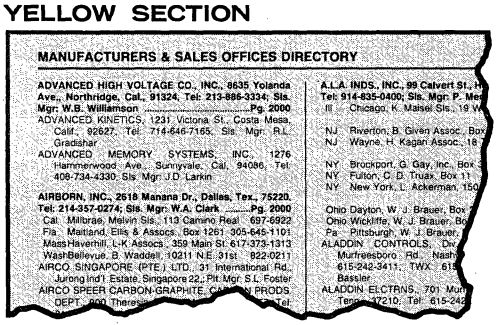
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165, Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal, 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st. 822-0211
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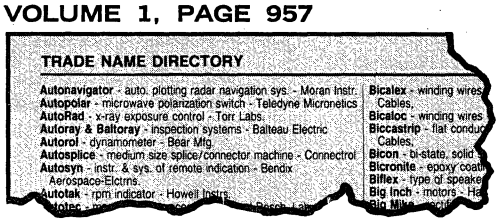
A.L.A. INDS., INC., 89 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer,...
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nashv... 615-242-2411; TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn. 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

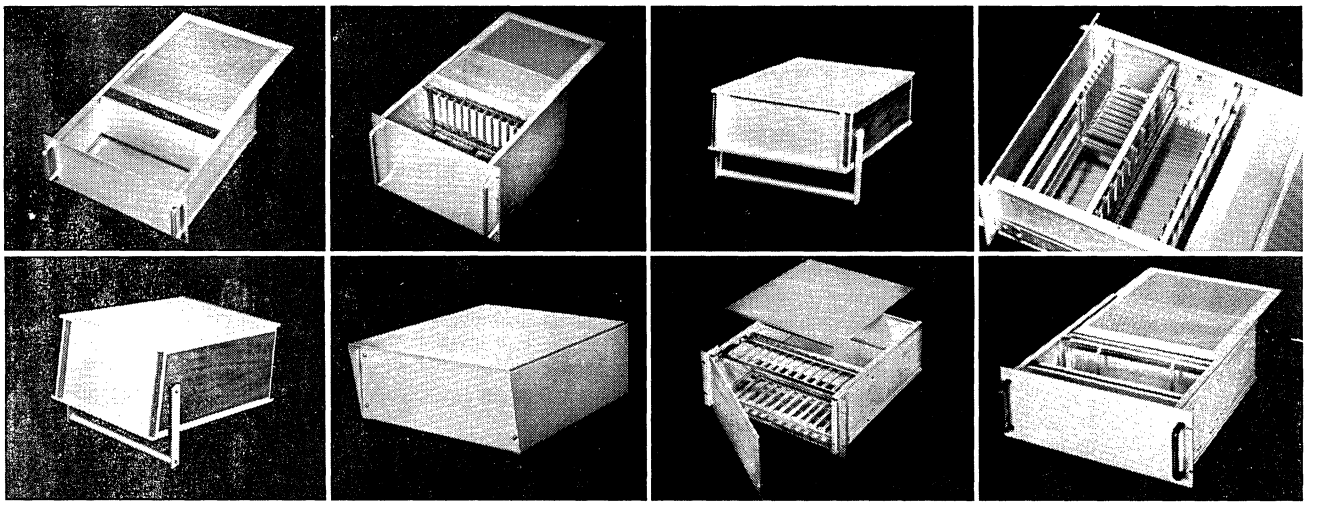
Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autorray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotes... - m... ...Rasch Lab...
Bicalex - winding wires... Cables.
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike - ...ecific...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

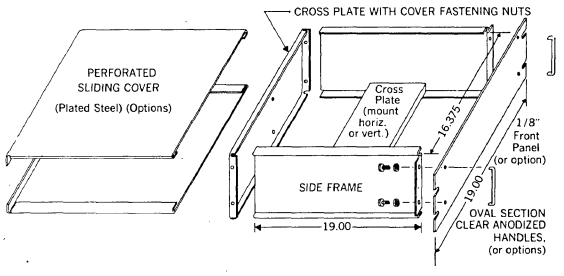
contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

OMNICLOSURE™



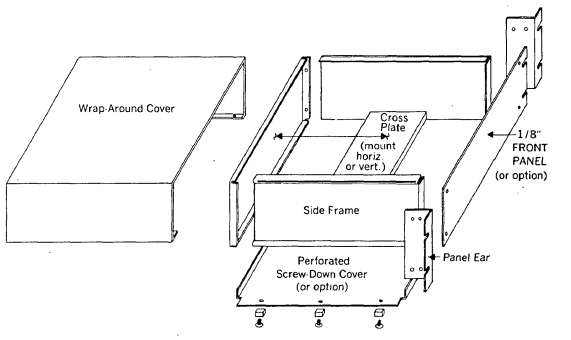
THESE ARE A FEW OF THE 4.5×10^7 CONFIGURATIONS THAT ASSEMBLE FROM OMNICLOSURE KITS AND PARTS STOCKED FOR IMMEDIATE DELIVERY ANYWHERE

PREFAB RACK-MOUNTING CHASSIS KITS AND PARTS



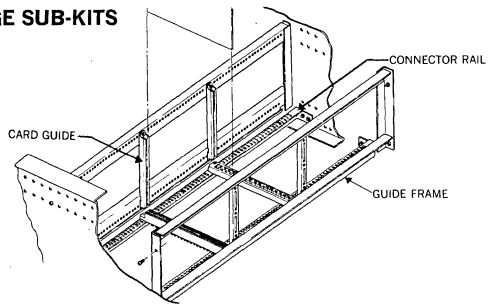
The original prefabricated chassis system. Combines breadboard flexibility, finished-product appearance, moderate prices, and immediate availability. Kits and parts stocked in six EIA heights. Features include choice of sliding or screw-down cover, and the Erector Set concept, which permits parts to be assembled in hundreds of different ways.

CONVERTIBLE BENCH/RACK KITS AND PARTS



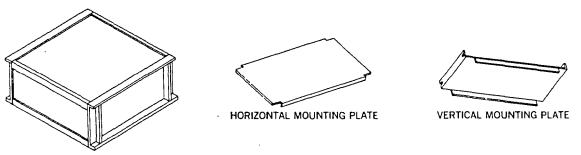
Similar to rack-mount units but self-enclosed and furnished with panel ears which detach for bench use and wrap-around cover which is removed when chassis is to be rack-mounted. Available with many options.

CARD CAGE SUB-KITS



Omniclosure rack-mounting and convertible chassis kits may be ordered with one, two or three row card cage sub-kits included. They assemble for top, front or rear access. Plastic snap-in guides eliminate time-consuming threading of guides and spacers, and permit changes to be made without disassembling the cage.

PORTABLE INSTRUMENT CABINET *Designed by Milton Sol Weiss—IDSA*



CLEAN, MODERN LOOK—Precision-framed front panel; no visible hardware on top, sides or front; choice of wood-grained vinyl trim; all aluminum clear anodized. BROAD RANGE OF SIZES—Eighteen stock sizes immediately available. ALL-ALUMINUM MODULAR CONSTRUCTION—Front, rear and sides are heavy extrusions. Sides grooved internally to accept printed circuit boards.

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VEMALINE

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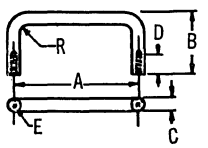
HIGHEST QUALITY—AVAILABLE FROM STOCK—MODERN RUGGED DESIGN

ROUND

Brass Polished Nickleplate	Brass Polished Chrome	Brass Black Oxide	Aluminum Black Alumilite	Aluminum Clear Satin Anodize	Alum. Black Satin Anodize	Alum. Black Vinyl Coated	Alum. Gray Vinyl Coated	Alum. Yellow Vinyl Coated	Stainless Steel	A	B	C	D	E	R
NP00	CP00	B000	ABA00						SS00	8	1½	5/16	5/8	10-32	5/16
NP 0	CP 0	BO 0	ABA 0						SS 0	9	1¾	5/16	5/8	10-32	5/16
NP 1	CP 1	BO 1	ABA 1						SS 1	6½	1¾	5/16	5/8	10-32	5/16
*NP 2	CP 2	BO 2	ABA 2						SS 2	6 7/16	1¾	5/16	5/8	10-32	5/16
NP 3	CP 3	BO 3	ABA 3						SS 3	6	1½	5/16	5/8	10-32	5/16
NP 4	CP 4	BO 4	ABA 4						SS 4	5½	1½	5/16	5/8	10-32	5/16
*NP 5	CP 5	BO 5	ABA 5						SS 5	4 9/16	1½	5/16	5/8	10-32	5/16
NP 6	CP 6	BO 6	ABA 6						SS 6	4½	1½	5/16	5/8	10-32	5/16
NP 7	CP 7	BO 7	ABA 7						SS 7	4¼	1½	5/16	5/8	10-32	5/16
NP 8	CP 8	BO 8	ABA 8						SS 8	4	1½	5/16	5/8	10-32	5/16
*NP 9	CP 9	BO 9	ABA 9						SS 9	3	1½	5/16	½	10-32	5/16
NP 10	CP 10	BO 10	ABA 10						SS 10	2	1 5/16	5/16	7/16	8-32	5/16
NP 11	CP 11	BO 11	ABA 11						SS 11	2	5/8	3/16	¼	6-32	1/8
			ABA 12	SPECIFY WITH FERRULES ON ORDER IF REQUIRED						4	1 7/8	3/8	5/8	10-32	3/8
			ABA 13							6½	1¾	3/8	5/8	10-32	3/8



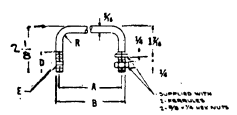
ROUND 30° OFFSET

AVAILABLE IN SAME SIZES AND MATERIALS AS THE STRAIGHT ROUND ABOVE. SUFFIX ROUND PART NO. WITH "-30".

(½" (D) THD. DEPTH)

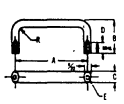
HEAVY DUTY

14-1	Brass	N.P.								4 1/4	4 5/16	5/16	13/16	5/16-18	5/16
14-2	Brass	N.P.								6	6 5/16	5/16	13/16	5/16-18	5/16
14-3	Brass	N.P.								9	9 5/16	5/16	13/16	5/16-18	5/16
14-4	Aluminum Black Anodize									4 1/4	4 5/16	5/16	13/16	5/16-18	5/16
14-5										6	6 5/16	5/16	13/16	5/16-18	5/16
14-6										9	9 5/16	5/16	13/16	5/16-18	5/16

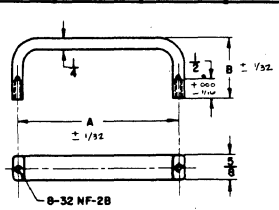


OVAL

NP 12	CP 12	BO 12	OBA 12	OCA 12						3	1 9/32	5/8	3/8	10-32	½
NP 13	CP 13	BO 13	OBA 13	OCA 13						4	1¾	5/8	½	10-32	½
NP 14	CP 14	BO 14	OBA 14	OCA 14						4 5/16	1½	5/8	½	10-32	½
NP 15	CP 15	BO 15	OBA 15	OCA 15						6 7/16	1¾	5/8	½	10-32	½
NP 16	CP 16	BO 16	OBA 16	OCA 16						9	1¾	5/8	½	10-32	½



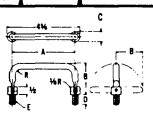
FLAT



				FCA 0	FBA 0	BV0	GV0	YV0		9	1¾	5/8	½	8-32	½
				FCA 1	FBA 1	BV1	GV1	YV1		6½	1¾	5/8	½	8-32	½
				FCA 2	FBA 2	BV2	GV2	YV2		6 7/16	1¾	5/8	½	8-32	½
				FCA 3	FBA 3	BV3	GV3	YV3		6	1½	5/8	½	8-32	½
				FCA 4	FBA 4	BV4	GV4	YV4		4 5/16	1½	5/8	½	8-32	½
				FCA 5	FBA 5	BV5	GV5	YV5		4½	1½	5/8	½	8-32	½
				FCA 6	FBA 6	BV6	GV6	YV6		4¼	1½	5/8	½	8-32	½
				FCA 7	FBA 7	BV7	GV7	YV7		4	1½	5/8	½	8-32	½
				FCA 8	FBA 8	BV8	GV8	YV8		3	1½	5/8	½	8-32	½
				FCA 9	FBA 9	BV9	GV9	YV9		2	1½	5/8	½	8-32	½

ROUND FOLDING

76-1 —FOLDS TO ONE SIDE (90°)
76-2 —FOLDS TO ONE SIDE (90°)
77-1 —FOLDS TO BOTH SIDES (180°)
77-2 —FOLDS TO BOTH SIDES (180°)

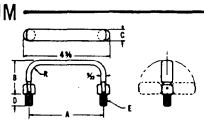


4	1 27/32	5/8	5/8	3/8-24	3/8
4	1 27/32	5/8	5/8	3/8-24	3/8
4	1 27/32	5/8	5/8	3/8-24	3/8
4	1 27/32	5/8	5/8	3/8-24	3/8

ALSO AVAILABLE IN ALUMINUM

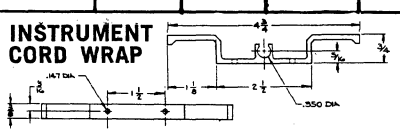
OVAL FOLDING

78-1 —FOLDS TO ONE SIDE (90°)
78-2 —FOLDS TO ONE SIDE (90°)
79-1 —FOLDS TO BOTH SIDES (180°)
79-2 —FOLDS TO BOTH SIDES (180°)



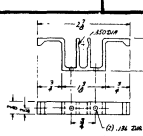
4	1 27/32	5/8	5/8	3/8-24	½
4	1 27/32	5/8	5/8	3/8-24	½
4	1 27/32	5/8	5/8	3/8-24	½
4	1 27/32	5/8	5/8	3/8-24	½

INSTRUMENT CORD WRAP



CA81

CA95



IRRIDITE. OTHER FINISHES AVAILABLE.
ALUMINUM 6063T5

*1 MIL TYPE MS 39087 *2 Clear Anodized Mounting Plate **SIZES OTHER THAN LISTED ABOVE AVAILABLE ON SHORT NOTICE**

MATERIALS

BRASS—HALF HARD PER QQ-B-626A COMP 22

ALUMINUM—PER QQ-A-325 TEMP T6 (6061-T6)

STAINLESS STEEL PER QQ-S-763A CLASS 7 TYPE A

FINISHES

POLISHED NICKLEPLATE—PER QQ-N-290 CLASS 1
BLACK OXIDE—PER MIL-F-495a
POLISHED CHROMIUM PLATE

BLACK ANODIZE (ALUMILITE) MIL-A-8625a
CLEAR ANODIZE PER MIL-A-8625a

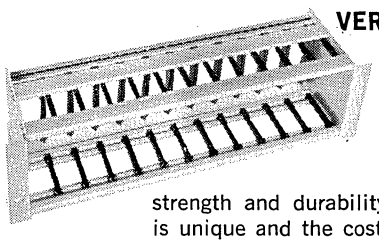
PASSIVATE PER MIL-F-14072

VEMALINE PRODUCTS COMPANY, INC.
WYCKOFF, NEW JERSEY / PHONE (201) 891-3200

NEW *Fast, Simple and Economical* COMPLETE PACKAGING SYSTEMS *From* VERO

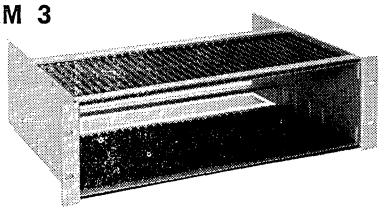
VERO INTRODUCES THE ULTIMATE PC CARD FRAMES • VERORACK SYSTEM 3

VERORACK SYSTEM 3



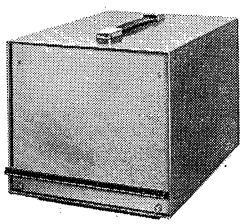
The ultimate PC card frame featuring variable card spacing from .4" up. This rack combines beauty, strength and durability. Connector mounting is unique and the cost is low.

VERORACK SYSTEM 3



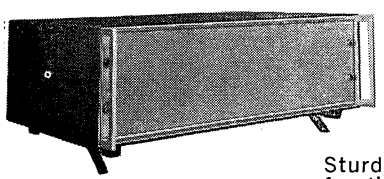
Features standard .5" card spacing with noryl guide slabs that slide with precision extrusions. This rack is versatile, rigid and low in assembly cost. It accepts cards any length and up to 4½" high in 5¼" frame. Other frame heights are also available.

VERO MODULE CASES



A line of Portable Module Cases has been designed for use in conjunction with standard modules from the Vero Module Rack. The cases are available in three heights, 5¼", 7" and 8¾" and in four standard widths, 4", 6", 8" and 16". Guides are included for Single or Multiple Module Mounting.

VERO INSTRUMENT CASE



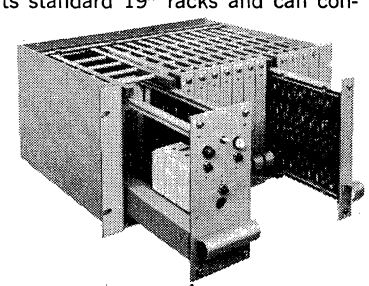
An attractive new range of of instrument cases available in heights from 3½" to 10½" to accept 19" wide racks. Sturdy construction and functional design are featured.

VERO MODULE RACK

OVER 450 ASSEMBLY COMBINATIONS — DELIVERY FROM STOCK — GREATEST FLEXIBILITY AT LOWEST COST

The Vero Module Assembly — another phase of the Vero circuit concept — provides a fast, simple and inexpensive method of circuit packaging.

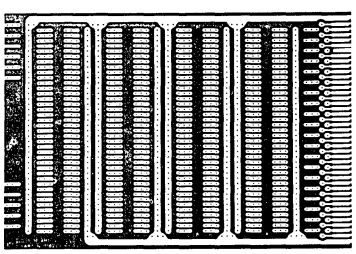
The Vero principle of versatile standardization has produced a module which fits standard 19" racks and can contain any combinations of 1", 2", 4", 8" or 16" pull out modules. It is available in 5¼", 7" or 8¾" heights and 11" or 14" depths.



This rugged ⅛" aluminum units is also available as a composite of modules and printed circuit cards for the ultimate in flexible circuit assembly.

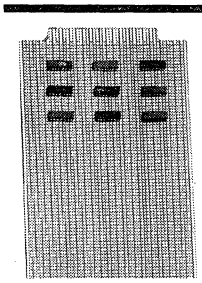
VERO D.I.P. BOARD

FOR DUAL IN-LINE I.C. PACKAGES



- .1 x .1 hole pattern with .041 dia. holes
- Accepts D.I.P. socket or direct I.C. plug in
- Gold plated contacts with connectors to match
- Boards available in epoxy glass 1/16 thick or low cost paper
- Complete versatility with continuous isolated pads on .1 centers holds 20 D.I.P.s on 4.5 x 6.5 board
- Power and ground buss plus test points all on one side of board
- Reverse side printed with grid to ease component location
- Vero handle location indicated

VEROBOARD*



Hole Patterns — .050 x .050, .1 x .1, .150 x .150, .156 x .1, .2 x .2, .2 x .1.

Over 200 Standard Sizes — Single and Double Sided x-y pattern.

Material — XXXP and FR-4 Epoxy Glass.

*Patented.

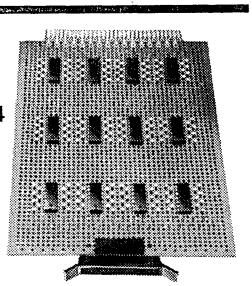
VERO "FINGER BOARDS"

Hole Patterns — .1 x .1, .052 dia.

Material — 1/16 Epoxy Glass, FR-4.

Connector Fingers — 22 x .156, 44 x .156, 40 x .1, 32 x .1, 80 x .1.

OFF THE SHELF IN SIZES TO FIT ALL CARD FILE SYSTEMS



COMPLETE RANGE OF CONNECTORS, TERMINAL PINS, MODULE CASES AND ACCESSORIES. BASIC VERO SYSTEMS CAN BE QUICKLY MODIFIED TO MEET CUSTOMER REQUIREMENTS.

vero

VERO ELECTRONICS INC.

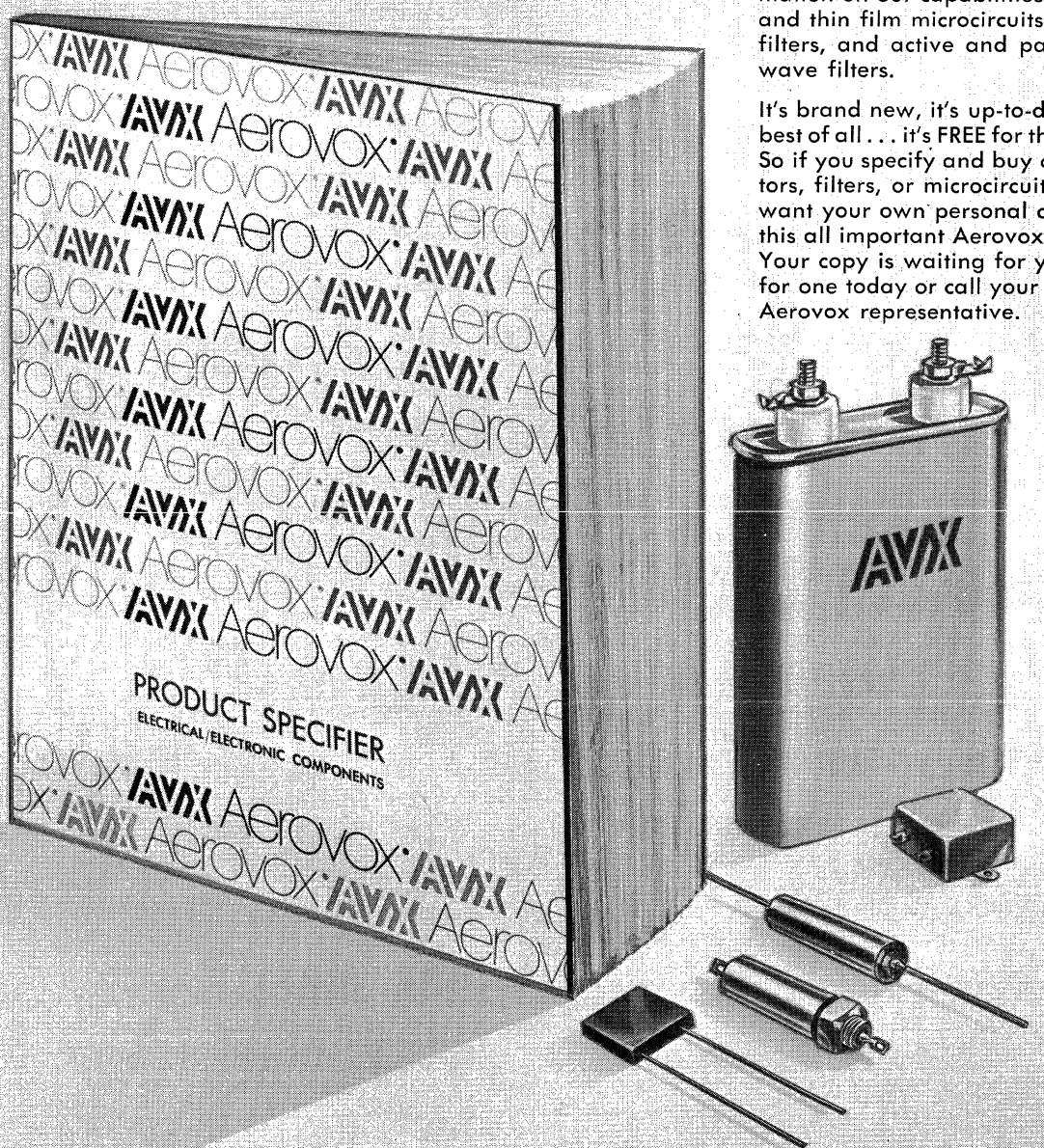
171 Bridge Rd., Hauppauge, N.Y. 11787 • Tel: 516-234-0400 • TWX: 510-227-8890

with what we know about capacitors we could write a book...

so we did!

If you specify or buy capacitors you'll find the Aerovox Product Specifier for Electrical and Electronic Components the handiest thing that's come off the press since money. Between the covers we've included basic technical data, application data, Mil Spec and industry data along with detailed product information on multi-layer ceramic, paper, film, mica, oil filled, high voltage, SCR, EDC, feed-thru, disc and high voltage multiplier capacitors. In addition we have included technical information on our capabilities in thick and thin film microcircuits, RFI/EMI filters, and active and passive wave filters.

It's brand new, it's up-to-date and best of all . . . it's FREE for the asking. So if you specify and buy capacitors, filters, or microcircuits, you'll want your own personal copy of this all important Aerovox catalog. Your copy is waiting for you; write for one today or call your local Aerovox representative.



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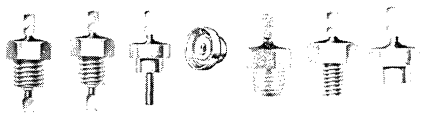
ALLEN-BRADLEY

Milwaukee, Wisconsin 53204

Ceramic Disc Type Feed-Thru and Stand-Off Capacitors.



For complete information write for Publication 5409.

GENERAL SPECIFICATIONS

AMBIENT TEMPERATURE—
−55°C to +85° C

CORROSION RESISTANT AND NON-MAGNETIC—All metal parts including hardware are made of corrosion resistant non-magnetic materials which pass MIL-STD-202 salt spray tests.

PARALLEL RESONANCE—None of the feed-thru capacitor types will exhibit parallel resonance effects at frequencies of 1,000 MHz or less, regardless of capacitance value.

CAPACITANCE VALUES AND TOLERANCES (STANDARD)—470 pF ±20 percent and 1,000 pF GMV (−0, +100 percent).

(SPECIAL)—6.8 pF to 1,000 pF inclusive in EIA or MIL nominal values. Tolerances: ±10 percent, ±20 percent or GMV (−0, +100 percent) depending upon nominal capacitance value.

MAXIMUM CONTINUOUS WORKING VOLTAGE — 500 volts dc all types except uninsulated FW5N- 300 volts dc. Derate linearly from maximum rating at −85°C to 50 percent rating at +125°C, all types.

MAXIMUM DIELECTRIC WITHSTANDING VOLTAGE—1,250 volts dc for all types except uninsulated FW5N- 600 volts dc. Applied for 5 seconds, with surge current limited to 50 milliamperes maximum in all cases.

INSULATION RESISTANCE—More than 100,000 megohms at +25°C for all types and all values, after 2 minutes at maximum continuous working voltage.

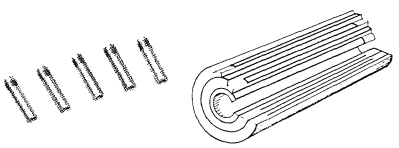
DISSIPATION FACTOR—Less than 2 percent at 1 KHz for all types and all values. "Q" more than 50.

STANDARD CONDITIONS—Unless otherwise specified, all measurements are understood to be made at normal atmospheric pressure; a relative humidity of 50 ±2 percent; an ambient temperature of +25° ±1°C; a frequency of 1 kHz; and 2.5 VRMS maximum.

MILITARY SPECIFICATIONS — Meet or exceed the applicable requirements of MIL-C-11015.

Multi-Layer Feed-Thru Capacitors–Type CL.

These feed-thru capacitors reflect Allen-Bradley's total capability in ceramic processing. Consisting of concentric layers of a proprietary ceramic formulation and noble metal electrodes, they are fired to produce true monolithic structures impervious to moisture and contamination. The concentric structure yields a low inductance when compared to conventional rolled dielectric capacitors. These non-polar capacitors are extremely small, light in weight, and have a high dielectric strength. Maximum operating temperature is 125°C, with no voltage derating. They are ideally suited for by-pass filtering, especially in connectors and filter-block assemblies.



For complete information write for Publication 5411.

GENERAL SPECIFICATIONS

VOLTAGE-TEMPERATURE CHARACTERISTICS—
+65 percent, −65 percent at 0 volts
+35 percent, −90 percent at rated voltage

DISSIPATION FACTOR—Maximum 4 percent at 0.1 VRMS, 25°C, 1 kHz.

TEMPERATURE RANGE —55°C to +125°C.

MINIMUM INSERTION LOSS IN dB* (Per MIL-STD-220)

Nominal Capacitance (In μF)	FREQUENCY						
	30 KHz	50 KHz	100 KHz	1 MHz	10 MHz	100 MHz	1 GHz
0.05	—	—	—	16	33	45	50
0.08	—	—	—	20	36	47	55
0.09	—	—	—	20	36	48	56
0.12	—	—	—	24	41	50	60
0.3	—	8	13	32	47	60	72
1.0	10	15	20	40	52	70	80

*At rated DCWV over the operating temperature range of -55°C to +125°C insertion loss is typically 6 dB less. For capacitance values other than the above, please contact your local Allen-Bradley representative.

PARAMETERS	TYPE DESIGNATION							
	CL001 DA503P	CL002 DA503P	CL003 DA903P	CL003 HA503P	CL004 HA124P	CL005 HA803P	CL006 BA304P	CL007 BA105M
DC Working Voltage (DCWV)	100	100	100	200	200	200	50	50
Capacitance, μF at 0.1 VRMS, 25°C, 1 KHz	0.05 GMV	0.05 GMV	0.09 GMV	0.05 GMV	0.12 GMV	0.08 GMV	0.3 GMV	1.0 ±20%
Dielectric Withstanding Voltage; VDC, 1 sec., Charging Current <50 ma.	300	300	300	600	600	600	150	150
Minimum Insulation Resistance, megohms, at DCWV, 25°C, 2 min., Charging Current <50 ma.	10,000	10,000	5,500	10,000	4,000	6,000	1,200	700

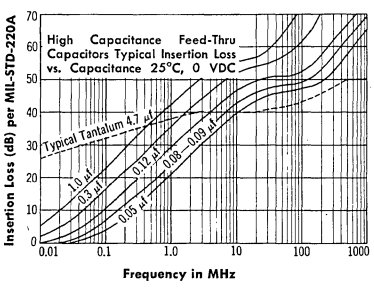
Multi-Layer Feed-Thru Capacitors–Types MT and MS.

These new non-polar multi-layer Allen-Bradley capacitors are extremely small, light weight, and have high dielectric strength and reliability. Their concentric structure yields a low inductance when compared to conventional rolled dielectric capacitors. Maximum operating temperature is +125°C with no voltage derating. They are ideally suited for by-passing, filtering, and coupling.

For complete information write for Publication 5414.

ELECTRICAL CHARACTERISTICS

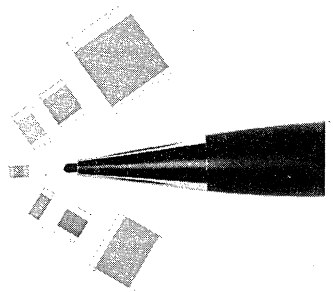
PARAMETER	TYPE	
	MT	MS
DC Working Voltage (DCWV)	50, 100	50, 100
Capacitance, μF at 0.1 VRMS, 25°C, 1 kHz.	0.05, 0.3, 1.0	0.05, 0.3, 1.0
Maximum Dissipation Factor at 0.1 VRMS, 25°C, 1 kHz.	4 percent	4 percent
DC Feed-Thru Current (amps)	10	10
Operating Temperature Range	−55°C to +125°C	−55°C to +125°C
Minimum Insulation Resistance at DCWV, 25°C, with 2 minute charging current less than 50 milliamperes	500 ohm-Farad	500 ohm-Farad



Ceramic Chip Capacitors–Type MB.

Allen-Bradley Type MB ceramic chip capacitors are ideally suited for hybrid circuit design. Their small uniform size, convenient TC's, ease of bonding, and availability of numerous dielectric materials make them applicable for most thick and thin film applications. Range of the Type MB capacitor is 10.0 pF to 1.0 μF. They are available in standard EIA and MIL sizes and standard capacitance values. Temperature range is −55°C to +125°C. Standard voltage ratings are 50, 100, and 200 volts dc with no voltage derating over the temperature range. Capacitance tolerances are ±10 percent, ±20 percent, and GMV. The monolithic chips come in NPO (COG), stable (X7R), semi-stable (X7S), and Hi-K (X7U) materials. They are supplied with silver terminals, with an optional solder coat. Special sizes are available on request.

For complete information write for Publication 5415.



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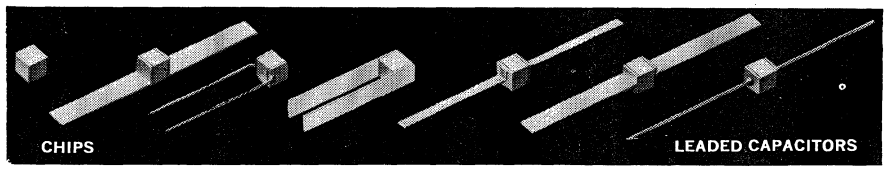
ATC UHF/MICROWAVE PORCELAIN



ATC UHF/MICROWAVE CHIP CAPACITORS

ATC-100 UHF/MICROWAVE PORCELAIN CHIP CAPACITORS

ATC Microwave Porcelain Capacitors are designed to advance the state-of-the-art in broadband, high power and low noise applications. Unique construction techniques provide ultra-high unloaded-Q (10,000 at 100 MHz in a 10 PF unit), with loss tangents lower than 0.0001, and self-resonance up to 15 GHz depending upon capacitor value and case type.

ATC 100 porcelain material exhibits no instability with voltage, time or frequency, contrary to common NPO and high dielectric-constant ceramics. There is no measurable piezoelectric effect, no aging, and no retrace hysteresis, or drift. Close tolerances of 1%, or better, are available, and unlike NPO's ATC Microwave porcelain retains a high insulation resistance at high temperatures. This material is specifically designed for use at high RF voltage and current all the way up through microwave frequencies. ATC-100 Case B is recommended for use up to 1 GHz, above which ATC-100 Case A is recommended.

Superior metallization, which prevents leaching off by soft solders, or epoxies, provides durable terminations under adverse soldering conditions. Other noble metals also available for special mounting, or with eutectics, or wire bonding. Special construction techniques provide extremely high packaging density with high reliability and high working voltage. Units are completely hermetically sealed by virtue of their basic construction, thus eliminating need for any encapsulant. Microwave porcelain is an extremely dense, low-loss material, impervious to penetration by atmospheric conditions or solvents. Exceptionally low inductance gives reliable wideband operation as a capacitor up to X-Band in capacitance values as large as 20 pF. Exceptionally close control over physical construction makes possible very high RF or DC voltage levels, plus low-loss, high power capability.

CHARACTERISTICS

UHF/MICROWAVE

INSERTION LOSS: Less than 0.03 dB @ 10 watts @ 1 GHz
QUALITY FACTORS: (Qu) Greater than 10,000 @ 100 MHz (10 PF)
GUARANTEED MINIMUM QUALITY FACTOR: @ 1 MHz = 10,000
SELF-RESONANT FREQUENCY: DC up to 20 GHz
VSWR: CASE B — 1.05:1 for typical non-ceramic substrates
CASE A — 1.1:1 for 25 Mil thick alumina substrates

S-PARAMETERS
Complete S-Parameter, VSWR, and Insertion Loss data is available, upon request, from 100 MHz through 3 GHz. Test data provided by a Hewlett Packard 8542A, computer controlled, synthesizer-referenced, phased-locked, network analyzer.

ELECTRICAL

TEMPERATURE RANGE: From —55°C to 125°C (no derating of working voltages)
From 125°C to 200°C derate linearly to 50% @ 200°C
TEMPERATURE COEFFICIENT OF CAPACITY: + 90 ± 20 PPM/°C (—55°C to 125°C) @ 1 MHz
CAPACITY RANGE, INSULATION RESISTANCE, AND OPERATING VOLTAGE (WVDC) BY CASE SIZE
CASE A: .1 PF to 100 PF (50 WVDC);
10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
CASE B: .1 PF to 47 PF (1000 WVDC)*;
10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
.1 PF to 100 PF (500 WVDC);
10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
110 PF to 200 PF (300 WVDC);
10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
220 PF to 470 PF (200 WVDC);
10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
510 PF to 1000 PF (100 WVDC)
10^5 Megohms Min @ 25°C, 10^4 Megohms Min @ 125°C
*Special Order
DIELECTRIC TEST VOLTAGE: All units tested at 250% of WVDC rating for 5 secs.
RETRACE: Less than 0.1%
PIEZO ELECTRIC EFFECTS: None
CASE SIZE: A 50 mil cube
B 110 mil cube

ATC-700 ULTRA-STABLE CERAMIC CHIP CAPACITORS

ATC ultra-stable NPO ceramic is rated for extremely high stability with temperature (TC = 0 ± 30 PPM/°C). Environmental resistance approaches that of porcelain types, even without encapsulation. Composition and construction techniques provide moderately high Q at moderate cost. Especially useful for low frequency tuned circuits where high stability with temperature is required. Practical for low power handling (less than 2 watts) where X_c is less than 1. Ohm max. ATC-700 is 1/10 the size of conventional NPO capacitors of equivalent capacitance and voltage ratings.

ELECTRICAL

CAPACITY RANGE BY CASE SIZE: CASE A, 47 PF to 470 PF;
CASE B, 200 PF to 4700 PF

TEMPERATURE COEFFICIENT OF CAPACITY: 0 ± 30 PPM/°C (—55°C to 125°C)

QUALITY FACTOR: 2000 @ 1 KHz

INSULATION RESISTANCE: 10^5 megohms min @ 25°C

ATC-200 HIGH PACKAGING DENSITY CERAMIC CHIP CAPACITORS

ATC-200 UHF ceramic is designed for by-passing applications where high packaging density is required with good insulation resistance, environmental resistance, and moderate temperature stability. Suitable for use through UHF frequencies in low power, DC block, applications.

ELECTRICAL

CAPACITY RANGE BY CASE SIZE: CASE A, 510 PF to .01 MF
CASE B, 5000 PF to .1 MF
TEMPERATURE COEFFICIENT OF CAPACITY: (BX) ± 15% max. (—55°C to 125°C)
DISSIPATION FACTOR: 2.5% max @ 1 KHz
INSULATION RESISTANCE: 10,000 Megohms min
DIELECTRIC TEST VOLTAGE: 3 x Rated for 5 secs.

ATC-300 ULTRA-HIGH PACKAGING DENSITY CERAMIC CHIP CAPACITORS

The ATC-300 Series is designed to attain extremely high values of capacity in a minimal case size for use over a moderate temperature range. Values to .1 MF in a 50 Mil square (CASE A), and 1 MF in a 110 Mil square (CASE B) are standard.

ELECTRICAL

CAPACITY RANGE BY CASE SIZE: CASE A, .012 MF to .1 MF
CASE B, .12 MF to 1.0 MF
TEMPERATURE COEFFICIENT OF CAPACITY: Room temperature peak
DISSIPATION FACTOR: 4% max @ 1 KHz
INSULATION RESISTANCE: 1000 megohms min
DIELECTRIC TEST VOLTAGE: 3 x Rated for 5 secs.

AND CERAMIC CHIP CAPACITORS

ORDERING CODE

ATC-100 B 10 1 J C

- Type — ATC-100
- Case — B
- First Two Digits Of Capacitance — 10
- Number of Zeros Following Digits Of Capacitance — 1
- Tolerance — J
- Chip — C

THE ABOVE EXAMPLE DESIGNATES ATC-100 SERIES CASE B CHIP CAPACITOR OF 100 PF WITH A 5% TOLERANCE.

TYPICAL POWER HANDLING

1 KW CW at 3 GHz in an ATC-100 CASE B 62 PF.

20 amperes CW at 25 MHz in an ATC-100 CASE B 1000 PF.

14 KVA in an ATC-100 CASE B, 30 PF unit @ 170 MHz.

70 amperes of pulsed RF at 500 MHz.

VSWR often less than 1.1:1 and Insertion Loss .05 dB up to several GHz in an ATC-100 CASE A 33 PF capacitor on 25 mil thick alumina substrate with a 25 mil wide line.

Typical series RF resistance of .05 ohms (compared to Barium Titinate types which may have up to 2.0 ohms for the same capacitance value).

THIS RESULTS IN EXTRAORDINARILY LOW INSERTION LOSS, WHICH IS ESPECIALLY CRITICAL WHERE IMPEDANCES TO BE MATCHED ARE LOW, SUCH AS THE BASE-TO-EMITTER JUNCTION AND AT FREQUENCIES WHERE TRANSISTOR GAINS ARE LOW AND LOSS CANNOT BE TOLERATED.

ELECTRICAL

MILITARY SPECIFICATION: All ATC-100 capacitors meet MIL-C-11272B (Complete independent Test Data sent upon request.)

CAPACITANCE DRIFT: 0.05% or 0.05 PF, whichever is greater

AGING: None

ELECTRICAL CHARACTERISTICS AFTER LIFE TEST

CHANGE IN CAPACITANCE: At 25°C —0.1% max

QUALITY FACTOR: Greater than 10,000 @ 1 MHz

INSULATION RESISTANCE: 1,000,000 megohms min @ 25°C, 100,000 megohms min @ 125°C (for 100 WVDC units, 10^5 Meg Ω @ 25°C, and 10^4 Meg Ω @ 125°C)

TOLERANCES AVAILABLE:

B (± .1 PF) from .1 PF to 9.1 PF,
C (± .25 PF) from .3 PF to 9.1 PF,
D (± .5 PF) from .5 PF to 6.2 PF,
F (± 1%) from 10 PF to 1000 PF,
G (± 2%) from 10 PF to 1000 PF,
J (± 5%) and K (± 10%) from 6.8 PF to 1000 PF,
M (± 20%) from 6.8 PF to 1000 PF

APPLICATIONS

PRODUCT

Phased-array radar, wide-band amplifiers, low noise circuits, receiver RF-IF stages, proximity fuses, radiosonde, microwave power sources, UHF converters, military communications, telemetry, UHF mobile, ECM, DME, microwave power amplifiers, troposcatter communications; commercial aircraft communications; military, marine, and amateur AM/FM/SSB, military hand-held survival radios.

CIRCUIT

Constant-capacitance matching and coupling in octave bandwidth microstrip and stripline L and S-Band amplifiers, swept L.O.'s, mixers, synthesizers, and switches.

Low-loss signal paths for low noise receivers.

Coupling and by-passing for low and high power UHF transmitters.

Excellent first base-shunt elements in low-pass Matthaei wideband interstages.

Utilization in base and emitter by-passing, as well as coupling applications, where extremely low inductance is required.

Applications in ultra-stable oscillator sources where absolute retrace and minimal drift (less than .1%), as well as low inductance, are an important factor, particularly over environmental extremes.

Use in RF tank circuits where high circulating currents or where stability and Q are important factors. Use in timing and control circuits demanding high stability under extreme environmental conditions.

High Q DC blocks in wideband varactor-tuned sweepers.

Compact stable elements for use in low-distortion and narrow pulse width, high PRF delay lines.

Low and high values of capacity where close tolerances and high stability are required in HF and VHF filter design. (See ATC-100 Capacity Values)

Single-replacement for multiple-capacitor collector and base by-passes.

Pellet styles for input-matching and pseudo-idler circuits of high-ratio step-recovery multipliers.

Where state-of-the-art high Q capacity -vs-size microminiaturization is required.

DIELECTRIC TEST VOLTAGE: 3 x Rated 5 secs.
WORKING VOLTAGE: 50 WVDC
TOLERANCES AVAILABLE: F (± 1%), G (± 2%), J (± 5%), K (±10%), M (± 20%)

GENERAL

Similar to ATC-100, except for restriction to power levels and lower frequency applications where higher loss can be tolerated. Not to be used at low impedance levels having high current, or where low noise, low loss, or low power dissipation is required.

WORKING VOLTAGE: 50 WVDC
VOLUMETRIC EFFICIENCY: 100 MFDS/Cu. inch
TOLERANCES AVAILABLE: K (10%), M (20%), N (30%), GMV (—20%, +80%)
RECOMMENDED TESTING SEQUENCE: CAP., DF., IR., V.D.C.
MILITARY SPECIFICATION: Meets applicable portions of MIL-C-11015D

GENERAL

Coupling and by-passing for low power, UHF transmitters and receivers. Applications requiring low inductance, high capacity per unit volume with moderate temperature stability, such as tantalum replacements and emitter by-passes.

CIRCUIT

RF by-pass for C_{ob} cancelling inductor.

WORKING VOLTAGE: 25 WVDC
RECOMMENDED OPERATING RANGE: 10°C to 60°C
VOLUMETRIC EFFICIENCY: 1000 MFDS/Cu. inch
TOLERANCES AVAILABLE: M (± 20%), N (± 30%), GMV (—20%, +80%
RECOMMENDED TESTING SEQUENCE: CAP., DF., IR., V.D.C.

GENERAL

Similar to ATC-200, except for use over a moderate temperature range such as encountered in computers, heart pacers, medical electronics, etc.

ATC STANDARD CAPACITY VALUES

0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2.2, 2.7, 3.0, 3.3, 3.6, 3.9, 4.3, 4.7, 5.1, 5.6, 6.2, 6.8, 7.5, 8.2, 9.1, 10, 11, 12, 13, 15, 16, 18, 20, 22, 24, 27, 30, 33, 36, 39, 43, 47, 51, 56, 62, 68, 75, 82, 91, 100, 110, 120, 130, 150, 160, 180, 200, 220, 240, 270, 300, 330, 360, 390, 430, 470, 510, 560, 620, 680, 750, 820, 910, 1000, 1,200, 1,500, 1,800, 2,000, 2,200, 2,700, 3,300, 3,900, 4,700, 5,000, 5,600, 6,800, 8,200, 10,000, 12,000, 15,000, 18,000, 20,000, 22,000, 27,000, 33,000, 39,000, 47,000, 50,000, 56,000, 68,000, 82,000, 100,000, 120,000, 150,000, 180,000, 200,000, 220,000, 270,000, 330,000, 390,000, 470,000, 500,000, 560,000, 680,000, 820,000, 1,000,000

american technical ceramics

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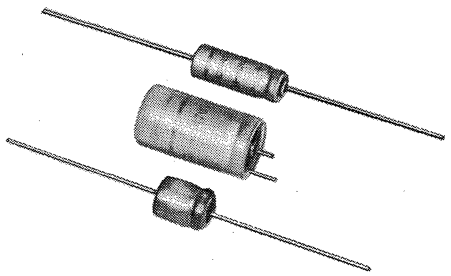
Amperex ELECTROLYTIC Capacitors



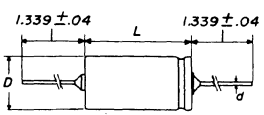
Amperex high quality, low cost electrolytic capacitors feature small size, high capacitance and long service life. Low leakage currents are achieved through the use of highly purified materials and carefully controlled manufacturing processes. They are the "dry" type with the liquid electrolyte absorbed into a layer of paper between cathode and anode foils. Winding is sealed in an aluminum can.

They are designed to operate at varied efficiencies over a temperature range of −40°C to +85°C. The minimum and maximum temperatures depend on the application . . . increase of impedance and losses are the limiting factors.

C426 SERIES (Miniature)

Can Size	Working Voltage (volt)	Capacity (µf)	Insulated	Voltage and Capacitance
1	2.5	10	AS	A10
2	2.5	40	AR	A40
3	2.5	80	AR	A80
4	2.5	160	AR	A160
5	2.5	320	AR	A320
6	2.5	500	AR	A500
1	4	8	AS	B8
4	4	8	AR	B8
2	4	32	AR	B32
3	4	64	AR	B64
4	4	125	AR	B125
5	4	250	AR	B250
6	4	400	AR	B400
1	6.4	6.4	AS	C6.4
2	6.4	25	AR	C25
4	6.4	32	AR	C32
3	6.4	50	AR	C50
4	6.4	100	AR	C100
5	6.4	200	AR	C200
6	6.4	320	AR	C320
1	10	4	AS	D4
2	10	16	AR	D16
3	10	32	AR	D32
4	10	64	AR	D64
5	10	125	AR	D125
6	10	200	AR	D200
1	16	2.5	AS	E2.5
4	16	2.5	AR	E2.5
2	16	10	AR	E10
4	16	16	AR	E16
3	16	20	AR	E20
4	16	40	AR	E40
5	16	80	AR	E80
6	16	125	AR	E125

Can Size	Working Voltage (volt)	Capacity (µf)	Insulated	Voltage and Capacitance
1	25	1.6	AS	F1.6
4	25	1.6	AR	F1.6
2	25	6.4	AR	F6.4
4	25	10	AR	F10
3	25	12.5	AR	F12.5
4	25	25	AR	F25
5	25	50	AR	F50
6	25	80	AR	F80
1	40	1	AS	G1
4	40	1	AR	G1
2	40	4	AR	G4
4	40	6.4	AR	G6.4
3	40	8	AR	G8
4	40	16	AR	G16
5	40	32	AR	G32
6	40	50	AR	G50
4	64	0.32	AR	H0.32
1	64	0.64	AS	H0.64
4	64	0.64	AR	H0.64
2	64	2.5	AR	H2.5
4	64	4	AR	H4
3	64	5	AR	H5
4	64	10	AR	H10
5	64	20	AR	H20
6	64	32	AR	H32



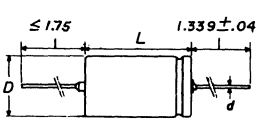
DIMENSIONS (inches)

Can Size	d diam.	INSULATED D	INSULATED L
1	.023	.122 + .012	.394 ± .008
2	.023	.173 + .012	.394 ± .008
3	.023	.228 + .008	.394 ± .008
4	.031	.248 + .008	.709 ± .008
5	.031	.315 + .008	.709 ± .008
6	.031	.394 + .008	.709 ± .008

C437 SERIES (Small)

Can Size	Working Voltage (volt)	Capacity (µf)	Voltage and Capacitance
00	2.5	1000	A1000
01	2.5	1600	A1600
02	2.5	2500	A2500
03	2.5	4000	A4000
00	4	800	B800
01	4	1250	B1250
02	4	2000	B2000
03	4	3200	B3200
*00	6.4	640	C640
*01	6.4	1000	C1000
02	6.4	1600	C1600
03	6.4	2500	C2500
*00	10	400	D400
*01	10	640	D640
*02	10	1000	D1000
03	10	1600	D1600
*00	16	250	E250
*01	16	400	E400
*02	16	640	E640
*03	16	1000	E1000

Can Size	Working Voltage (volt)	Capacity (µf)	Voltage and Capacitance
*00	25	160	F160
01	25	250	F250
02	25	250	F400
03	25	640	F640
00	40	100	G100
01	40	160	G160
02	40	250	G250
03	40	400	G400
*00	64	64	H64
01	64	100	H100
02	64	160	H160
03	64	250	H250



DIMENSIONS (Inches)

Can Size	d (dia)	D	L
00	.031	.394 + .008	1.18 ± .020
01	.031	.492 + .008	1.18 ± .020
02	.031	.591 + .008	1.18 ± .020
03	.031	.709 + .008	1.18 ± .020

AMPEREX ELECTRONIC CORPORATION
Component Division: 35 Hoffman Ave., Hauppauge, N.Y.
Telephone: 516-234-7000 TWX 510-227-8552

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Amperex FIXED-FILM DIELECTRIC Capacitors

METALLIZED POLYCARBONATE

Metallized polycarbonate capacitors offer 125°C operation with no voltage de-rating, extreme capacitance stability with temperature, and low dissipation factor. High insulation resistance coupled with small physical size make these capacitors ideally suited for the most critical applications. Available in 100 VDC, 400 VDC, and 630 VDC.

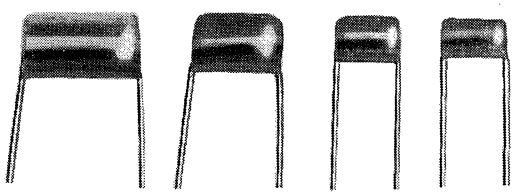
METALLIZED POLYESTER

Available in 250 VDC rating from .001 mfd to 2.2 mfd. Offer small size and cost advantages and are suitable for all general purpose applications.

C280 SERIES

The Amperex C280 Series Flat Film Capacitors are intended for use with printed circuit wiring and are suitable for tube as well as transistorized circuitry. These capacitors are available in three voltage ratings: 250 VDC, 400 VDC, and 630 VDC. Short-time overloading is permited with these components. Cap. Tol. ±10% or ±20%.

Dielectrics used with each voltage series are: 250V — metallized polyester; 400V — metallized polycarbonate; 630V — metallized polycarbonate.



Type	Voltage	Dielectric	Capacitance Range	Thickness	Width	Height
C280AE	250V	metallized polyester	0.01 μf to 2.2 μf	0.157 to 0.512	0.492 to 1.18	0.443 to 0.886
C280CF	400V	metallized polycarbonate	0.01 μf to 1.0 μf	0.157 to 0.512	0.492 to 1.18	0.433 to 0.906
C280CG	630V	metallized polycarbonate	0.01 μf to 0.47 μf	0.177 to 0.532	0.492 to 1.18	0.453 to 0.925

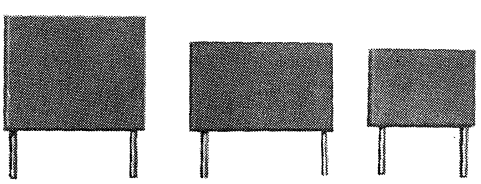
C280M SERIES

Amperex metallized film capacitors are designed for tube or transistor printed circuit applications. Their flat rectangular shape ensures stable mounting on printed circuit boards. The size of these capacitors makes them extremely useful in the miniaturized components field.

These capacitors are available in four voltage ratings: 100 VDC, 250 VDC, 400 VDC, and 630 VDC.

Metallized polyester is the dielectric used with the 250 volt series, while metallized polycarbonate is used in the 100, 400, and 630 volt series.

Their technical characteristics are visibly marked on top of the capacitor's body in durable embossed printing.

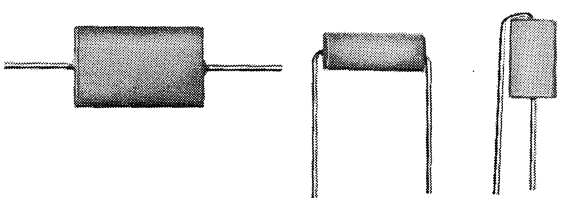


Type	Voltage (VDC)	Dielectric	Capacitance Range (μf)	DIMENSIONS IN INCHES				
				Length	Width	Height	Lead Span	Lead Diam.
C280MCH	100	metallized polycarbonate	0.047 to 3.3	0.512 to 1.024	0.177 to 0.374	0.394 to 0.748	0.394 to 0.886	0.024 to 0.031
C280MAE	250	metallized polyester	0.01 to 2.2	0.512 to 1.181	0.177 to 0.512	0.394 to 0.925	0.394 to 1.083	0.024 to 0.031
C280MCF	400	metallized polycarbonate	0.01 to 1.0	0.512 to 1.181	0.177 to 0.512	0.394 to 0.925	0.394 to 1.083	0.024 to 0.031
C280MCG	630	metallized polycarbonate	0.01 to 0.47	0.512 to 1.181	0.177 to 0.512	0.394 to 0.925	0.394 to 1.083	0.024 to 0.031

C281 SERIES

This new compact capacitor offers a superior film quality in every respect and is used to replace paper capacitors in quality equipment. They can withstand overload and are insensitive to adverse environmental conditions.

The Amperex C281 series was designed primarily for use as general purpose capacitors in the entertainment and industrial field. In addition, their high permissible AC voltages make them ideally suitable as an anti-interference capacitor in small electrical appliances. Their rectangular shape ensures wobble-free mounting on PC boards in either the vertical or horizontal position.



AVAILABLE TYPES

Type No.	Voltage	Dielectric	Capacitance Range	Cap. Tol.	DIMENSIONS IN INCHES		
					Length	Width	Height
C281CH	100V	metallized polycarbonate	0.068 μf to 5.6 μf	±10%	0.55 to 1.18	0.34 to 0.86	0.18 to 0.59
C281AB	250V	metallized polyester	0.033 μf to 2.2 μf	±10%	0.55 to 1.18	0.34 to 0.86	0.18 to 0.59
C281CD	400V	metallized polycarbonate	0.01 μf to 1 μf	±10%	0.55 to 1.18	0.34 to 0.86	0.18 to 0.59
C281CG	630V	metallized polycarbonate	0.01 μf to 0.47 μf	±10%	0.55 to 1.18	0.34 to 0.86	0.18 to 0.59

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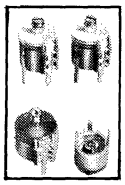
Amperex Variable Capacitors

FILM DIELECTRIC TRIMMERS



C010 and HT10 Series

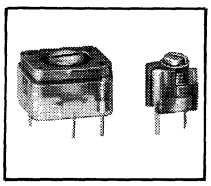
Amperex Film Dielectric Trimmers are state-of-the-art with regard to dielectrics used and construction. The excellent characteristics of polyethylene and PTFE films now also are available for trimmer applications. A few advantages of Film Dielectric Trimmers are:

- excellent adjustment accuracy
- limited program covers wide trimming range
- new constructional concept achieves attractive dimensions with corresponding space savings
- reduced cost

Technical Specifications

STYLE C010 — POLYETHYLENE DIELECTRIC			
Description	C010KA/10E	C010KA/20E	C010MA/60E
Capacitance swing	>10pf	>20pf	>60pf
Zero capacitance	<2pf	<2pf	<5.5pf
Temp. coefficient/deg C	(—200±300).10-6	(—350±250).10-6	(—200±300).10-6
Temperature range	—40 to +70°C		
Working voltage	100 VDC		

STYLE HT10 — PTFE DIELECTRIC			
Description	HT10KA/29	HT10KA/218	HT10MA/550
Capacitance swing	>9pf	>18pf	>50pf
Zero capacitance	<2pf	<2pf	<5pf
Temp. coefficient/deg C	(—400±300).10-6	(—400±300).10-6	(—500±200).10-6
Temperature range	—40 to +125°C		
Working voltage	100 VDC		



2222 — 809 — 050/070 Series

These capacitors have been designed for use in miniaturized measuring and telecommunication equipment. Four types are available: single-stator (6 x 8 mm), single-stator (11 x 14 mm), split-stator (11 x 14 mm), and differential trimmers (11 x 14 mm). Single-stator trimmers are suitable for fine adjustment of h.f. tuned circuits, split-stator trimmers for symmetrically built h.f. circuits, and differential types for capacitive volume or voltage control.

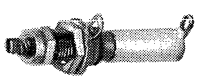
Technical Specifications

Catalogue Number 2222 809 . . .	Cap. Swing (pF)	Zero Cap. (pF)	Accuracy of Adjustment (pF)	Working Voltage	Temp. Coefficient/°C
05001	≥ 3	≤1	<0.01	500 VDC	(—200 ± 150) 10-6
05002	≥ 9	≤1.8	<0.02	500 VDC	(—250 ± 75) 10-6
05003	≥ 18	≤2	<0.03	500 VDC	(—250 ± 75) 10-6
07004	≥ 20	≤2	<0.03	350 VDC	(—150 ± 150) 10-6
07008	≥ 40	≤4	<0.03	350 VDC	(—150 ± 150) 10-6
07011	≥ 60	≤4	<0.05	350 VDC	(—150 ± 150) 10-6
07013	≥ 80	≤4	<0.05	350 VDC	(—150 ± 150) 10-6
07015	≥100	≤4	<0.605	350 VDC	(—150 ± 150) 10-6

TUBULAR CERAMIC TRIMMERS

2222 — 802 — 20011/15 Series

These capacitors have been designed for the precision trimming of industrial equipment which operates at the higher frequencies. Their simple form of construction guarantees high reliability and facilitates, moreover, a high breakdown voltage, good stability and high adjustment accuracy. For many applications the negative temperature coefficient characteristics results in adequate compensation at various temperatures. The small dimensions contribute to the miniaturization of electronic equipment.



Technical Specifications

Catalog Number 2222 ⅈ 802	Capacitance Swing (pF)	Zero Capacitance (pF)	Temp. Coeff. (10-6/°C)	Working Voltage
20011	≥ 3	≤0.5	— 10± 60	500 VDC
20012	≥4.5	≤0.6	— 10± 60	500 VDC
20013	≥ 6	≤0.7	— 10± 60	500 VDC
20014	≥ 9	≤0.9	—250±250	500 VDC
20015	≥ 12	≤1.0	—250±250	500 VDC

C004 Series

Specifically designed for UHF applications in radio and TV receivers. Their negative temperature coefficient provides a favorable compensation at varying temperature conditions. Excellent quality level is maintained by a high degree of production mechanization. Available in three standard and one miniature dimension style which provide economical means of meeting the most accepted mounting techniques used in the radio and TV industry. The basic trimmer design consists of an internally-ground ceramic tube matched to a threaded invar rotor spindle; both ends are slotted for screwdriver adjustment.

Technical Specifications

1. Standard Dimension Styles
   Capacitance Range: 3 pf to 12 pf
   Temp. Coef.: —200 ± 200 PPM/degC
   Working Voltage: 500 VDC
2. Miniature Dimension Style
   Capacitance Range: 3 pf and 6 pf
   Temp. Coef.: —200 ± 200 PPM/°C (3pf)
   to —300 ± 200 PPM/°C (6pf)
   Working Voltage: 400 VDC

2222 — 802 — 20001/5 Series

These capacitors have been designed for the precision trimming of industrial equipment which operate at the higher frequencies. Their simple form of construction guarantees high reliability and facilitates, moreover, a high breakdown voltage, good stability and high adjustment accuracy. For many applications the negative temperature coefficient characteristic results in adequate compensation of various temperatures. The small dimensions contribute to the miniaturization of electronic equipment.

Technical Specifications

Cat. No. 2222 802...	Capacitance Swing (pF)	Zero Capacitance (pF)	Working Voltage	Temp. Coefficient/°C
20001	≥ 3	≤0.8	500 VDC	(—200±200)10-6
20002	≥ 6	≤0.8	500 VDC	(—200±200)10-6
20003	≥ 9	≤0.9	500 VDC	(—200±200)10-6
20004	≥12	≤1.0	500 VDC	(—200±200)10-6
20005	≥18	≤1.7	500 VDC	(—200±200)10-6

HIGH STABILITY TUBULAR CERAMIC TRIMMERS

2222 — 802 — 96044/72 Series

These trimmers have been designed for u.h.f. applications, where high stability has to be maintained even under severe mechanical conditions, e.g., television aerial amplifiers.

Technical Specifications

Catalog Number 2222 802 960					
Screw Mounting Type	Solder Mounting Type	Cap. Swing (pF)	Zero Cap. (pF)	Temperature Coefficient/°C	Working Voltage
44	51	≥ 3	≤0.8	(—200±150) 10-6	400 VDC
45	52	≥ 6	≤0.8	(—200±150) 10-6	400 VDC
46	53	≥ 9	≤0.9	(—200±150) 10-6	400 VDC
47	54	≥12	≤1.0	(—200±150) 10-6	400 VDC
66	69	≥ 3	≤0.5	(—10±60) 10-6	630 VDC
67	71	≥ 4.5	≤0.6	(—10±60) 10-6	630 VDC
68	72	≥ 6	≤0.7	(—10±60) 10-6	630 VDC
55	57	≥ 3	≤0.8	(—200±150) 10-6	400 VDC
56	58	≥ 6	≤0.8	(—200±150) 10-6	400 VDC

MIDGET TUBULAR CERAMIC TRIMMERS

2222 — 802 — 96035/36 Series

Designed for professional electronic applications, particularly in the domain of miniaturized industrial equipment. Reliability is ensured by the simple construction and good stability.

Technical Specifications

Capacitance Range: 3 pf and 6 pf
Temperature Coefficient: —200 ± 200 PPM/°C (3 pf)
—300 ± 200 PPM/°C (6 pf)
Working Voltage: 400 VDC

AMPEREX ELECTRONIC CORPORATION
Component Division: 35 Hoffman Ave., Hauppauge, N.Y.
Telephone: 516-234-7000 TWX 510-227-8552

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TOMORROW'S THINKING IN TODAY'S PRODUCTS
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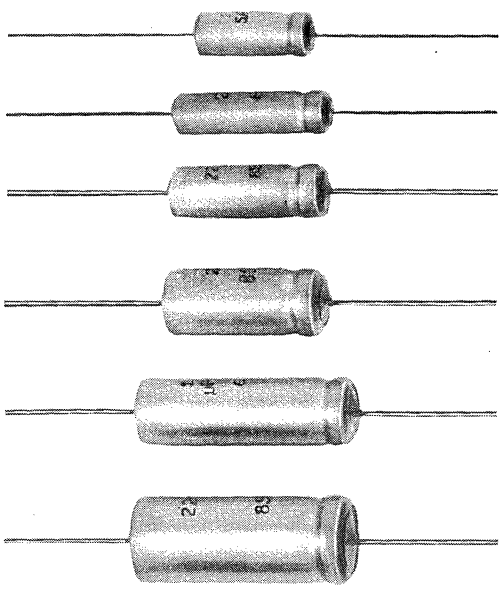
Amperex SOLID ELECTROLYTE ALUMINUM FOIL Capacitors



Amperex patented solid electrolyte aluminum foil capacitors fill the gap between dry aluminum and tantalum electrolytics in circuitry requiring long life, high reliability and stability over a wide temperature range. The electrolyte, manganese dioxide, a solid semiconductor, is carried in glass fiber between two foils of etched aluminum. Since no liquid is used there can be no loss of electrolyte by evaporation at high temperature; the electrical characteristics of manganese dioxide are extremely stable with changes in temperature.

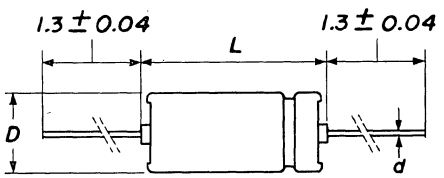
An aluminum case with a ceramic disc seal provides mechanical strength.

Solid electrolyte aluminum foil capacitors offer very high reliability; failure rates are less than 0.01% per 1000 hours at 85°C and at maximum operating voltage.

Extended shelf storage has no effect on performance since there is no tendency for the dielectric film to dissolve when no voltage is applied.

Unlike tantalum electrolytic capacitors, these devices tolerate, for short durations, reverse voltages up to the rated voltage, resulting in high ripple current ratings. There is no limitation on the magnitude of the discharge current.

Amperex solid electrolyte aluminum foil capacitors operate with only small changes in characteristics from −80°C to +125°C.



Dimensions (Inches)			
Can Size	D (Maximum)	d	L
1	0.260	0.032	0.690
2	0.260	0.032	0.945
3	0.327	0.032	0.945
4	0.410	0.032	0.945
5	0.410	0.032	1.260
6	0.509	0.032	1.260

ELECTRICAL CHARACTERISTICS

Can Size	Working Voltage VDC	Nominal Capacity At 120 Hz (μF)	Maximum Ripple Current (mA) At 120 Hz up to 70°C	Maximum Leakage Current After 5 Min. (μA)	Maximum Impedance At 120 Hz (Ω)
1	6.3	22	90	12.5	2.5
2	6.3	47	150	25	1.25
3	6.3	68	205	40	0.75
4	6.3	150	340	70	0.5
5	6.3	220	480	125	0.4
6	6.3	330	670	150	0.4
1	10	15	80	15	2.5
2	10	33	135	30	1.25
3	10	47	175	50	0.75
4	10	100	290	80	0.5
5	10	150	430	150	0.4
6	10	220	575	200	0.4
1	16	10	70	20	2.5
2	16	15	95	40	1.25
3	16	33	195	75	0.75
4	16	47	215	100	0.5
5	16	68	300	175	0.4
6	16	100	410	250	0.4
1	25	4.7	45	20	5.0
2	25	10	80	40	2.5
3	25	22	140	75	1.5
4	25	33	180	100	1.0
5	25	47	255	175	0.8
6	25	68	340	250	0.5
1	40	2.2	40	20	5.0
2	40	4.7	65	40	2.5
3	40	10	105	75	1.5
4	40	22	175	100	1.0
5	40	33	245	175	0.8
6	40	47	325	250	0.5

AMPEREX ELECTRONIC CORPORATION
Component Division: 35 Hoffman Ave., Hauppauge, N.Y.
Telephone: 516-234-7000 TWX 510-227-8552

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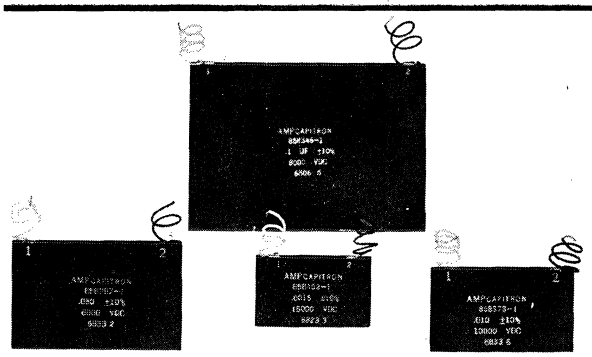
AMPLIFILM★ HIGH VOLTAGE CAPACITORS 2,500 to 60,000 VDC

INDUSTRIAL • MILITARY • COMMERCIAL

The CAPITRON★ Division of AMP Incorporated has specialized in the development of a diversified line of high voltage capacitors that provide outstanding performance characteristics. AMPLIFILM dielectric capacitors feature monolithic construction which results in substantial size and weight reduction, making them particularly suitable for use in high voltage power supplies, modulators, pulse forming networks, etc. AMPLIFILM capacitors, custom or stock, are designed to your exacting requirements as to size, shape and performance.

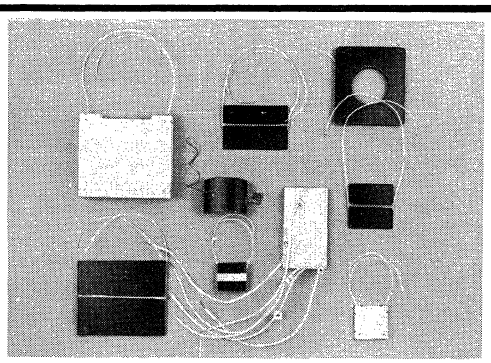


AMPLIFILM★

WAFER CAPACITORS FOR TEMPERATURES UP TO 125° C

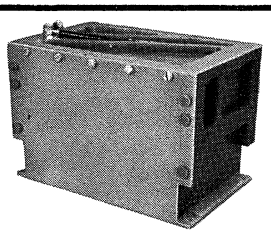
The basic element in these capacitors is AMP's AMPLIFILM dielectric, interleaved with copper foils and bonded with a non-polar thermoplastic resin specially selected for its excellent dielectric qualities. Heavy gage foil and molded construction combine to make these components ideal for rugged high voltage oil-filled or encapsulated assemblies.

- Operating temperature: −55° C to +125° C
- Capacitance range: 100 $\mu\mu$f to 1.0 μf
- Voltage range: 2,500 to 60,000 volts DC
- Power factor: 0.5% max.
- High insulation resistance
- Conforms to MIL-C-19978 where applicable
- Moisture resistant
- Very low dielectric absorption: less than 0.2%
- Wafer sizes from 1 sq. in. to 36 sq. in.
- Many configurations available



Configuration variety of AMPLIFILM ★ wafers

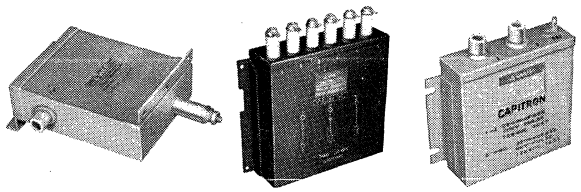
For complete information write for 858 Series AMPLIFILM capacitor catalog.



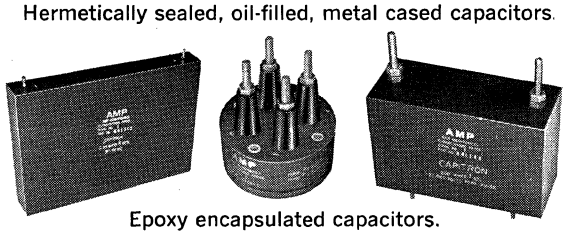
A typical AMPLIFILM capacitor assembly. Even **before encapsulation,** the exclusive dielectric construction provides moisture resistance meeting MIL-STD-202 (Method 106), making possible an energy efficiency greater than 0.6 joules per cubic inch without the encumbrance of a metal case.

- Capacitance: 0.1 μf ± 5%
- Voltage rating: 40,000 volts DC
- Power factor: 0.5% max.
- Temperature Range: −55° C to +100° C
- Size: 4½" x 4½" x 6½" max. (exclusive of frame)
- Weight: 9½ lbs. (exclusive of frame)

CUSTOM-PACKAGED AMPLIFILM HIGH VOLTAGE CAPACITORS



Hermetically sealed, oil-filled, metal cased capacitors.



Epoxy encapsulated capacitors.

CAPITRON DIVISION, AMP INCORPORATED
155 PARK STREET, ELIZABETHTOWN, PA. 17022.
TWX: 510-657-4561 • PHONE: 717-367-1105.

CAPITRON products and engineering assistance are available in Canada through AMP of Canada Ltd., Ontario, Canada ★Trademark of AMP Incorporated

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NOTE: See other CAPITRON High Voltage products under Catalog Sections 2100 and 4000.

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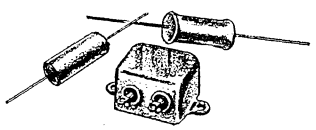
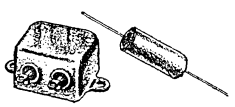
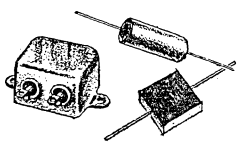
	precision polystyrene capacitors	2340, 2341
	precision standards	2342
	modified polystyrene capacitors	2343
	polystyrene and mica precision capacitors	2344
	polystyrene capacitors	2345
	precision RC networks	2345

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MANUFACTURING DIVISION

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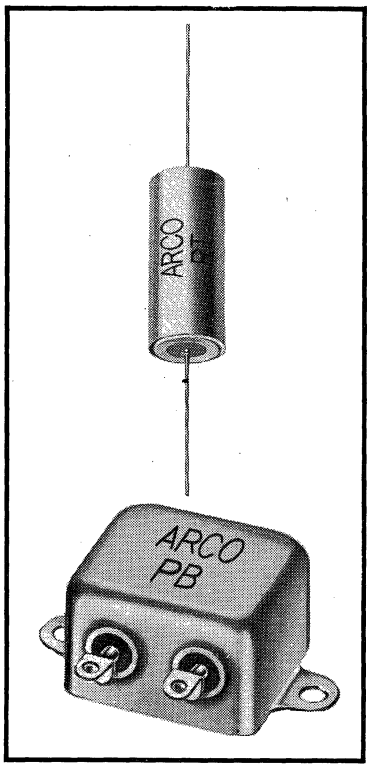
Manufacturing Division
ARCO ELECTRONICS

precision polystyrene capacitors



for military applications and hostile environments

type PT, CT and ST tubular

type PB, CB and SB rectangular bathtub cans

hermetically-sealed — metal case

Design innovations and extreme care in production have enabled ARCO to approach the optimum performance characteristics of the polystyrene film. These capacitors will exceed all performance requirements of MIL-C-19978 under ALL ENVIRONMENTAL CONDITIONS specified therein. ARCO polystyrene capacitors were specifically designed for the most critical applications where requirements for extremely high insulation resistance, high Q, extraordinary stability, close tolerance, and low dielectric absorption and dissipation factor are mandatory. These capacitors are intended primarily for use in ANALOG and DIGITAL COMPUTERS, CALCULATORS, HIGH Q TUNED CIRCUITS, INTEGRATORS, PRECISION FILTER CIRCUITS, PULSE NETWORKS, SERVO SYSTEMS, and as REFERENCE CAPACITORS.

specifications

DISSIPATION FACTOR: When measured at or referred to 1kHz the dissipation factor shall not exceed the following
.0001 at 23°C
.0002 at 85°C

INSULATION RESISTANCE: Insulation resistance when measured at the applicable test temperature, shall equal or exceed the following values

	23°C	*85°C
megohm x mfd	10^6	1.5×10^5
except the insulation resistance in megohms need not exceed	10^8	10^6

*NOTE: verified on 100% of production

DIELECTRIC ABSORPTION: When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 0.05% over the entire operating temperature range.

OPERATING TEMPERATURE RANGE: The ARCO capacitor types listed can be used for continuous operation from −55°C to +85°C without derating. Transient exposure to +95°C will have NO DELETERIOUS effect.

TEMPERATURE COEFFICIENT: The following temperature coefficient variants are available —
Type PT & PB negative 120 ±15 PPM/°C
Type ST & SB negative 120 ±15 PPM/°C
Type CT & CB negative 175 ±15 PPM/°C

STABILITY: Long term (1 year) capacitance drift under maximum operating conditions shall not exceed the following limits for the types listed.
Type PT & PB ±0.1%
Type CT & CB ±0.1%
Type ST & SB ±0.05%

VOLTAGE RATING: All ARCO capacitors are available in 100, 200, 400, 600 and 1,000 Volts DC ratings. Special voltages can be supplied upon request or to specification.

CAPACITANCE TOLERANCE: ARCO specializes in precision capacitors. Available from standard production are tolerances of ±10%, ±5%, ±3%, ±2%, ±1%, ±½%, ±¼%, ±0.1%.

BURN-IN: All ARCO capacitors are subjected to a minimum of two 16 hour burn-in periods with 300% of rated voltage applied at 85°C.

CONSTRUCTION: All ARCO precision polystyrene capacitor types here listed are hermetically sealed in metal cases with compression glass-to-metal, solder-sealed terminals. They are wound with a SOLID CORE in the center for optimum stability, and are terminated with a disc lead assembly soldered directly to the extended foil for a completely NON-INDUCTIVE construction resulting in the lowest possible contact resistance and exhibiting complete FREEDOM FROM MICROPHONISM.

PFC Manufacturing Division • ARCO ELECTRONICS INC • Community Drive, Great Neck, N. Y. 11022 • (516) 487-0500—Ext. 717 or 727

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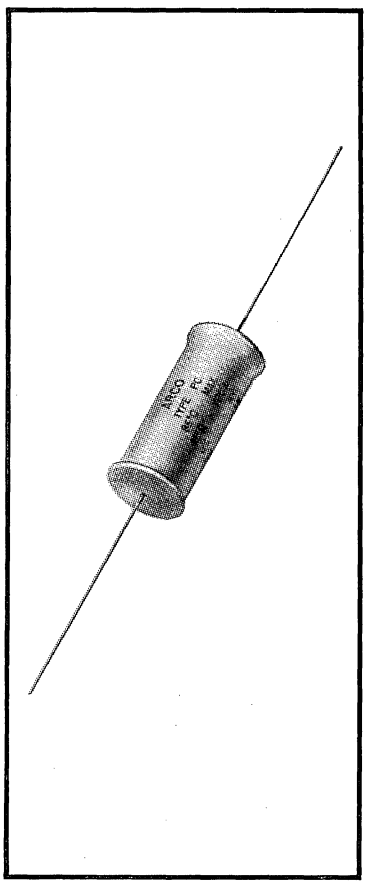
precision polystyrene capacitors



superior environmental protection at low cost—smallest size

type PC & PJ tubular
type SC & SJ tubular

The unique design of Arco Type PC capacitors provides physical and electrical stability, ruggedness and strength of termination, and excellent uniformity in production. All these features enable tight control of the narrow specification limits published. Type PC offers the smallest, lowest cost construction available, while retaining optimum performance characteristics.

The Type PC enclosure provides unusual protection against moisture, solvents and inadvertent contact with a soldering iron. The rugged, heat resistant jacket material makes Type PC particularly suited to printed circuit dip-solder assemblies subject to solvent cleaning and also to densely packed component structures where there is danger of damage to adjacent units while making solder connections.

Extensive evaluation has confirmed the excellent moisture resistance of the type PC (surpassed only by metal cased enclosures) and its conformance to the most stringent shock and vibration specifications. Type PC capacitors are exceptionally well suited for PRECISION FILTERS, DELAY LINES, and PRECISION TIMING CIRCUITS, where small size and excellence of performance are mandatory at LOW COST.

specifications (See Page 2340 for Electrical Characteristics)

CONSTRUCTION: The ARCO precision polystyrene capacitors types PC & SC are encased in an irradiated polyolefin jacket sealed with bonded silicone rubber. Types PJ & SJ are encased in a silicone treated fused polystyrene jacket. This unique construction economically protects the excellent electrical characteristics exhibited in types PC and SC and is primarily intended for use where they will not be subjected to the following hazards:

1. Physical damage due to excessive heat during dip or flow solder assembly.
2. Solvent damage during cleaning operations
3. Exposure to excessive humidity for prolonged periods of time.

All types herein listed are wound with a SOLID CORE in the center for optimum stability, and are terminated with a disc lead assembly soldered directly to the extended foil for a completely NON-INDUCTIVE construction resulting in the lowest possible contact resistance and exhibiting complete FREEDOM FROM MICROPHONISM.

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Manufacturing Division
ARCO ELECTRONICS

precision standards Continued

specifications:

TEMPERATURE COEFFICIENT

.0001 to .1 mfd. +40 ±15 ppm/°C.
0.2 to 1.0 mfd. −120 ±15 ppm/°C.

MAXIMUM VOLTAGE

.0001 to 0.04 mfd. 500 volts peak.
.05 to 1.0 mfd. 300 volts peak.

ACCURACY OF CALIBRATION

±0.1% +0.5 mmf. of nominal printed on capacitor at 1000 cycles frequency and 23°C.

LONG TERM STABILITY

±0.05% +0.1 mmf.

INSULATION RESISTANCE

5000 megohm-microfarads or 50,000 megohms, whichever is the lesser.

DISSIPATION FACTOR

.0001 to .0004 mfd. — 0.15%
.0005 to .001 mfd. — 0.1%
.002 to 1.0 mfd. — 0.05%

CASE SIZE

All standards up to 0.5 mfd. have mounting base 1 9/16" long by 15/16" wide. .001 to 0.1 mfd. is 1 3/16" high. 0.2 to 0.5 mfd. is 2 7/32" high. 0.6 to 1.0 mfd. is 2 13/16" high, 1 9/16" wide, 1 11/16" deep. Height dimension excludes banana plugs. Plug spacing ¾".

Part No.	Cap. Mfd.	Max. Diss. Factor	Min. Leak. Resist. Megohms
SS-101	.0001	.0015	50,000
SS-201	.0002	.0015	50,000
SS-301	.0003	.0015	50,000
SS-401	.0004	.0015	50,000
SS-501	.0005	.001	50,000
SS-601	.0006	.001	50,000
SS-701	.0007	.001	50,000
SS-801	.0008	.001	50,000
SS-901	.0009	.001	50,000
SS-102	.001	.001	50,000
SS-202	.002	.0005	50,000
SS-302	.003	.0005	50,000
SS-402	.004	.0005	50,000
SS-502	.005	.0005	50,000
SS-602	.006	.0005	50,000
SS-702	.007	.0005	50,000
CC-802	.008	.0005	50,000
SS-902	.009	.0005	50,000
SS-103	.01	.0005	50,000
SS-203	.02	.0005	50,000
SS-303	.03	.0005	50,000
SS-403	.04	.0005	50,000
SS-503	.05	.0005	50,000
SS-603	.06	.0005	50,000
SS-703	.07	.0005	50,000
SS-803	.08	.0005	50,000
SS-903	.09	.0005	50,000
SS-104	.1	.0005	50,000
SS-204	.2	.0005	100,000
SS-304	.3	.0005	100,000
SS-404	.4	.0005	100,000
SS-504	.5	.0005	100,000
SS-604	.6	.0005	100,000
SS-704	.7	.0005	100,000
SS-804	.8	.0005	100,000
SS-904	.9	.0005	100,000
SS-105	1.0	.0005	100,000

NOTE: Peak voltage for capacity values from .0001 mfd. to .04 mfd. is 500 volts. From .05 mfd. to 1.0 mfd. is 300 volts.

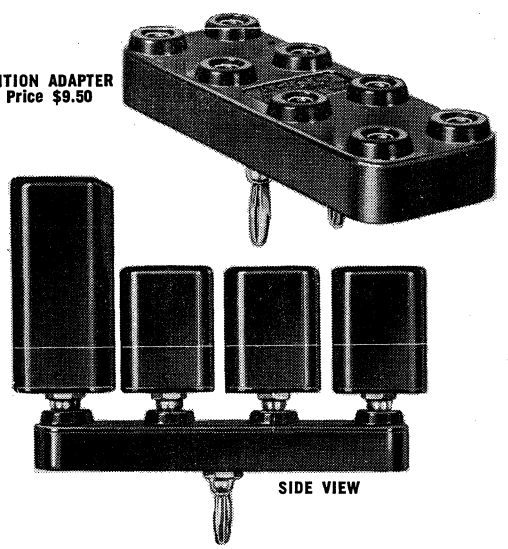
COMPLETE SETS OF PRECISION STANDARDS

KIT #SS-32

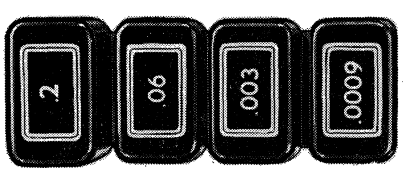
Complete Set of 32 Precision Standards ranging from .0001 to .5 mfd. as listed on opposite page. (Dimensions: 11⅜ w x 9⅜ h x 3⅝ d) plus 4 POSITION ADAPTER. Including handsome, durable carrying case.

NET PRICE $510

4 POSITION ADAPTER
Net Price $9.50



SIDE VIEW

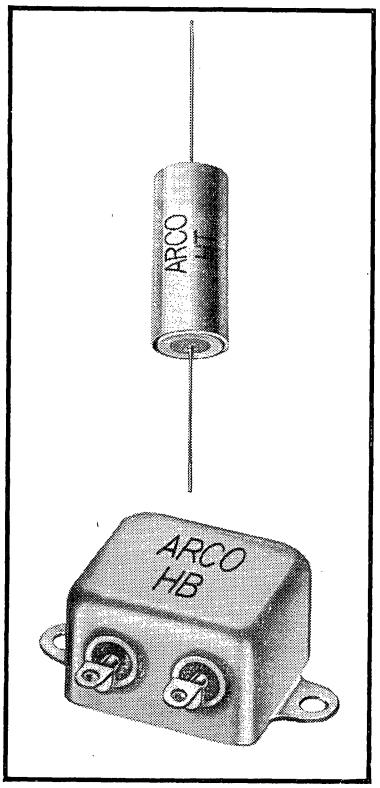


TOP VIEW .2639 mfd. ±0.1%

By quick and easy insertion of ARCO Standard Capacitors into the adapter jig a capacitance value of four significant figures with an accuracy of ±0.1% is obtained.

PFC
Manufacturing Division
ARCO ELECTRONICS

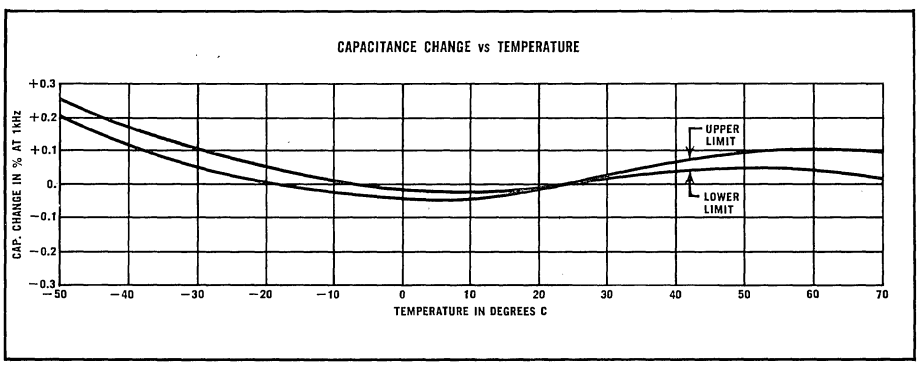
modified polystyrene capacitors



temperature-stable
small size
type HT tubular
type HB rectangular bathtub cans
hermetically sealed — metal case

An exclusive ARCO design modifying the temperature characteristics of the dielectric film to provide capacitors insensitive to temperature changes (±0.1% change to 85°C). Type HT and HB capacitors will meet ALL ENVIRONMENTAL REQUIREMENTS OF MIL-C-19978.

ARCO Type HT and HB capacitors are specifically designed for INTEGRATORS, PRECISION TIMING CIRCUITS, and PRECISION RC NETWORKS.



specifications

DISSIPATION FACTOR: When measured at or referred to 1kHz the dissipation factor shall not exceed 0.002 at 23°C

INSULATION RESISTANCE: Insulation resistance when measured at the applicable test temperature, shall equal or exceed the following values

	23°C	*85°C
megohm x mfd	10^6	1.5×10^5
except the insulation resistance in megohms need not exceed	10^8	10^6

*NOTE: verified on 100% of production

OPERATING TEMPERATURE RANGE: The ARCO capacitor types listed can be used for continuous operation from −55°C to +85°C without derating. Transient exposure to +95°C will have NO DELETERIOUS effect.

TEMPERATURE COEFFICIENT: The temperature coefficient of ARCO type HT and HB capacitors is controlled so that the variation of capacitance from room temperature to 85°C. is less than ±0.1%; from room temperature to −55°C. variation is less than ±0.25%. Tighter control is available to special order (±0.05% from 10°C to 50°C).

DIELECTRIC ABSORPTION: When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 0.05% over the entire operating temperature range.

STABILITY: Long term (1 year) capacitance drift under maximum operating conditions shall not exceed ±0.1%.

VOLTAGE RATING: ARCO type HT and HB capacitors are produced in 100 Volt DC rating. Other voltages to 1,000 volts can be supplied upon request.

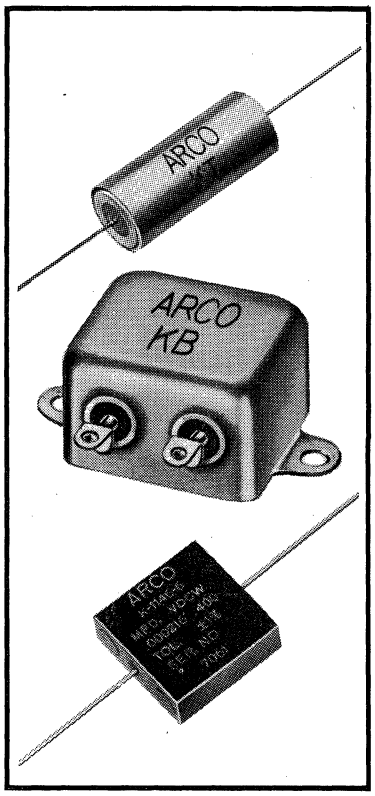
CAPACITANCE TOLERANCE: ARCO specializes in precision capacitors. Available from standard production are tolerances of ±10%, ±5%, ±3%, ±2%, ±1%, ±½%, ±¼%, ±0.1%.

BURN-IN: All ARCO capacitors are subjected to a minimum of two 16 hour burn-in periods with 300% of rated voltage applied at 85°C.

CONSTRUCTION: ARCO type HT and HB capacitors are hermetically sealed in metal cases with compression glass-to-metal, solder-sealed terminals. They are wound with a SOLID CORE in the center for optimum stability, and are terminated with a disc lead assembly soldered directly to the extended foil for a completely NON-INDUCTIVE construction resulting in the lowest possible contact resistance and exhibiting complete FREEDOM FROM MICROPHONISM.

PFC
Manufacturing Division
ARCO ELECTRONICS

polystyrene and mica precision capacitors



zero temperature coefficient

type KT tubular

type KB rectangular bathtub cans

hermetically sealed — metal case

type KE flat epoxy encapsulated

A unique combination of Polystyrene and Mica dielectrics resulting in a capacitor offering a truly ZERO TEMPERATURE COEFFICIENT (±10 ppm/°C from −55°C to +85°C standard production) with the ultimate in long term STABILITY. Type KT and KB capacitors will meet or exceed all requirements of MIL-C-19978, where applicable, under ALL ENVIRONMENTAL CONDITIONS specified therein.

ARCO Type KT, KB, and KE capacitors provide the utmost in performance for PRECISION-OSCILLATORS, TIMING CIRCUITS, and RC NETWORKS.

specifications

DISSIPATION FACTOR: When measured at or referred to 1kHz the dissipation factor shall not exceed the following
.001 @ 23°C

INSULATION RESISTANCE: Insulation resistance when measured at the applicable test temperature, shall equal or exceed the following values

	23°C	*85°C
megohm x mfd	10^5	10^3
except the insulation resistance in megohms need not exceed	10^6	10^4

***NOTE:** verified on 100% of production

OPERATING TEMPERATURE RANGE: The ARCO capacitor types listed can be used for continuous operation from −55°C to +85°C without derating. Transient exposure to +95°C will have NO DELETERIOUS effect.

TEMPERATURE COEFFICIENT: The temperature coefficient of Arco Type KT, KB, and KE capacitors is truly zero, they are usually produced to a tolerance of ±10 ppm/°C. They can also be produced to zero ±5 ppm°/C. The linearity of the temperature coefficient regardless of tolerance is ±1 ppm/°C. Other temperature coefficient centers may be supplied within the range of −100 to +20 ppm/°C THE TEMPERATURE COEFFICIENT OF THESE CAPACITORS **is tested on a 100% basis.** Data verifying these tests can be supplied at NO EXTRA COST as requested.

DIELECTRIC ABSORPTION: When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 1.0% over the entire operating temperature range.

STABILITY: Long term (1 year) capacitance drift under maximum operating conditions shall not exceed ±0.05%.

VOLTAGE RATING: Arco Type KT, KB, and KE capacitors are available in 100, 200, and 400 volts DC ratings (all supplied in the same case size). Other voltages up to 1,000 volts can be supplied upon request.

CAPACITANCE TOLERANCE: ARCO specializes in precision capacitors. Available from standard production are tolerances of ±10%, ±5%, ±3%, ±2%, ±1%, ±½%, ±¼%, ±0.1%.

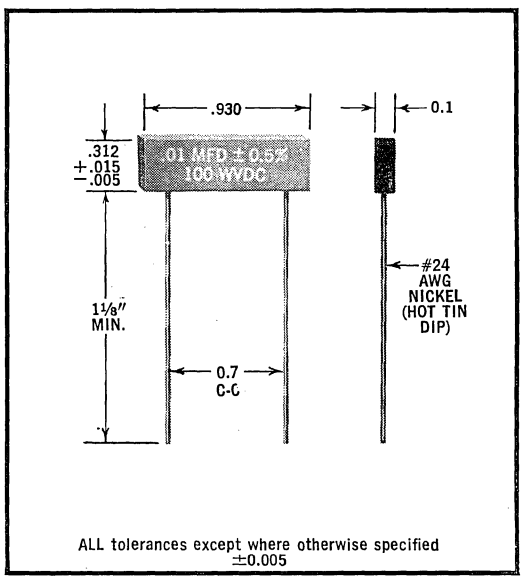
BURN-IN: All ARCO capacitors are subjected to a minimum of two 16 hour burn-in periods with 300% of rated voltage applied at 85°C.

CONSTRUCTION: The Arco Type KT, KB, and KE capacitors are constructed by a unique combination of polystyrene dielectric sections with a linear negative temperature coefficient cross compensating a mica dielectric capacitor section with a linear positive TC. The polystyrene capacitor section is wound with a SOLID CORE in the center for optimum stability, and is terminated with a disc lead assembly soldered directly to the extended foil for a completely NON-INDUCTIVE construction resulting in the lowest possible contact resistance. The mica capacitor section is the well known Arco-Elmenco capacitor exhibiting highest reliability and performance characteristics. The individual capacitor sections as well as their combination have been constructed so as to guarantee all performance characteristics listed as well as complete FREEDOM FROM MICROPHONISM.

PFC Manufacturing Division • ARCO ELECTRONICS INC • Community Drive, Great Neck, N. Y. 11022 • (516) 487-0500—Ext. 717 or 727

PFC
Manufacturing Division
ARCO ELECTRONICS

polystyrene capacitors



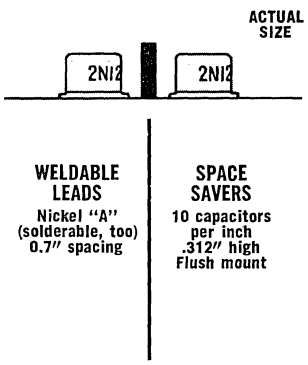
ALL tolerances except where otherwise specified ±0.005

type PE

Arco PFC Division announces availability of a new polystyrene dielectric capacitor with a thin configuration specifically designed for conservation of space in printed circuits and in filters. Flat polystyrene sections are encapsulated in uniform epoxy preforms to provide the following features:

0.1" thickness

Uniform lead spacing for p-c use.
Uniform size and flush mounting.
Both weldable and solderable leads.
Rugged, moisture proof construction.



specifications

CAPACITANCE RANGE: .001 to .01 mfd
TOLERANCE: ±5%, ±2%, ±1%, ±½%, ±¼%, ±0.1%.
VOLTAGE RATING: 100VDCW
INSULATION RESISTANCE: 10^{13} ohms minimum at 25°C — 10^{12} ohms at 85°C.
DISSIPATION FACTOR: 0.01% maximum at 25°C, — 0.02 maximum at 85°C.
DIELECTRIC ABSORPTION: 0.05% maximum at all temperatures.
TEMPERATURE COEFFICIENT: Negative 190 ±30 ppm/°C
LONG TERM OPERATING STABILITY: ±0.1% maximum drift under fixed or variable operating conditions within specified maximum limits.

All the above design advantages are accompanied by modest prices and quick delivery. Any value within the standard range (.001 mfd. to .01 mfd.) is in stock in all tolerances for immediate delivery (72 hours).

In addition to the physical advantages of this design, the electrical excellence of ARCO polystyrenes has been retained. High long term stability under maximum operating conditions, low dissipation factor and dielectric absorption, extremely high insulation resistance, close tolerance are featured. And also important is the ARCO control of quality which results in close uniformity not only from unit to unit, but from production lot to production lot as well.

The Nickel "A" leads of ARCO Type PE capacitors are welded directly to the capacitor section. The strength and permanence of electrical contact is thereby entirely independent of encapsulation.

All Arco Type PE capacitors are "debugged" 100% prior to shipment by accelerated life test at stress levels exceeding ratings to eliminate potential early failures. Extensive data on reliability of Arco polystyrene capacitors is available for documentation

precision RC networks

the ultimate in temperature coefficient control of RC product.

linear TC of ±5 ppm/°C over temperature range of −55°C to +85°C.

ARCO's ability to produce capacitors with adjustable and closely uniform characteristics has facilitated the design of highly precise RC networks. By matching zero temperature coefficient resistors and capacitors, or by balancing temperature coefficients to obtain a zero (or other specified) T.C. on the RC product, networks which have long term stability independent of temperature are obtained. At the same time, RC products of better than ±0.05% accuracy can be supplied. Testing is performed on a 100% basis on both resistors and capacitors with temperature coefficient data recorded at the temperature extremes.

Balco marstan
BALCO ELECTRONICS, INCORPORATED
307 Washington Street, Orange, N.J. 07050 • (201) 677-1200
TWX 710-994-5812

PRECISION FILM CAPACITORS

Balco/Marstan brings together the precision capacitor experience of Balco Capacitors and the precision resistor capability of Marstan Electronics. Balco/Marstan specializes in the design of ultraprecision film capacitors, wirewound resistors, and networks — resistive, capacitive, or RC. The product line — special or standard — is designed for the user who needs a combination of demanding performance parameters such as high stability, low temperature coefficient, and tight tolerance over a wide range of environmental extremes.

BALCO/MARSTAN PLASTIC FILM CAPACITORS
Feature:

- Accuracy Tolerances to 0.1%
- Dielectric Absorption lower than 0.03%
- Dissipation Factors to 0.008%
- Insulation Resistance greater than 10^{14} ohms
- Retrace Stability lower than 0.02%

DIELECTRIC SELECTOR GUIDE

The following chart lists typical specifications:
Precision and stability factors can be improved by special processing of materials before assembly.

PARAMETER	TEFLON		POLYCARBONATE		POLYSTYRENE		MYLAR	
	Extended Foil	Metalized Film	Extended Foil	Metalized Film	Extended Foil	Metalized Film	Extended Foil	Metalized Film
Capac. Range (μF)	0.0005 to 2.0	0.05 to 4.0	.01 to 5.0	0.03 to 20.0	.001 to 10.0	.01 to 20.0	0.0047 to 2.0	.01 to 20.0
Working Volt. (Vdc)	50 to 600	50 to 600	30 to 600	30 to 600	50 to 600	50 to 600	30 to 600	30 to 600
Stability (retrace after temperature cycling, %)	<0.2	<0.02	<.10	<0.10	<0.05	<.05	<0.5	<0.3
Temperature Coefficient	−100 ±70 PPM/°C	−90 ±30 PPM/°C	<±100 PPM/°C	<±100 PPM/°C	−120 ±30 PPM/°C	−120 ±30 PPM/°C	+3% to 85°C +15% to 125°C	+3% to 85°C +15% to 125°C
Min. Insulation Resistance at 25°C (ohms to 1.0 μF, ohms x μF above 1.0 μF)	$>10^{14}$	$>10^{12}$	$>10^{11}$	$>10^{10}$	$>5 \times 10^{11}$	$>10^{11}$	$>10^{11}$	$>3 \times 10^{10}$
Dissipation Factor at 25°C and 1 kHz (%)	<0.02	<0.05	<.10	<0.5	<.02	<.05	<.6	<1
Dielectric Absorption at 25°C (%)	<0.03	<0.03	<.5	<0.5	<0.05	<.05	<0.5	<0.5
Operating Temp. Range (°C)	−55 to +200	−55 to +200	−55 to +125**	−55 to +125**	−55 to +85	−55 to +85	−55 to +125*	−55 to +125
Tolerances (%) Standard Precision	5 .10	5 .10	5 .10	5 .10	5 .10	5 .10	5 .50	5 .50

* 50% derating above 85°C ** 50% derating above 100°C

TERM	DEFINITION
Dielectric Absorption	Property of dielectric materials, sometimes called dielectric hysteresis, causing current to continue flowing after capacitor is theoretically charged and charge to remain after capacitor is theoretically discharged.
Dissipation Factor	Ratio of the equivalent series resistance to reactance of a capacitor at a given frequency.
Retrace Stability	Measure of the difference in capacitance value at a specific temperature after the capacitor has been exposed to a temperature excursion.
Temperature Coefficient	Change in capacitance as a function of temperature, resulting from variations in dielectric constant, capacitor geometry, and mechanical stresses.

For Presision Resistors see pages 2820 and 2821; for Precision RC Networks see page 1296.

CAPACITOR TYPES

Balco/Marstan uses six different dielectrics to assure you of precision capacitors to meet a variety of specifications:

Teflon — ultrastable, low loss, low temperature coefficient material, ideally suited for high insulation resistance requirements at temperatures up to 200°C. Available in extended foil and metalized film.

Polystyrene — ultrastable, very low loss material with a linear negative temperature coefficient that favors its use in applications at temperatures up to 85°C, where optimum electrical performance is essential. Available in extended foil and metalized film.

Polycarbonate — ultrastable material with a low temperature coefficient, for use at temperatures up to 125°C. Available in extended foil and metalized film.

Mylar — suggested for temperatures up to 125°C in applications where extreme precision is not required, but size and cost are important factors. Available in extended foil and metalized film.

Two different internal construction styles are offered as options to the circuit design engineer:

Extended Foil — Low dissipation factors and high circulating current capabilities favor its selection for use in high power resonant and pulse circuits.

Metalized Film — Self healing in the event of voltage breakdown, its more uniform temperature coefficient and low volume per microfarad make it ideal for resistor coefficient matching and for use in subminiature capacitors.

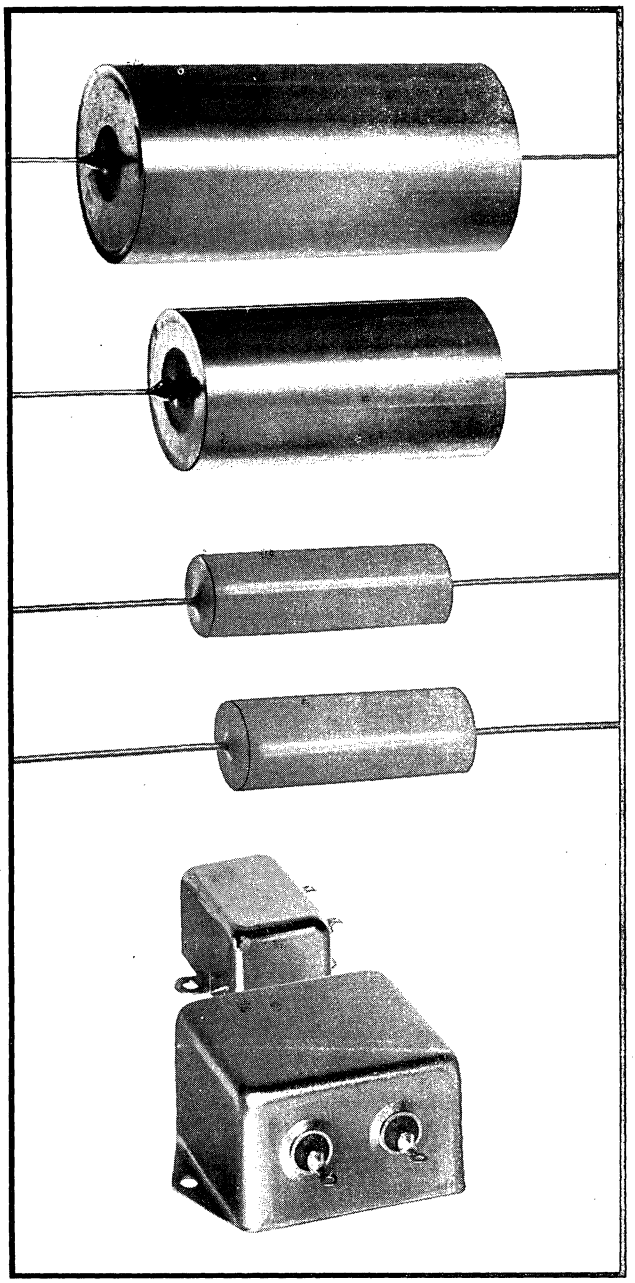
Capacitors can be provided in any of the following packages:

Hermetically Sealed for maximum environmental protection to insure high precision and stability.

Tape Wrap primarily for economy in price and size where severe environments are not involved.

Plastic Encased to provide mechanical ruggedness and moderate environmental protection.

Specials, including plastic and metallic enclosures, designed for custom packaging requirements.

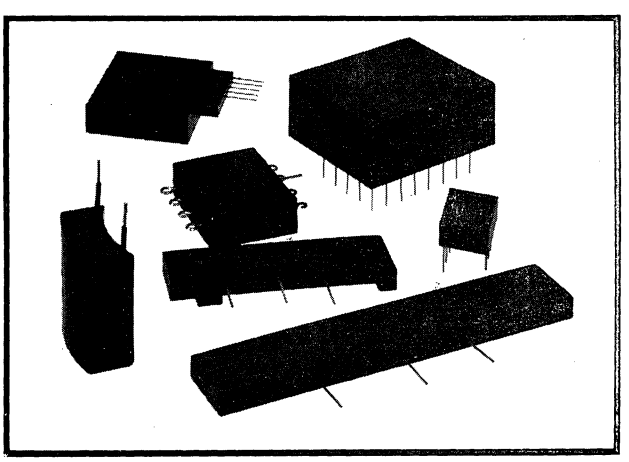


PRECISION NETWORKS

Our unique side by side resistor and capacitor processing ensures the ultimate in component compatibility and overall network performance. Resistors and capacitors can be precisely matched to track over wide temperature ranges.

Typical Networks Manufactured by Balco/Marstan:

- Matched impedance Attenuators
- Summing Networks
- Integrators
- Voltage Dividers
- Phase Shifters
- Binary Resistance Networks
- Twin T Networks
- Bridges
- A/D and D/A Converters
- Timing Networks



Balco marstan

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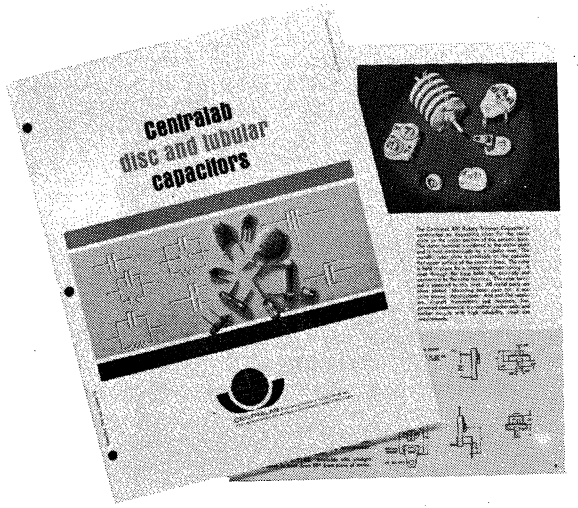
Centralab Ceramic Capacitors Can fill your Capacitor Needs!



Centralab disc and tubular capacitor catalog, as well as the special purpose catalogs cover hundreds of types of ceramic capacitors for military, industrial and commercial applications.

Request your copy through Centralab's advertising department.

Here are typical Centralab Capacitors. Types listed here are not necessarily available, in all extremes of temperature coefficients, capacitance ranges, and tolerances.

Temperature Compensating Discs

WORKING VOLTAGE	TEMPERATURE COEFFICIENTS	CAPACITANCE RANGE pf	CAPACITANCE TOLERANCES
DISCS			
500V	NPO to N5250	1.1-3100	±.25 pf and ±.5 pf when nominal capacitance is 10 pf or less. Over 10 pf ±5%, ±10% or ±20%
1KV	NPO to N5250	2.5-2150	
2KV	N750, N1500, N2200*	17-450	
3KV	N750, N1500, N2200*	12-310	
4KV	N750, N1500, N2200*	12-210	
5KV	N750, N1500, N2200*	18-165	
6KV	N750, N1500, N2200*	17-135	

*Available in all standard TC's in other capacitance ranges.

General Purpose Discs

EIA FORMULATION & T. C. TOLERANCE		CAPACITANCE TOLERANCE	CAPACITANCE RANGE IN pf	WORKING VOLTAGE
Y5D	±3.3%	±10%, ±20%, GMV	150 to 9700	150, 500V
X5F	±7.5%	±10%, ±20%, +80 −20% GMV	70-6100	150V-6KV
X5P	±10%	±10%, ±20%, +80 −20%	45-3000	150V-6KV
Z5P	±10%	±10%, ±20%, +80 −20%	175-14,650	150V-6KV
X5S	±22%	±10%, ±20%, +80 −20%	150-11,000	150V-6KV
X5U	+22 −56%	±20%, +80 −20%, GMV	375-20,000	150V-6KV
Z5U	+22 −56%	±20%, +80 −20%, GMV	650-34,800	150V-6KV
Z5V	+22 −82%	±20%, +80 −20%	.005MFD-.1MFD	100V

Not all capacitance values at all voltages: maximum capacitance shown available in 500V rated units.

Low Voltage General Purpose Discs (Ultra Kaps)

DC WORKING VOLTAGE	APPROX. DIAMETER	CAPACITANCE TOLERANCE	MAXIMUM DISSIPATION FACTOR	CAPACITANCE RANGE MFD
3	.3 to .9"	+100 −0%	5%	.22 to 2.2
10	.3 to .9"	+80 −20%	10%	.05 to .47
16	.6 to .9"	+80 −20%	10%	.05 to .2
20	.6 to .9"	+80 −20%	10%	.05 to .2
25	.3 to 1.0"	±30% or ±20%	5%	.015 to .2

High Temperature

Wide range of capacities, tolerances, TC & Hi-K bodies for operation at 125°C. Exceptionally stable Hi-K bodies with maximum change in capacity of ±15% from −55°C to +125°C are available.

Polystyrene Capacitors are also available in the Centralab line. These long life, low cost units are the ideal replacements for paper, mica, and Mylar capacitors.

FOR IMMEDIATE DELIVERY — many of these are available through Centralab Industrial Distributors.

TYPE	CAP. RANGE pF.	TOLERANCES % @ 25°C	TEMP. CO-EFFICIENT	WORKING VOLTAGE —DC
Feed-Thrus				
DA—717 series (Bushing types)	10-500	±5, ±10, ±20		500
	10-4000	±20, GMV		500
DA—720 series (Bushing types)	10-820	±5, ±10, ±20		500
	10-820	±5, ±10, ±20		1000
	10-400	±5, ±10, ±20		1500
	10-5000	±20, GMV		500
	10-3000	±20, GMV		1000
	10-2500	±20, GMV		1500
DA—721-722 (High Reliability)	5-400	±5, ±10, ±20		500
	5-1000	±20, GMV		500
DA—740 (Ring Type)	5-1000	±5, ±10, ±20 +80, −20, GMV		500
DA—784, 785, 787 (Eyelet Type)	5-400	±5, ±10, ±20		500
	5-2000	±20, GMV		500
DA—742 (Eyelet) (MIL Type)	5-400	±5, ±10, ±20		500
	5-2000	±20, GMV		500
Trimmers				
Type 829 (Tubular)	.5-3/3-20		NPO, 220, 660	500
Type 820 (Rotary)	1-3.5/70-90			500
Type 821 (Rotary)	3-12/7-35		NPO, 750	500
Type 822 (Rotary)	1.5-3/8.0-50		NPO, 650	500
Type 823 (Rotary)	5-12/20-125		NPO, 650	500
Type 824 (Rotary)	1.5-3/7-45		NPO, 650	500
Type 826 (Rotary)	10-30/225-400		NPO, 650	500
Transmitting Capacitors				
Type 850	25-1000	±5, ±10, ±20	NPO, 750	5K-7.5K
Type 851, 857	25-200	±5, ±10	NPO, 750	7.5K-15K
Type 853, 854, 855	3-40	±5, ±10	NPO, 750	5K
Type 858, (Hi-K)	500-1000	±20, GMV		5K
Type 859	50-500	±10	NPO, 750	20K
Discoidal				
	5-1000	±10, ±20, GMV		500

Antenna Coupling & Line Bypass Components UL Yellow card listed

DISC-R-CAP & TUBE-R-CAP®: parallel resistor, capacitor, and spark gap available with 50 to 2500 pf capacitance, 1.4 KVDC, 1 KVDC, 150 VAC, 60 HZ voltage rating.

AC LINE DISC CAPACITORS 380-10,000 pf.

CENTRALAB Electronics Division • GLOBE-UNION INC.
5757 NORTH GREEN BAY AVENUE • MILWAUKEE, WISCONSIN 53201

CAL-R INC. / CAPACITOR DIVISION

a subsidiary of CapTech, Inc.

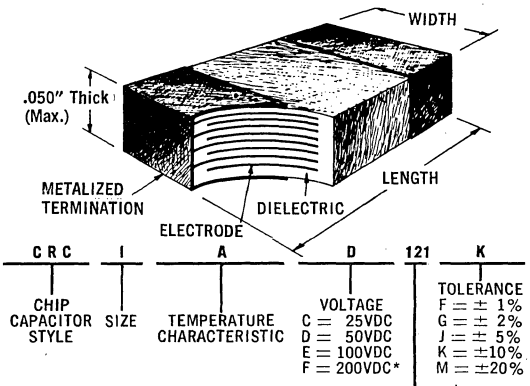
CHIP CAPACITORS

GENERAL SPECIFICATIONS

1. Capacitance: Capacitance range 1 pf through 3.9 mfd. When measured as listed below at 25°C (Reference MIL-STD 202 Method 305).
2. Capacitance Tolerance: Standard tolerance ±10%, ±20%, and G.M.V. (Other tolerances available on special order.)
3. Dissipation Factor: Measured as listed below at 25°C (Reference MIL-STD 202 Method 305).
4. Insulation Resistance: Greater than 50,000 megohms or 1,000 megohm mfd, whichever is less when tested at a minimum of twice rated voltage and in accordance with Method 302, of MIL-STD 202.
5. Voltage Rating: See chart (Other voltage ratings available for special applications.)
6. Temperature Range: —55°C to +125°C, operating for all values with no voltage derating required.
7. Dielectric Withstanding Voltage: A test potential of 2.5 times rated voltage applied between the capacitor terminals for a period of 5±1 seconds with a limiting surge current of 50 m a maximum, in accordance with method 301 of MIL-STD 202.

Characteristic	Maximum DF @ 25°C	Temperature Characteristics	
		Zero Volts	Rated Volts
A	.1% when measured @ 1 KHz @ 1 VRMS	± .5%	± .5%
B	2.5% when measured @ 1 KHz @ 1 VRMS	±15%	±15% —25%
C	2.5% when measured @ 1 KHz @ 1 VRMS	+ 8% —17%	+ 8% —30%

*Over Temp. Range —15° to +85°C



Capacitance in Pico-farads (pf). The first two digits represent significant figures; the last digit specifies the number of zeros to follow. (120 pf is illustrated.)

*Special quote for 200VDC or higher voltage rating

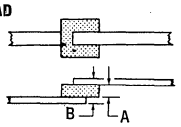
SIZE	DIMENSIONS			CAPACITANCE RANGE TEMPERATURE CHARACTERISTICS					
				A		B		C	
	L (±.010*)	W (±.010*)	T (MAX.)	50V	100V	50V	100V	50V	100V
30	.050	.040	.040	330pf	220pf	4700pf	1800pf	6800pf	2700pf
31	.080	.050	.050	680pf	470pf	0.1mfd	3300pf	.015mfd	4700pf
32	.095	.050	.050	1200pf	820pf	.018mfd	8200pf	.027mfd	.012mfd
33	.105	.105	.100	.01mfd	5600pf	.068mfd	.027mfd	.1mfd	.047mfd
34	.125	.095	.070	4700pf	2700pf	.068mfd	.027mfd	.1mfd	.056mfd
35	.150	.050	.050	2000pf	1200pf	.033mfd	.015mfd	.047mfd	.022mfd
36	.170	.065	.070	4700pf	2700pf	.068mfd	.027mfd	.1mfd	.039mfd
37	.180	.050	.050	2200pf	1500pf	.033mfd	.012mfd	.056mfd	.033mfd
38	.180	.080	.070	6800pf	4700pf	.082mfd	.039mfd	.12mfd	.056mfd
39	.175	.125	.070	8200pf	5600pf	.1mfd	4700pf	.15mfd	.068mfd
40	.180	.250	.050	.015mfd	.01mfd	.22mfd	.12mfd	.33mfd	.15mfd
41	.225	.250	.085	.027mfd	.01mfd	.39mfd	.15mfd	.56mfd	.22mfd

* or 7% whichever is greater

PELLET SERIES

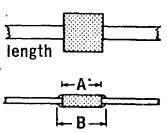
RIBBON OR 30 GA. LEAD

.003 thk. × .020 wide
× .750 min. length
Alloy 180 Gold plated



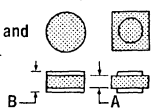
30 GA. LEAD

30 ga. 1¼" min. length
Alloy 180
Gold plated



DISC. TERMINATION

.050 Dia. and
.100 Dia.



A = Thickness of basic element.
B = Total thickness with terminations attached.
Protective coating: Thin film resin impregnated to withstand normal handling and storage.
Run up: .025" maximum unless otherwise specified.
Terminations: Solderable and weldable.

GENERAL SPECIFICATIONS: SCP PELLET SERIES

1. Voltage Rating: 50 WVDC from —55°C +85°C; 25WVDC +85°C to ±150°C.
2. Maximum capacitance change with temperature: ±10% of R.T. value @ 1 KC from —15°C to +85°C; +15% —20% from —55°C to +150°C.
3. Test Voltage: 2.5 × rated voltage.
4. Capacitance: Measured at 25°C ±2°C, 1 KC and .5VRMS.
5. Capacitance Tolerance: Available in ±10% and ±20% (±5% tolerance special).
6. Dissipation Factor: 2.5% maximum @ 1 KC 25°C ±2°C and .5VRMS.
7. Insulation Resistance: Greater than 1000 megohm microfarads or 25,000 megohms @ 25°C.
8. Tolerance: For tolerance add the following letter to end of part number: J = ±5%, K = ±10%, M = ±20%.

PART NUMBERING GUIDE

SCP	3	A	D	101	J
Hi K Style	Termination Type	Case Size	Voltage	Value	Tolerance

Case Size	Basic Element	With Disc. Term.	With Ribbon Lead	With 30 Ga. Lead
ROUND. Diameter dimensions ±.005, thickness dimensions maximum.				
A	.010 X .050 dia. 47 pf-270 pf	.020 X .050 dia. 47 pf-270 pf	.030 X .050 dia. 22 pf-270 pf	.040 X .050 dia. 22 pf-270 pf
B	.010 X .1 dia. 220 pf-1000 pf	.020 X .1 dia. 220 pf-1000 pf	.030 X .1 dia. 100 pf-1000 pf	.040 X .1 dia. 100 pf-1000 pf
RECTANGULAR. All dimensions maximum.				
C		.030 X .1 X .1 1200 pf-5600 pf	.045 X .1 X .1 1200 pf-5600 pf	.055 X .1 X .1 1200 pf-5600 pf
D		.030 X .125 X .125 6800 pf-12000 pf	.045 X .125 X .125 6800 pf-12000 pf	.055 X .125 X .125 6800 pf-12000 pf
E		.030 X .175 X .175 12000 pf-27000 pf	.045 X .175 X .175 12000 pf-27000 pf	.055 X .175 X .175 12000 pf-27000 pf
F		.062 X .125 X .125 15000 pf-22000 pf	.075 X .125 X .125 15000 pf-22000 pf	.085 X .125 X .125 15000 pf-22000 pf
G		.062 X .2 X .2 33000 pf-100000 pf	.075 X .2 X .2 33000 pf-100000 pf	.085 X .2 X .2 33000 pf-100000 pf

GENERAL SPECIFICATIONS: CNP PELLET SERIES

1. Capacitance Tolerance: Available in F = ±1%; G = ±2%; J = ±5%; K = ±10%; M = ±20%; Z = GMV.
2. Dissipation Factor (DF): 0.1% maximum for values of 10 pf through 3300 pf.
3. Voltage Rating: D = 50 VDC; E = 100 VDC.
4. Capacitance and DF Measurements: Tested IAW with Method 305 of MIL-STD 202. Values of 1000 pf or less: 1 MHz ± 1 KHz. Values over 1000 pf: 1 KHz ± 100 Hz. Test Voltage: 1.0 ±0.2 Volts rms.
5. Insulation Resistance (IR): When tested IAW Method 302 of MIL-STD 202, 50 Volts DC applied, the insulation resistance shall be 100,000 megohms minimum or 1000 megohm microfarads, whichever is less.
6. Dielectric Withstanding Voltage: A test voltage equal to 250% of rated DC voltage current limited to 50 MA.

PART NUMBERING SYSTEM

CNP	3	D	D	151	J
NPO Style	Termination Type	Case Size	Voltage	Value	Tolerance

Case Size	Basic Element (1)	With Disc Term. (2)	With Ribbon Lead (3)	With 30 Ga. Lead (4)
ROUND. Diameter dimensions ±.005, thickness dimensions maximum.				
A	.010 X .050 dia. 1 pf-3.3 pf	.020 X .050 dia. 1 pf-3.3 pf	.030 X .050 dia. 1 pf-3.3 pf	.040 X .050 dia. 1 pf-3.3 pf
B	.010 X .1 dia. 3.9 pf-10 pf	.020 X .1 dia. 3.9 pf-10 pf	.030 X .1 dia. 3.9 pf-10 pf	.040 X .1 dia. 3.9 pf-10 pf
RECTANGULAR. All dimensions maximum.				
C		.030 X .1 X .1 11 pf-140 pf	.045 X .1 X .1 11 pf-140 pf	.055 X .1 X .1 11 pf-140 pf
D		.062 X .1 X .1 150 pf-330 pf	.075 X .1 X .1 150 pf-330 pf	.085 X .1 X .1 150 pf-330 pf
E		.062 X .125 X .125 340 pf-820 pf	.075 X .125 X .125 340 pf-820 pf	.085 X .125 X .125 340 pf-820 pf
F		.062 X .2 X .2 830 pf-3300 pf	.075 X .2 X .2 830 pf-3300 pf	.085 X .2 X .2 830 pf-3300 pf

CAL-R INC. CAPACITOR DIVISION

CK12, CK13, CK14, CK15 & CK16 CAPACITORS

GENERAL SPECIFICATIONS

CASE TYPE: Molded epoxy, tubular axial leads.
LEADS: Solder coated oxygen free copper. No. 26 AWG .016 +.004, −.001 for CK12 & CK13 Styles and No. 22 AWG .026 +.004, −.001 for CK14, CK15, CK16 Styles.
PART MARKING: Manufacturers Symbol, Date Code, Part Number, Tolerance and Voltage Rating.

ELECTRICAL

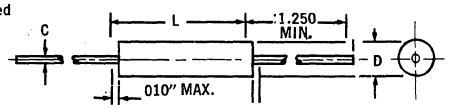
DISSIPATION FACTOR (DF): 2.5% maximum.
INSULATION RESISTANCE (IR): 100,000 megohms minimum or 1,000 megohm microfarad minimum, whichever is less.
DIELECTRIC WITHSTANDING VOLTAGE: 250% of rated voltage, current limited to 50 mA, applied between the capacitor terminals.

ENVIRONMENTAL

OPERATING TEMPERATURE RANGE: −55°C to +125°C operating for all values with no voltage derating.
TEMPERATURE CHARACTERISTICS: BX, ±15% at zero volts, +15%, −25% at rated volts for all values −55°C to +125°C.
BR, ±15% at 0 volts, +15%, −40% at rated volts for all values −55°C to +125°C.

Style	Dimensions (L) Length	(D) Dia.	(C) Leads Dia.
CK12	.160 (±.010)	.090 (±.010)	.016 (+.004 −.001)
CK13	.250 (±.010)	.090 (±.010)	.016 (+.004 −.001)
CK14	.390 (±.010)	.140 (±.010)	.025 (+.004 −.001)
CK15	.500 (±.020)	.250 (±.015)	.025 (+.004 −.001)
CK16	.690 (±.030)	.350 (±.020)	.025 (+.004 −.001)

Leads: Solder coated oxygen free copper



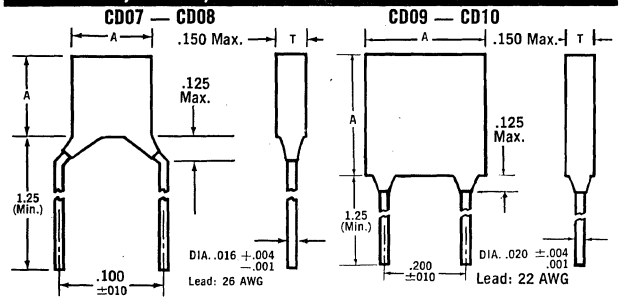
PART NUMBERING SYSTEM

Type	Style	Characteristics Temperature	Capacitance Value	Capacitance Tolerance
MIL	CK12	BX	472	K
Cal-R	SCM12	BX	472	K

TOLERANCE K = ±10% M = ±20%

Capacity Value	Cal-R P/N	MIL P/N	WVDC Voltage	Cal-R P/N	MIL P/N	WVDC Voltage
10pF	SCM12BX100K	CK12BX100K	100			
12pF	SCM12BX120K	CK12BX120K	100			
15pF	SCM12BX150K	CK12BX150K	100			
18pF	SCM12BX180K	CK12BX180K	100			
22pF	SCM12BX220K	CK12BX220K	100			
27pF	SCM12BX270K	CK12BX270K	100			
33pF	SCM12BX330K	CK12BX330K	100			
39pF	SCM12BX390K	CK12BX390K	100			
47pF	SCM12BX470K	CK12BX470K	100			
56pF	SCM12BX560K	CK12BX560K	100			
68pF	SCM12BX680K	CK12BX680K	100			
82pF	SCM12BX820K	CK12BX820K	100			
100pF	SCM12BX101K	CK12BX101K	100			
120pF	SCM12BX121K	CK12BX121K	100			
150pF	SCM12BX151K	CK12BX151K	100			
180pF	SCM12BX181K	CK12BX181K	100			
220pF	SCM12BX221K	CK12BX221K	100			
270pF	SCM12BX271K	CK12BX271K	100			
330pF	SCM12BX331K	CK12BX331K	100			
390pF	SCM12BX391K	CK12BX391K	100			
470pF	SCM12BX471K	CK12BX471K	100			
560pF	SCM12BX561K	CK12BX561K	100			
680pF	SCM12BX681K	CK12BX681K	100			
820pF	SCM12BX821K	CK12BX821K	100			
1000pF	SCM12BX102K	CK12BX102K	100			
1200pF	SCM12BX122K	CK12BX122K	100			
1500pF	SCM12BX152K	CK12BX152K	100			
1800pF	SCM12BX182K	CK12BX182K	100			
2200pF	SCM12BX222K	CK12BX222K	100			
2700pF	SCM12BX272K	CK12BX272K	100			
3300pF	SCM12BX332K	CK12BX332K	100			
3900pF	SCM12BX392K	CK12BX392K	100			
4700pF	SCM12BX472K	CK12BX472K	100			
5600pF	SCM12BX562K	CK12BX562K	50	SCM13BX562K	CK13BX562K	100
6800pF	SCM12BX682K	CK12BX682K	50	SCM13BX682K	CK13BX682K	100
8200pF	SCM12BX822K	CK12BX822K	50	SCM13BX822K	CK13BX822K	100
.01mF	SCM12BX103K	CK12BX103K	50	SCM13BX103K	CK13BX103K	100
.012mF	SCM14BX123K	CK14BX123K	100	SCM13BX123K	CK13BX123K	50
.015mF	SCM14BX153K	CK14BX153K	100	SCM13BX153K	CK13BX153K	50
.018mF	SCM14BX183K	CK14BX183K	100	SCM13BX183K	CK13BX183K	50
.022mF	SCM14BX223K	CK14BX223K	100	SCM13BX223K	CK13BX223K	50
.027mF	SCM14BX273K	CK14BX273K	100	SCM13BR272K	CK13BR273K	50
.033mF	SCM14BX333K	CK14BX333K	100	SCM13BR333K	CK13BR333K	50
.039mF	SCM14BX393K	CK14BX393K	100	SCM13BR393K	CK13BR393K	50
.047mF	SCM14BX473K	CK14BX473K	100	SCM13BR473K	CK13BR473K	50
.056mF	SCM14BR563K	CK14BR563K	100			
.068mF	SCM14BR683K	CK14BR683K	100			
.082mF	SCM14BR823K	CK14BR823K	100			
.10mF	SCM14BR104K	CK14BR104K	100	SCM15BX104K	CK15BX104K	100
.12mF	SCM14BR124K	CK14BR124K	50	SCM15BR124K	CK15BR124K	100
.15mF	SCM14BR154K	CK14BR154K	50	SCM15BR154K	CK15BR154K	100
.18mF	SCM14BR184K	CK14BR184K	50	SCM15BR184K	CK15BR184K	100
.22mF	SCM14BR224K	CK14BR224K	50	SCM15BR224K	CK15BR224K	100
.27mF	SCM14BR274K	CK14BR274K	50	SCM15BR274K	CK15BR274K	100
.33mF				SCM15BR334K	CK15BR334K	100
.47mF	SCM16BR474K		100	SCM15BR474K	CK15BR474K	50
1.00mF	SCM16BR105K		100	SCM15BR105K	CK15BR105K	50
2.20mF	SCM16BR225K		50			
3.30mF	SCM16BR335K		50			

CD07, CD08, CD09 & CD10 CAPACITORS



GENERAL SPECIFICATIONS

CASE TYPE: Dipped resin.
LEADS: Solder coated oxygen free copper. No. 26 AWG (CD07/08). No. 22 AWG (CD09/10).
PART MARKING: Where space permits. Manufacturing Symbol, Capacitance Value, Capacitance Tolerance (K or M) and Voltage Rating.

ELECTRICAL

DISSIPATION FACTOR (DF): Characteristic K: 2.5% maximum for values of 10 pF through 1.00 microfarad. Characteristic N: 0.1% maximum for values of 10 pF through 0.01 microfarad.
CAPACITANCE AND DF MEASUREMENTS: Test Frequency for characteristic K in values of 100 pF or less: 1 MHz ±1 kHz and values over 100 pF: 1 kHz ±100 Hz. Characteristic N in values of 1000 pF or less: 1 MHz ±1 kHz. Values over 1000 pF: 1 kHz ±100 Hz. Test Voltage: 1.0 ±0.2 volts rms.
INSULATION RESISTANCE (IR): 50 volts DC applied, the insulation resistance shall be 100,000 megohms Minimum or 1000 megohm microfarad, whichever is less.
DIELECTRIC WITHSTANDING VOLTAGE: A test voltage equal to 250% of rated DC voltage current limited to 50 MA.

ENVIRONMENTAL

OPERATING TEMPERATURE RANGE: −55°C to +125°C operating for all values with no voltage derating required.
TEMPERATURE CHARACTERISTICS: Characteristic K: ±15% at zero volts DC, from −55°C to +125°C. Characteristic N: 0 ±30 PPM/°C at zero volts DC from −55°C to +125°C.

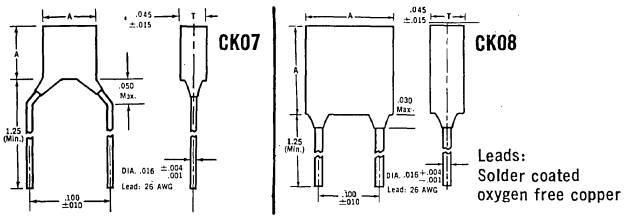
PART NUMBERING SYSTEM

Type	Style	Temperature Characteristics	Volts	Capacitance Value	Capacitance Tolerance
Cal-R	CD07	N	D	101	M

VOLTS: D = 50V C = 25V
TEMPERATURE CHARACTERISTICS: N = 0±30 PPM K = ±15%

Capacity Value	Tolerance	Characteristic N 50 volt	N Dimension Max. A	Characteristic K 25 Volt	K Dimension Max. A	Characteristic K 50 volt	K Dimension Max. A
10pF	K—M	CD07ND100	.130	CD07KC100	.130	CD07KD100	.130
12	K	CD07ND120	.130	CD07KC120	.130	CD07KD120	.130
15	K—M	CD07ND150	.130	CD07KC150	.130	CD07KD150	.130
18	K	CD07ND180	.130	CD07KC180	.130	CD07KD180	.130
22	K—M	CD07ND220	.130	CD07KC220	.130	CD07KD220	.130
27	K	CD07ND270	.130	CD07KC270	.130	CD07KD270	.130
33	K—M	CD07ND330	.130	CD07KC330	.130	CD07KD330	.130
39	K	CD07ND390	.130	CD07KC390	.130	CD07KD390	.130
47	K—M	CD07ND470	.130	CD07KC470	.130	CD07KD470	.130
56	K	CD07ND560	.130	CD07KC560	.130	CD07KD560	.130
68	K—M	CD07ND680	.130	CD07KC680	.130	CD07KD680	.130
82	K	CD07ND820	.130	CD07KC820	.130	CD07KD820	.130
100	K—M	CD07ND101	.130	CD07KC101	.130	CD07KD101	.130
120	K	CD07ND121	.130	CD07KC121	.130	CD07KD121	.130
150	K—M	CD07ND151	.130	CD07KC151	.130	CD07KD151	.130
180	K	CD07ND181	.130	CD07KC181	.130	CD07KD181	.130
220	K—M	CD07ND221	.130	CD07KC221	.130	CD07KD221	.130
270	K	CD07ND271	.130	CD07KC271	.130	CD07KD271	.130
330	K—M	CD07ND331	.130	CD07KC331	.130	CD07KD331	.130
390	K	CD08ND391	.150	CD07KC391	.130	CD07KD391	.130
470	K—M	CD08ND471	.150	CD07KC471	.130	CD07KD471	.130
560	K	CD08ND561	.150	CD07KC561	.130	CD07KD561	.130
680	K—M	CD08ND681	.150	CD07KC681	.130	CD07KD681	.130
820	K	CD08ND821	.150	CD07KC821	.130	CD07KD821	.130
1000	K—M	CD09ND102	.250	CD07KC102	.130	CD07KD102	.130
1200	K	CD09ND122	.250	CD07KC122	.130	CD07KD122	.130
1500	K—M	CD09ND152	.250	CD07KC152	.130	CD07KD152	.130
1800	K	CD09ND182	.250	CD07KC182	.130	CD07KD182	.130
2200	K—M	CD09ND222	.250	CD07KC222	.130	CD07KD222	.130
2700	K	CD09ND272	.250	CD07KC272	.130	CD07KD272	.130
3300	K—M	CD09ND332	.250	CD07KC332	.130	CD07KD332	.130
3900	K	CD10ND392	.350	CD07KC392	.130	CD07KD392	.130
4700	K—M	CD10ND472	.350	CD07KC472	.130	CD07KD472	.130
5600	K	CD10ND562	.350	CD07KC562	.130	CD07KD562	.130
6800	K—M	CD10ND682	.350	CD07KC682	.130	CD07KD682	.130
8200	K	CD10ND822	.350	CD07KC822	.130	CD07KD822	.130
.01mF	K—M	CD10ND103	.350	CD07KC103	.130	CD07KD103	.130
.012	K			CD07KC123	.130	CD07KD123	.130
.015	K—M			CD07KC153	.130	CD08KD153	.150
.018	K			CD07KC183	.130	CD08KD183	.150
.022	K—M			CD07KC223	.130	CD08KD223	.150
.027	K			CD07KC273	.130	CD08KD273	.150
.033	K—M			CD08KC333	.150	CD09KD333	.250
.039	K			CD08KC393	.150	CD09KD393	.250
.047	K—M			CD08KC473	.150	CD09KD473	.250
.056	K			CD08KC563	.150	CD09KD563	.250
.068	K—M			CD09KC683	.250	CD09KD683	.250
.082	K			CD09KC823	.250	CD09KD823	.250
.10	K—M			CD09KC104	.250	CD09KD104	.250
.12	K			CD09KC124	.250	CD09KD124	.250
.15	K—M			CD09KC154	.250	CD09KD154	.250
.18	K			CD09KC184	.250	CD09KD184	.250
.22	K—M			CD09KC224	.250	CD09KD224	.250
.27	K			CD09KC274	.250	CD09KD274	.250
.33	K—M			CD09KC334	.250	CD10KD334	.350
.39	K			CD10KC394	.350	CD10KD394	.350
.47	K—M			CD10KC474	.350	CD10KD474	.350
.56	K			CD10KC564	.350		
.68	K—M			CD10KC684	.350		
.82	K			CD10KC824	.350		
1.00	K—M			CD10KC105	.350		

CK07 & CK08 CAPACITORS



GENERAL SPECIFICATIONS/24B SERIES

CASE TYPE
Dipped resin
LEADS
Solder coated, oxygen free copper. No. 26 AWG (CK07 and CK08).
PART MARKING
Where space permits Manufacturing Symbol, Capacitance Value, Capacitance Tolerance (K or M), and Voltage Rating.

ELECTRICAL

DISSIPATION FACTOR (DF)
2.0% maximum
CAPACITANCE AND DF MEASUREMENTS
100 pF or less: 1 mHz ±1 kHz. Values over 100 pF: 1 kHz ±100 Hz. Test Voltage 1.0 ±0.2 volts rms.
INSULATION RESISTANCE (IR)
50 volts DC applied the insulation resistance shall be 100,000 megohms Min.
VOLTAGE RATING
50 WVDC for all values to 125°C. Refer to Part Number Table on front of data sheet.
DIELECTRIC WITHSTANDING VOLTAGE
A test voltage of 400 volts DC current limited to 50 mA applied between the capacitor terminals.

ENVIRONMENTAL

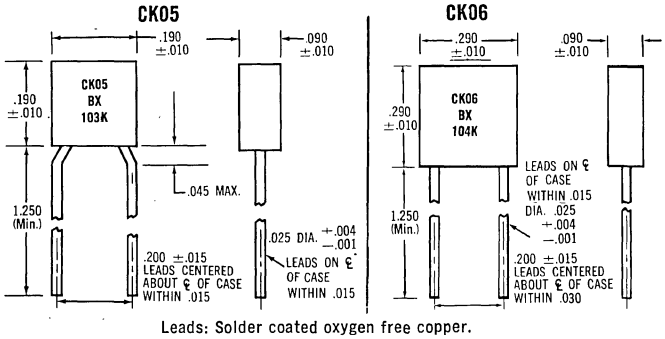
OPERATING TEMPERATURE RANGE
—55°C to +125°C operating for all values with no voltage derating required.
TEMPERATURE CHARACTERISTICS
BX ±15% at zero volts, +15% —22% at rated voltage from —55°C to +125°C.

Capacity Value	Cal-R P/N	MIL P/N	WVDC Voltage	Size (tol. ±.020) A	Lead Spacing (±.010)
27pF	SC07BX270K	CK07BX270K	50	.080	.100
33	SC07BX330K	CK07BX330K	50	.080	.100
39	SC07BX390K	CK07BX390K	50	.080	.100
47	SC07BX470K	CK07BX470K	50	.080	.100
56	SC07BX560K	CK07BX560K	50	.080	.100
68	SC07BX680K	CK07BX680K	50	.080	.100
82	SC07BX820K	CK07BX820K	50	.080	.100
100	SC07BX101K	CK07BX101K	50	.080	.100
120	SC07BX121K	CK07BX121K	50	.080	.100
150	SC07BX151K	CK07BX151K	50	.080	.100
180	SC07BX181K	CK07BX181K	50	.080	.100
220	SC07BX221K	CK07BX221K	50	.080	.100
270	SC07BX271K	CK07BX271K	50	.080	.100
330	SC07BX331K	CK07BX331K	50	.080	.100
390	SC07BX391K	CK07BX391K	50	.080	.100
470	SC07BX471K	CK07BX471K	50	.080	.100
560	SC07BX561K	CK07BX561K	50	.080	.100
680	SC07BX681M	CK07BX681M	50	.080	.100
1000	SC07BX102M	CK07BX102M	50	.080	.100
1500	SC08BX152M	CK08BX152M	50	.130	.100
2200	SC08BX222M	CK08BX222M	50	.130	.100
3300	SC08BX332M	CK08BX332M	50	.130	.100
3900	SC08BX392M	CK08BX392M	50	.130	.100
4700	SC08BX472M	CK08BX472M	50	.130	.100
5600	SC08BX562M	CK08BX562M	50	.130	.100
6800	SC08BX682M	CK08BX682M	50	.130	.100
8200	SC08BX822M	CK08BX822M	50	.130	.100
10000	SC08BX100M	CK08BX103M	50	.130	.100

PART NUMBERING SYSTEM

Type	Style	Temperature Characteristics	Capacitance Value	Capacitance Tolerance
MIL	CK07	Bx	101	M
Cal-R	SC07	Bx	101	M

CK05 & CK06 CAPACITORS



Leads: Solder coated oxygen free copper.

GENERAL SPECIFICATIONS/819 SERIES

CASE TYPE
Molded epoxy
LEADS
Solder coated oxygen free copper suitable for soldering or welding No. 22 AWG .025 + .004, —.001
PART MARKING
Manufacturers Symbol, Data Code, Part Number, Tolerance and Voltage Rating.

ELECTRICAL

DISSIPATION FACTOR (DF)
2.5% maximum
CAPACITANCE AND DF MEASUREMENTS
Test Frequency, 100 pF or less: 1 mHz ±1 kHz. Values over 100 pF: 1 kHz ±100 Hz. Test Voltage 1.0 ±0.2 volts rms.
INSULATION RESISTANCE (IR)
Rated voltage applied, the insulation resistance shall be 100,000 megohms minimum or 1000 megohm microfarad, whichever is less.
DIELECTRIC WITHSTANDING VOLTAGE
250% of rated voltage, current limited to 50 mA, applied between the capacitor terminals.

ENVIRONMENTAL

OPERATING TEMPERATURE RANGE
—55°C to +125°C operating for all values with no voltage derating.
—55°C to +150°C operating for values 10 pF thru 1000 pF (CK05 style) and 1200 pF through .01 μF (CK06 style).
TEMPERATURE CHARACTERISTICS
BX, ±15% at zero volts, +15% —25% at rated volts for all values
—55°C to 125°C.
CW, +22% —56% at zero volts, +22% —66% at rated volts for values 10 pF through 1000 pF (CK05 style) and 1200 pF thru .01 μF (CK06 style) —55% to +150°C.

PART NUMBERING SYSTEM

Type	Style	Temperature Characteristics	Capacitance Value	Capacitance Tolerance
MIL	CK05	BX	103	K
Cal-R	SCM05	BX	103	K

TOLERANCE: K = ±10% M = ±20%

Capacity Value	Cal-R P/N	MIL P/N	WVDC Voltage	Cal-R P/N	MIL P/N	WVDC Voltage
10pF	SCM05BX100K	CK05BX100K	200			
12pF	SCM05BX120K	CK05BX120K	200			
15pF	SCM05BX150K	CK05BX150K	200			
18pF	SCM05BX180K	CK05BX180K	200			
22pF	SCM05BX220K	CK05BX220K	200			
27pF	SCM05BX270K	CK05BX270K	200			
33pF	SCM05BX330K	CK05BX330K	200			
39pF	SCM05BX390K	CK05BX390K	200			
47pF	SCM05BX470K	CK05BX470K	200			
56pF	SCM05BX560K	CK05BX560K	200			
68pF	SCM05BX680K	CK05BX680K	200			
82pF	SCM05BX820K	CK05BX820K	200			
100pF	SCM05BX101K	CK05BX101K	200			
120pF	SCM05BX121K	CK05BX121K	200			
150pF	SCM05BX151K	CK05BX151K	200			
180pF	SCM05BX181K	CK05BX181K	200			
220pF	SCM05BX221K	CK05BX221K	200			
270pF	SCM05BX271K	CK05BX271K	200			
330pF	SCM05BX331K	CK05BX331K	200			
390pF	SCM05BX391K	CK05BX391K	200			
470pF	SCM05BX471K	CK05BX471K	200			
560pF	SCM05BX561K	CK05BX561K	200			
680pF	SCM05BX681K	CK05BX681K	200			
820pF	SCM05BX821K	CK05BX821K	200			
1000pF	SCM05BX102K	CK05BX102K	200			
1200pF	SCM05BX122K	CK05BX122K	100	SCM06BX122K	CK06BX122K	200
1500pF	SCM05BX152K	CK05BX152K	100	SCM06BX152K	CK06BX152K	200
1800pF	SCM05BX182K	CK05BX182K	100	SCM06BX182K	CK06BX182K	200
2200pF	SCM05BX222K	CK05BX222K	100	SCM06BX222K	CK06BX222K	200
2700pF	SCM05BX272K	CK05BX272K	100	SCM06BX272K	CK06BX272K	200
3300pF	SCM05BX332K	CK05BX332K	100	SCM06BX332K	CK06BX332K	200
3900pF	SCM05BX392K	CK05BX392K	100	SCM06BX392K	CK06BX392K	200
4700pF	SCM05BX472K	CK05BX472K	100	SCM06BX472K	CK06BX472K	200
5600pF	SCM05BX562K	CK05BX562K	100	SCM06BX562K	CK06BX562K	200
6800pF	SCM05BX682K	CK05BX682K	100	SCM06BX682K	CK06BX682K	200
8200pF	SCM05BX822K	CK05BX822K	100	SCM06BX822K	CK06BX822K	200
.01mF	SCM05BX103K	CK05BX103K	100	SCM06BX103K	CK06BX103K	200
.012mF	SCM05BX123K	CK05BX123K	50	SCM06BX123K	CK06BX123K	100
.015mF	SCM05BX153K	CK05BX153K	50	SCM06BX153K	CK06BX153K	100
.018mF	SCM05BX183K	CK05BX183K	50	SCM06BX183K	CK06BX183K	100
.022mF	SCM05BX223K	CK05BX223K	50	SCM06BX223K	CK06BX223K	100
.027mF	SCM05BX273K	CK05BX273K	50	SCM06BX273K	CK06BX273K	100
.033mF	SCM05BX333K	CK05BX333K	50	SCM06BX333K	CK06BX333K	100
.039mF	SCM05BX393K	CK05BX393K	50	SCM06BX393K	CK06BX393K	100
.047mF	SCM05BX473K	CK05BX473K	50	SCM06BX473K	CK06BX473K	100
.056mF	SCM05BX563K	CK05BX563K	50	SCM06BX563K	CK06BX563K	100
.068mF	SCM05BX683K	CK05BX683K	50	SCM06BX683K	CK06BX683K	100
.082mF	SCM05BX823K	CK05BX823K	50	SCM06BX823K	CK06BX823K	100
.10mF	SCM05BX104K	CK05BX104K	50	SCM06BX104K	CK06BX104K	100
.12mF				SCM06BX124K	CK06BX124K	50
.15mF				SCM06BX154K	CK06BX154K	50
.18mF				SCM06BX184K	CK06BX184K	50
.22mF				SCM06BX224K	CK06BX224K	50
.27mF				SCM06BX274K	CK06BX274K	50
.33mF				SCM06BX334K	CK06BX334K	50
.39mF				SCM06BX394K	CK06BX394K	50
.47mF				SCM06BX474K	CK06BX474K	50
.56mF				SCM06BX564K	CK06BX564K	50
.68mF				SCM06BX684K	CK06BX684K	50
.82mF				SCM06BX824K	CK06BX824K	50
1.00mF				SCM06BX105K	CK06BX105K	50

CAL-R® INC. a subsidiary of CapTech, Inc.
CAPACITORS • RESISTORS • THERMISTORS • MICROELECTRONICS
1601 OLYMPIC BOULEVARD, SANTA MONICA, CALIFORNIA 90404 (213) 451-9761 • TWX 910-343-6966

MIL-C-39022/9A

AC-DC RATED POLYCARBONATE CAPACITORS

CRC Polycarbonate Capacitors Qualified To MIL-C-39022/9A

SANTA MONICA, CALIF. — A new Air Force Established Reliability Specification, 39022/9A, Style CHROI, has been released for critical film capacitor applications.

The CHROIA, B and C styles are rated at 30VDC and 22 volts AC RMS up to 4,000 Hz. The CHROID, E and F styles are rated at 50VDC and 36 volts AC RMS up to 4,000 Hz.

The /9A individual spec. sheet is so unique in performance requirements that the basic document 39022 had to be revised to read, "CHROI styles may be used for applications requiring a tight tolerance, excellent capacitance stability, very high insulation resistance, and low loss factors where the alternating current (AC) component of voltage is large with respect to the applied direct current (DC) voltage and where momentary breakdowns cannot be tolerated."

Capacitors purchased to the /9A spec. must be 100% Group A screened including a special AC square wave test, which applies high energy current pulses to each capacitor. This test was included to eliminate termination and overheating problems common in AC applications.

Novel Group C test requirements include monthly AC life tests at 4,000 Hz and 100°C and semi-annual environmental testing to very tight measurement limits.

Failure rates based upon such closely held post-test requirements can not easily be compared to those established for existing Mil-Spec High-Rel Capacitors.

A Component Research Company spokesman stated that CHROI prices will be no higher than equivalent polycarbonate types listed in their catalog.

Plans are being studied for expansion of the Santa Monica plant to handle the increased business anticipated for the Mil-Spec. approved capacitors.

MIL-C-39022/9A is the first of a new generation of high reliability film capacitor specifications to be issued based upon the highest quality and performance requirements for the 1970's. Component Research Company has pioneered the development and manufacture of these polycarbonate capacitors which made such remarkable specifications possible.

Component Research Company is also conducting tests on standard Teflon, Polystyrene, Polysulfone and other dielectric type capacitors in order to qualify for similar Established (High) Reliability Specifications.

Capacitors of special design, covered by recent patents, which are capable of unusual performance with improved volume efficiency, are now being tested for ultimate qualification to meet Established (High) Reliability Specifications.

The 30 and 50 volt type PV, PK, PL and PG Polycarbonate capacitors shown on Pages 11-16 of this catalog are interchangeable with the CHROI styles listed in the table below.

In order for us to recommend the best suited capacitor for special applications, please send us your specification requirements.

100% SCREENING AND GROUP "A" INSPECTION PER MIL-C-39022/9A

• CHROI AND EQUIVALENT CRC STYLES •

EXAMINATION OR TEST	REQ. PAR.	TEST CONDITIONS	30 VDC POLYCARBONATE STYLES			50 VDC POLYCARBONATE STYLES		
			03PV	03PL	03PG	05PK	05PL	05PG
			CHROIA	CHROIB	CHROIC	CHROID	CHROIE	CHROIF
BURN-IN	100% 4.6.2.1	At 125°C and at 140% of rated DC voltage	For 48 hours minimum	For 16 hours minimum	None	For 48 hours minimum	For 16 hours minimum	None
TEMPERATURE CYCLING	100% 3.7	From −62°C to +125°C	10 cycles minimum	10 cycles minimum	5 cycles minimum	10 cycles minimum	10 cycles minimum	5 cycles minimum
SEAL	100% 3.8	Helium Leak Test	1 X 10^{-6} atm-cc/sec. max.	1 X 10^{-6} atm-cc/sec. max.	1 X 10^{-5} atm-cc/sec. max.	1 X 10^{-6} atm-cc/sec. max.	1 X 10^{-6} atm-cc/sec. max.	1 X 10^{-5} atm-cc/sec. max.
AC DIELECTRIC STRENGTH	100% 3.9	Apply 100 Hz square wave from lead to lead at a min. peak to peak voltage of 3X rated DC voltage for 60 sec. min.	90 volts peak to peak min.	90 volts peak to peak min.	90 volts peak to peak min.	150 volts peak to peak min.	150 volts peak to peak min.	150 volts peak to peak min.
DC DIELECTRIC STRENGTH	100% 3.9	Apply 200% of the rated DC voltage for 60 sec. minimum.	60 VDC min.	60 VDC min.	60 VDC min.	100 VDC min.	100 VDC min.	100 VDC min.
INSULATION RESISTANCE (terminal to terminal only)	100% 3.10	At rated (DC) voltage and 25°C, after 5 min. charge time. For values over 1 mfd, allow an additional minute/mfd.	300,000 Megs. X mfd min., but need not exceed 3,000,000 Megs.	200,000 Megs. X mfd min., but need not exceed 2,000,000 Megs.	100,000 Megs. X mfd min., but need not exceed 1,000,000 Megs.	300,000 Megs. X mfd min., but need not exceed 3,000,000 Megs.	200,000 Megs. X mfd min., but need not exceed 2,000,000 Megs.	100,000 Megs. X mfd min., but need not exceed 1,000,000 Megs.
CAPACITANCE % TOLERANCE	100% 3.11	At 1 KHz and 25°C. Available Tolerances: 0.25%, 0.5%, 1.0%, 2.0%, 5.0% & 10.0%.	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits
% DISSIPATION FACTOR	100% 3.12	At 1 KHz and 25°C. For values over 1 mfd, measure at 0.1 KHz.	0.15% max.	0.20% max.	0.25% max.	0.15% max.	0.20% max.	0.25% max.
VISUAL AND MECHANICAL INSPECTION (external)	100% 3.4,3.5	For dimensions, marking, and workmanship.	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits	Within Specified Limits

COMPONENT RESEARCH CO., INC. 1717 19th Street, Santa Monica, Calif. 90404 • Phone: (213) 393-3755 • TWX: (910) 343-6864

MIL-C-39022/9A
AC-DC RATED POLYCARBONATE CAPACITORS

GROUP "C" INSPECTION PER MIL-C-39022/9A

36 Group "A" Capacitors Selected From Production Every 6 Months For Environmental Testing

SUBGROUP IA, 12 UNITS	SUBGROUP IB, 12 UNITS	SUBGROUP IC, 12 UNITS
• Vibration • Salt Spray • Immersion	• Solderability • Shock • Moisture Resistance	• Terminal Strength • Capac. Change with Temp. • Resistance to Solvents
• Dielectric Strength • Insulation Resistance • △ Capac. % Change • % Dissipation Factor	• Dielectric Strength • Insulation Resistance • △ Capac. % Change • % Dissipation Factor	• Insulation Resistance • △ Capac. % Change • % Dissipation Factor

DC LIFE TEST

GROUP C, SUBGROUP 3A. ALL FAILURE RATE LEVELS FOR ALL CHROI STYLES.

This test is performed at accelerated conditions (using an acceleration factor of 5:1 approximately) on a minimum of 5 samples per style every month as shown in the table. CRC has increased this sample size significantly in order to enhance the reliability and achieve the lowest failure rates.

EXAMINATION OR TEST	CONDITIONS	CHROIA and CHROID 03PV and 05PK	CHROIB and CHROIE 03PL and 05PL	CHROIC and CHROIF 03PG and 05PG
CAPACITANCE CHANGE WITH TEMPERATURE	△C at −55°C	−1.5% to −0.5% max.	−1.7% to −0.5% max.	−2.0% to −0.5% max.
	Retrace at 25°C	0.03% max.	0.05% max.	0.25% max.
	△C at +125°C	+0.8% to −0.5% max.	+1.2% to −0.7% max.	±2.0% max.
DC-LIFE TEST	at 100°C for 2,000 hours	at 42VDC (for 30V)	at 42VDC (for 30V)	at 42VDC (for 30V)
		at 70VDC (for 50V)	at 70VDC (for 50V)	at 70VDC (for 50V)
% DISSIPATION FACTOR	at 100°C (measured after 24-48 hrs. of test)	0.15% max.	0.2% max.	0.25% max.

POST-LIFE TESTS: After 2,000 hours of life at 100°C and 42 VDC for CHROIA, CHROIB, and CHROIC, and at 70 VDC for CHROID, CHROIE, and CHROIF.

INSULATION RESISTANCE AT RATED VOLTAGE AND 25°C. MEGOHMS MINIMUM	Insulating Sleeves	1,000 megs.	1,000 megs.	1,000 megs.
	Terminal to Terminal	100,000 megs x mfd but need not exceed 1,000,000 megs	70,000 megs x mfd but need not exceed 700,000 megs	35,000 megs x mfd but need not exceed 350,000 megs
	Terminal to Case	5,000 megs.	5,000 megs.	5,000 megs.
CAPACITANCE CHANGE WITH LIFE	at 1KHz and 25°C	±2% max. of initial value	±4% max. of initial value.	±5% max. of initial value
% DISSIPATION FACTOR	at 1KHz and 25°C	0.25% max.	0.25% max.	0.35% max.

AC SINUSOIDAL LIFE TEST

GROUP C, SUBGROUP 3B. CHROIA AND CHROID ONLY.

Capacitors shall be tested at 100°C at a frequency of 4KHz with 30 VRMS (CHROIA) and 50 VRMS (CHROID) applied for 240 $^{+48}_{-0}$ hours. The total value of the samples to be tested shall equal 40 mfd. This test is to be performed every month to verify the AC ratings. We expect that failure rates based on AC Life Testing will be included in MIL-C-39022/9A after accumulation of sufficient data.

‡ AC Ratings apply to capacitance values up to 4 mfd, 0 to 4KHz. Above 4 mfd, the product of the capacitance in mfd and the frequency in KHz shall not exceed 16. Above 4KHz, derate linearly to 10KHz at 40%; to 40KHz at 10%.

‡ RMS CURRENT AND VOLTAGE RATINGS

DC RATED VOLTAGE		AC RATED VOLTAGE	
−55 to +100°C	+100 to +125°C	−55 to +100°C	+100 to +125°C
30VDC STYLES • CHROIA • CHROIB • CHROIC	Linear Derating from 30 volts at 100°C to 15 volts at 125°C	22 volts rms. Max. current 2.2 amps for values 4 mfd or greater.	Linear derating 22 to 11 VRMS Max. current 1.1 amps for values 4 mfd or greater
50VDC STYLES • CHROID • CHROIE • CHROIF	Linear Derating from 50 volts at 100°C to 25 volts at 125°C	36 volts rms. Max current 3.6 amps for values 4 mfd or greater.	Linear derating 36 to 18 VRMS Max. current 1.8 amps for values 4 mfd or greater

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GENERAL INFORMATION

ORDERING INFORMATION

To expedite the ordering of prototype quantities we have listed 1-6 quantity prices. Immediate quotation for any quantity required will be given upon request. Our terms are ½% 10 days, Net 30, F.O.B. our plant. Minimum order is $10.00.

PATENT INFORMATION

CRC capacitors are exclusively manufactured under one or more of the following patents and additional patents pending: 3,238,428; 3,260,906; 3,292,063; 3,506,895; 3,539,886.

SPECIAL PRODUCTS AND SERVICES

HIGH RELIABILITY SCREENING

Your most critical requirements for Space or Missile quality capacitors can be met by following a standard or custom CRC-engineered quality test plan.

STRESS TESTED STERILIZATION

CRC capacitors are being supplied high temperature screened to meet long-voyage space requirements of the 1970's and 1980's.

MATCHED CAPACITOR SETS

Customers may purchase 0.5% or 1% tolerance capacitors and ask that we match them in sets of the same or different values to ±0.1% accuracy. You may also require that capacitors be supplied in pairs that track in temperature coefficient linearity as close as ±0.01% for capacitance change with temperature.

HIGH INSULATION RESISTANCE

Capacitors can be supplied measured at temperatures higher than 25°C to meet a special requirement. As an example, we make 30 volt Polycarbonate Capacitors which must exceed 250,000 megohms at 85°C. We can also supply capacitors that can exceed 1,000,000 megohms at 85°C and higher.

ELECTRICAL TEST INFORMATION

The high quality of CRC capacitors may be difficult to evaluate unless sufficiently sensitive and accurate equipment is utilized in conjunction with proper measurement techniques.

Capacitance bridges equal to the General Radio 1620A are recommended for best accuracy of capacitance and dissipation factor. The dissipation factor of capacitors in values above 1 mfd should be measured at 0.1 KHz rather than at 1 KHz which is standard for smaller values, due to the high series resistance of presently available bridges. When performing remote measurements in a test chamber the same problem, due to lead resistance, may also cause an apparent increase in the dissipation factor readings.

Insulation resistance measurement is performed by Component Research Co. using leakage current methods which are repeatable to less than 1 picoamp for capacitors less than 0.1 mfd. Larger values require adequate charge time to minimize dielectric absoption effects. Guard boxes are used to perform leakage current and dielectric absorption measurements.

INSTALLATION INSTRUCTIONS

To prevent damage to the hermetic seal joint, use a tweezer type heat sink between the soldering iron and solder beads when soldering within ¼" of beads.

Prior to lead bending or twisting, protect glass seals and solder joints by gripping with a small pliers, area of leads near solder beads.

Contaminating films on the glass seal surfaces may occur during customer handling and installation of capacitors. To preserve the high insulation resistance inherent in CRC capacitors, clean the glass seal surfaces thoroughly with acetone or a chlorinated hydrocarbon fluid.

HOW TO SPECIFY COMPLETE PART NUMBER

05TA104 A Z S N

BASIC PART NUMBER

TOLERANCE LETTER

A 0.1%	B 0.25%	D 0.5%	F 1%	G 2%	J 5%	K10%

CASE STYLE: LETTER "Z" APPLIES ONLY TO GROUNDED STYLE, OMIT LETTER FOR STANDARD STYLE ISOLATED CASE.

SLEEVING: LETTER "S" APPLIES ONLY TO MYLAR SHRINK-FIT SLEEVING STYLE, OMIT LETTER FOR STANDARD UNINSULATED STYLE.

TERMINAL LEADS: LETTER "N" APPLIES TO GOLD PLATED NICKEL LEADS, OMIT LETTER FOR TINNED COPPER WELD LEADS.

Example 1—Part 05TA104AZSN shown above is a 50 volt, "TA" Teflon capacitor, 0.1mfd, ± 0.1% tolerance, with a grounded case, mylar sleeving, and gold-plated nickel leads.

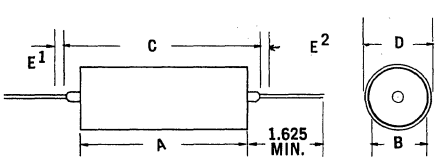
Example 2—Part 1PL106F would be a 100 volt, "PL" Polycarbonate capacitor, 10mfd, ± 1% tolerance, standard isolated case, and tinned copperweld leads.

Example 3—Part 05PL1354DS would be a 50 volt polycarbonate capacitor, 1.35 mfd, ± 0.5%, standard case, sleeving, and tinned copperweld leads.

Note: 1354 represents 1,350,000 picofarads. The last digit, 4, indicates the number of zeros.

CAPACITOR CONSTRUCTION INFORMATION

- All standard types in Catalog "E" are hermetically sealed in metal tubular cases with both terminals electrically isolated from the case. Capacitors are 100% helium leak tested for true hermetic seal.
- #22 AWG wire leads are used for .312 and smaller case diameters.
  #20 AWG wire leads are used for .400 and larger diameters.
- Lead material may be gold plated nickel per MIL-STD-1276, Type N2 or tinned copper clad steel wire as noted in the capacitor specifications.
- When mylar shrinkfit sleeving is desired, add "S" to the basic part number as shown to the left.



MECHANICAL TOLERANCES AND NOTES

A Length "A" is ± .03" max.

B Diameter "B" is ± .01" max. (without mylar sleeving)

C Length "C" is 0.2" max. greater than "A"

D Diameter "D" is .01" max. greater than "B" (when sleeving is put on case)

E Length "E" is .062" max. solder wick area.

TJ TEFLON CAPACITORS

TJ Teflon capacitors meet the highest quality standards of the industry. TJ capacitors are power aged, stabilized, 100% reliability screened per Level "A" shown on Flow Plan page 19 and certified for performance. Superior electrical characteristics plus thorough screening, make these capacitors especially useful for Space and high reliability Military applications. Special TJ capacitors can be supplied with zero temperature coefficient ±10 PPM/°C to ±100 PPM/°C for a limited or wide temperature range.

TJ SPECIFICATIONS

OPERATING TEMPERATURE —62°C to 125°C at full rated voltage

TEMPERATURE COEFFICIENT OF CAPACITANCE

+0.4% max at −55°C	0.0% ref. at 25°C
+0.25% max at −25°C	−0.15% max at 55°C
+0.2% max at −10°C	−0.25% max at 85°C
+0.1% max at 0°C	−0.4% max at 125°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
−10°C to 85°C	0.01% max
−62°C to 125°C	0.05% max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes, maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 mfd (in megohms ÷ mfd)	500,000	500,000	200,000	100,000	25,000

DIELECTRIC ABSORPTION—0.02% max at 25°C.

DISSIPATION FACTOR—0.03% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

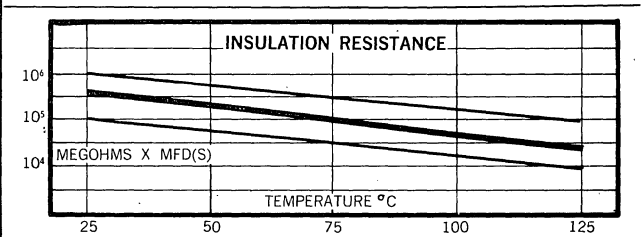
DIELECTRIC STRENGTH—200% of rated volts.

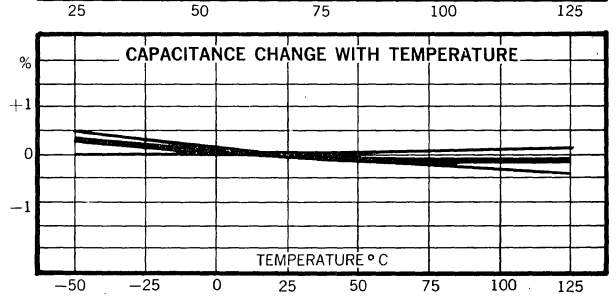
CONSTRUCTION—Hermetically sealed, extended metal film electrodes, leads isolated from case. Lead material is nickel, gold-plated, per Mil-Std-1276, Type N2.

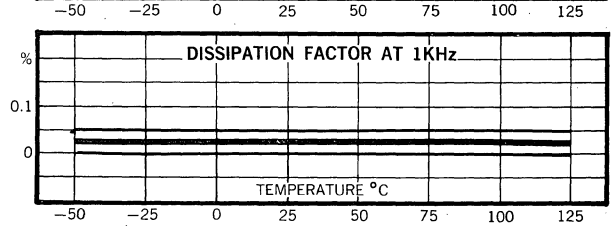
SEAL TEST—1 x 10^{-6} ATM-CC/SEC max leak rate.

ENVIRONMENTAL — Capacitors shall be capable of meeting all applicable requirements of MIL-C-39022/9A including high frequency vibration.

FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION, PAGE 3







LEVEL "A" QUALITY ASSURANCE

"TJ" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

RELIABILITY SCREENING

1. *Stabilization by temperature cycling from —62°C to 125°C, 5 cycles minimum.*
2. *Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C, procedure III A.*
3. *Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.*
4. *Insulation resistance at rated voltage and 25°C.*
5. *Capacitance tolerance at 1KHz and 25°C.*
6. *Dissipation factor at 25°C.*

POWER AGING AND STABILIZATION

7. *Burn-in at 125°C and 140% of rated voltage for a minimum of 48 hours.*
8. *Verification of stability by temperature cycling from —62°C to 125°C, 20 cycles minimum.*

PERFORMANCE CERTIFICATION

9. *Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.*
10. *Insulation resistance at rated voltage and 25°C.*
11. *Capacitance tolerance at 1KHz and 25°C.*
12. *Dissipation factor at 25°C.*
13. *Temperature coefficient measured from —55°C to 125°C at a minimum of 5 temperature points.*
14. *Visual inspection for dimensions, marking, and packaging.*
15. *Traceability to production and test records by permanent marking of parts with lot control number.*
16. *Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.*
17. *Capacitors are serialized and packaged with certified test data to accompany each shipment.*

50 VOLT TJ TEFLON

*ADD TOLERANCE LETTER AFTER PART NO.

Part No.	MFD	± .01 Diam.	± .03 Length	PRICES 1-6 2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
05TJ102	.001	.235	.687	$19.90	$22.89	$25.87	$29.85
05TJ202	.002	.235	.687	19.90	22.89	25.87	29.85
05TJ502	.005	.235	.687	19.90	22.89	25.87	29.85
05TJ103	.01	.235	.687	19.90	22.89	25.87	29.85
05TJ123	.012	.235	.687	19.90	22.89	25.87	29.85
05TJ153	.015	.312	.687	19.90	22.89	25.87	29.85
05TJ203	.02	.312	.687	19.90	22.89	25.87	29.85
05TJ223	.022	.312	.687	19.90	22.89	25.87	29.85
05TJ333	.033	.312	.687	19.90	22.89	25.87	29.85
05TJ473	.047	.312	.687	19.90	22.89	25.87	29.85
05TJ503	.05	.312	.687	19.90	22.89	25.87	29.85
05TJ683	.068	.312	.813	21.89	25.17	28.46	32.84
05TJ823	.082	.312	.937	21.89	25.17	28.46	32.84
05TJ104	.1	.312	.937	21.89	25.17	28.46	32.84
05TJ154	.15	.312	1.063	23.88	26.27	28.66	33.43
05TJ204	.2	.400	1.063	24.88	27.37	29.86	34.83
05TJ224	.22	.400	1.063	24.88	27.37	29.86	34.83
05TJ334	.33	.500	1.125	25.87	28.46	31.04	36.22
05TJ474	.47	.562	1.125	27.86	30.65	33.43	39.00
05TJ504	.5	.562	1.125	27.86	30.65	33.43	39.00
05TJ105	1.0	.67	1.375	37.81	41.59	45.37	49.15
05TJ205	2.0	.67	1.875	57.71	63.48	69.25	75.02

TA TEFLON CAPACITORS

TA teflon capacitors are used in aircraft and space guidance applications which require low loss, low temperature coefficient, excellent stability and reliability. The temperature coefficient slope from —55°C to +125°C is approximately —50 PPM/°C ±50 PPM. The TA capacitors are reliability screened per code **LEVEL B** shown on Flow Plan Page 19. See types TC and TJ teflon for higher reliability and performance.

TA SPECIFICATIONS

OPERATING TEMPERATURE

—62°C to 125°C at full rated voltage

TEMPERATURE COEFFICIENT OF CAPACITANCE

+0.6%	Max at	—55°C
+0.4%	Max at	—25°C
+0.3%	Max at	—10°C
+0.2%	Max at	0°C
0.0%	Reference	25°C
—0.25%	Max at	55°C
—0.5%	Max at	85°C
—0.6%	Max at	125°C

STABILITY

When temperature cycled from —62°C to 125°C for 5 temperature cycles, capacitance drift measured after stabilization shall not exceed:

Range	Retrace
—10°C to 85°C	0.02% Max
—62°C to 125°C	0.1% Max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 mfd (in megohms ÷ mfd)	500,000	500,000	200,000	100,000	25,000

DIELECTRIC ABSORPTION—0.02% maximum at 25°C.

DIELECTRIC STRENGTH—200% of rated voltage.

DISSIPATION FACTOR 0.03% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

CONSTRUCTION

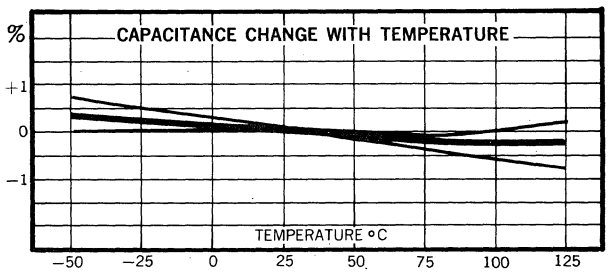
Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case. Lead material is nickel, gold-plated, per Mil-Std-1276, Type N2.

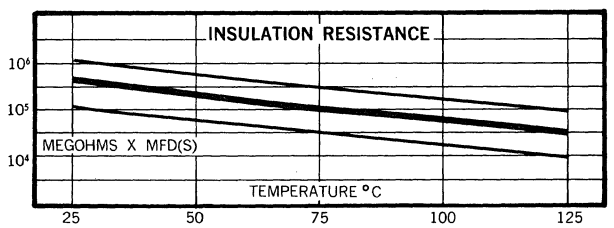
SEAL TEST — 1 x 10^{-6} ATM-CC/SEC max leak rate.

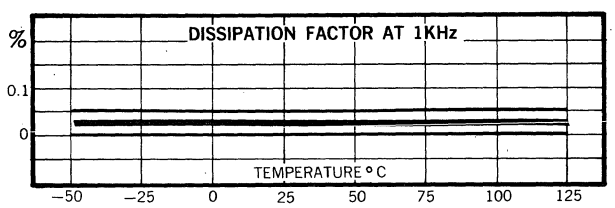
ENVIRONMENTAL

Capacitors shall be capable of meeting all applicable requirements of MIL-C-39022/9A including high frequency vibration.

FOR ADDITIONAL DETAILS,
SEE GENERAL INFORMATION SECTION, PAGE 3







LEVEL "B" QUALITY ASSURANCE

"TA" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. *Stabilization by temperature cycling from —62°C to 125°C, 5 cycles minimum.*
2. *Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C. procedure III A.*
3. *Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.*
4. *Insulation resistance at rated voltage and 25°C.*
5. *Capacitance tolerance at 1KHz and 25°C.*
6. *Dissipation factor at 25°C.*
7. *Visual inspection for dimensions, marking and packaging.*
8. *Traceability to production and test records by permanent marking of parts with lot control number.*
9. *Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.*

TA TEFLON CAPACITORS

50V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
05TA102	.001	.235	.687	$3.75	$4.15	$4.90	$5.85	$7.50	$9.95
05TA122	.0012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA152	.0015	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA182	.0018	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA202	.002	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA222	.0022	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA272	.0027	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA332	.0033	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA472	.0047	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA502	.005	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA682	.0068	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA822	.0082	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA103	.01	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA123	.012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA153	.015	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA183	.018	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA203	.02	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA223	.022	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
05TA273	.027	.312	.687	4.05	4.37	5.05	6.00	7.80	10.85
05TA333	.033	.312	.687	4.05	4.37	5.05	6.00	7.80	10.85

50V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
05TA393	.039	.312	.687	$4.15	$4.66	$5.35	$6.35	$8.25	$10.95
05TA473	.047	.312	.687	4.36	4.92	5.75	6.75	8.55	11.05
05TA503	.05	.312	.687	4.36	4.92	5.75	6.75	8.55	11.05
05TA563	.056	.312	.813	4.56	5.29	6.95	7.90	9.10	11.15
05TA683	.068	.312	.813	4.69	5.78	7.40	8.40	10.30	11.80
05TA823	.082	.312	.937	5.95	6.90	7.95	8.95	10.95	13.10
05TA104	.1	.312	.937	5.95	6.90	7.95	8.95	10.95	13.10
05TA124	.12	.312	1.063	6.54	7.43	8.60	9.60	11.65	14.50
05TA154	.15	.312	1.063	6.54	7.43	8.60	9.60	11.65	14.50
05TA204	.2	.400	1.063	8.58	9.75	10.80	11.80	13.85	16.00
05TA224	.22	.400	1.063	8.58	9.75	10.80	11.80	13.85	16.00
05TA274	.27	.400	1.063	9.64	10.95	12.50	13.50	15.55	18.10
05TA334	.33	.500	1.125	9.64	10.95	12.50	13.50	15.55	18.10
05TA394	.39	.500	1.125	10.64	11.95	13.85	14.80	17.10	19.30
05TA474	.47	.562	1.125	11.88	13.50	15.60	16.85	18.25	21.60
05TA504	.5	.562	1.125	11.88	13.50	15.60	16.85	18.25	21.60
05TA684	.68	.562	1.125	14.88	17.50	19.60	20.85	22.25	25.40
05TA105	1.0	.67	1.375	17.16	19.50	21.60	23.60	27.70	31.10
05TA205	2.0	.67	1.875	29.66	33.70	37.90	39.90	42.10	47.90

100V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
1TA102	.001	.235	.687	$3.75	$4.15	$4.90	$5.85	$7.50	$9.95
1TA122	.0012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA152	.0015	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA182	.0018	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA202	.002	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA222	.0022	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA272	.0027	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA332	.0033	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA472	.0047	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA502	.005	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA682	.0068	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA822	.0082	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA103	.01	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA123	.012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA153	.015	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA183	.018	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
1TA203	.02	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95

100V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
1TA223	.022	.312	.687	$3.75	$4.15	$4.90	$5.85	$7.50	$9.95
1TA273	.027	.312	.813	4.05	4.37	5.05	6.00	7.80	10.85
1TA333	.033	.312	.813	4.05	4.37	5.05	6.00	7.80	10.85
1TA393	.039	.400	.813	4.36	4.92	5.75	6.75	8.55	11.05
1TA473	.047	.400	.813	4.36	4.92	5.75	6.75	8.55	11.05
1TA503	.05	.400	.813	4.36	4.92	5.75	6.75	8.55	11.05
1TA683	.068	.400	.813	4.69	5.78	7.40	8.40	10.30	11.80
1TA104	.1	.400	1.063	5.95	6.90	7.95	8.95	10.95	13.10
1TA154	.15	.500	1.125	6.54	7.43	8.60	9.60	11.65	14.50
1TA224	.22	.562	1.125	8.58	9.75	10.80	11.80	13.85	16.00
1TA334	.33	.562	1.125	9.64	10.95	12.50	13.50	15.55	18.10
1TA474	.47	.670	1.375	11.88	13.50	15.60	16.85	18.25	21.60
1TA504	.5	.670	1.375	11.88	13.50	15.60	16.85	18.25	21.60
1TA684	.68	.670	1.875	14.88	17.50	19.60	20.85	22.25	25.40
1TA105	1.0	.670	1.875	17.16	19.50	21.60	23.60	27.70	31.10
1TA205	2.0	1.0	1.875	29.66	33.70	37.90	39.90	42.10	47.90

200V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
2TA102	.001	.235	.687	$3.75	$4.15	$4.90	$5.85	$7.50	$9.95
2TA122	.0012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA152	.0015	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA182	.0018	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA202	.002	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA222	.0022	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA272	.0027	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA332	.0033	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA472	.0047	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA682	.0068	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA822	.0082	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA103	.01	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA123	.012	.235	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA153	.015	.312	.687	3.75	4.15	4.90	5.85	7.50	9.95
2TA183	.018	.312	.813	3.75	4.15	4.90	5.85	7.50	9.95

200V TA

*ADD TOLERANCE LETTER AFTER PART No.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
2TA203	.020	.312	.813	$3.75	$4.15	$4.90	$5.85	$7.50	$9.95
2TA223	.022	.312	.813	3.75	4.15	4.90	5.85	7.50	9.95
2TA273	.027	.312	.813	4.05	4.37	5.05	6.00	7.80	10.85
2TA333	.033	.400	.813	4.05	4.37	5.05	6.00	7.80	10.85
2TA473	.047	.400	1.063	4.36	4.92	5.75	6.75	8.55	11.05
2TA503	.05	.400	1.063	4.36	4.92	5.75	6.75	8.55	11.05
2TA683	.068	.400	1.063	4.69	5.78	7.40	8.40	10.30	11.80
2TA104	.1	.500	1.125	5.95	6.90	7.95	8.95	10.95	13.10
2TA154	.15	.562	1.375	6.54	7.43	8.60	9.60	11.65	14.50
2TA224	.22	.562	1.375	8.58	9.75	10.80	11.80	13.85	16.00
2TA334	.33	.670	1.375	9.64	10.95	12.50	13.50	15.55	18.10
2TA474	.47	.670	1.875	11.88	13.50	15.60	16.85	18.25	21.60
2TA504	.5	.670	1.875	11.88	13.50	15.60	16.85	18.25	21.60
2TA105	1.0	.750	1.875	17.16	19.50	21.60	23.60	27.70	31.10

TC TEFLON CAPACITORS

Type TC teflon capacitors are high reliability screened per **LEVEL "A"** shown on Flow Plan page 19 and are qualified to meet the most stringent specifications. Each capacitor bears a unique serial number and is shipped with data certifying to 0.1% maximum capacitance drift after exposure to 5 temperature shock cycles from −62°C to +125°C. The TC capacitors are available in the same voltage ratings and case sizes as type "TA," level B capacitors. For increased screening and lower temperature coefficient see type TJ, level A capacitors.

TC SPECIFICATIONS

OPERATING TEMP. −62°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE

+0.7% max at −55°C	0.0% ref. at 25°C
+0.5% max at −25°C	−0.25% max at 55°C
+0.3% max at −10°C	−0.50% max at 85°C
+0.25% max at 0°C	−0.60% max at 125°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
0°C to 50°C	0.02% max
−10°C to 85°C	0.05% max
−62°C to 125°C	0.1% max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 mfd (in megohms ÷ mfd)	500,000	500,000	200,000	100,000	25,000

DIELECTRIC ABSORPTION — 0.02% max at 25°C.

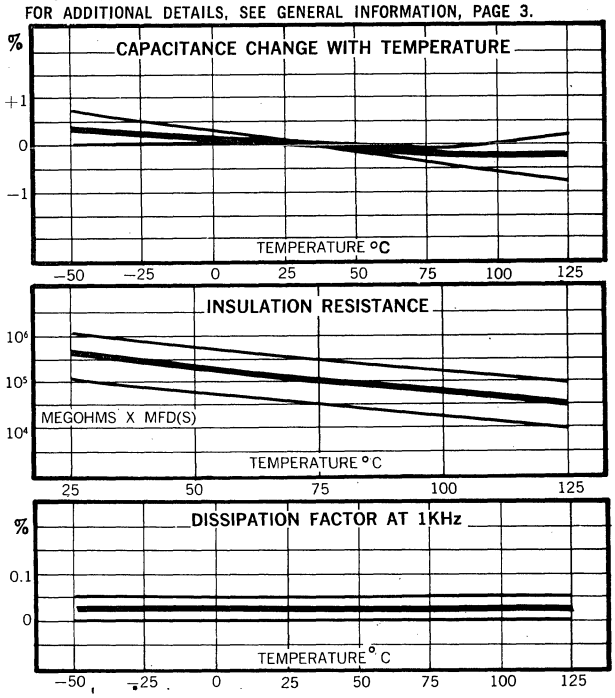
DISSIPATION FACTOR — 0.03% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

CONSTRUCTION — Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case. Lead material is nickel, gold-plated, per Mil-Std-1276, Type N2.

SEAL TEST — 1 x 10^{-6} ATM-CC/SEC max leak rate.

ENVIRONMENTAL — Capacitors shall be capable of meeting all applicable requirements of MIL-C-39022/9A including high frequency vibration.

FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION, PAGE 3.



LEVEL "A" QUALITY ASSURANCE

"TC" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

RELIABILITY SCREENING

1. Stabilization by temperature cycling from —62°C to 125°C, 5 cycles minimum.

2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C, procedure III A.

3. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.

4. Insulation resistance at rated voltage and 25°C.

5. Capacitance tolerance at 1KHz and 25°C.

6. Dissipation factor at 25°C.

POWER AGING

7. Burn-in at 125°C and 140% of rated voltage for a minimum of 48 hours.

8. Verification of stability by temperature cycling from −62°C to 125°C, 5 cycles minimum.

PERFORMANCE CERTIFICATION

9. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.

10. Insulation resistance at rated voltage and 25°C.

11. Capacitance tolerance at 1KHz and 25°C.

12. Dissipation factor at 25°C.

13. Capacitors are 100% tested for 0.1% maximum drift with cycling from −62°C to 125°C.

14. Visual inspection for dimensions, marking, and packaging.

15. Traceability to production and test records by permanent marking of parts with lot control number.

16. Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.

17. Capacitors are serialized and packaged with certified test data to accompany each shipment.

50 VOLT TC *ADD TOLERANCE LETTER AFTER PART NO.				PRICES 1-6					
Part No.	MFD	±.01 Diam.	±.03 Length	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN	0.1% tol. *AN
05TC102	.001	.235	.687	$6.23	$7.35	$8.78	$11.25	$14.93	$22.40
05TC122	.0012	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC152	.0015	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC182	.0018	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC202	.002	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC222	.0022	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC272	.0027	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC332	.0033	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC472	.0047	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC682	.0068	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC822	.0082	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC103	.01	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC123	.012	.235	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC153	.015	.312	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC183	.018	.312	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC203	.02	.312	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC223	.022	.312	.687	6.23	7.35	8.78	11.25	14.93	22.40
05TC273	.027	.312	.687	6.56	7.58	9.00	11.70	16.28	24.42
05TC333	.033	.312	.687	6.56	7.58	9.00	11.70	16.28	24.42
05TC393	.039	.312	.687	6.99	8.03	9.53	12.38	16.43	24.65
05TC473	.047	.312	.687	7.38	8.63	10.13	12.83	16.58	24.87
05TC503	.05	.312	.687	7.38	8.63	10.13	12.83	16.58	24.87
05TC563	.056	.312	.813	7.94	10.43	11.85	13.65	16.73	25.10
05TC683	.068	.312	.813	8.67	11.10	12.60	15.45	17.70	26.55
05TC823	.082	.312	.937	10.35	11.93	13.43	16.43	19.65	29.48
05TC104	.1	.312	.937	10.35	11.93	13.43	16.43	19.65	29.48
05TC124	.12	.312	1.063	11.44	13.24	14.78	17.94	22.33	33.50
05TC154	.15	.312	1.063	11.44	13.24	14.78	17.94	22.33	33.50
05TC204	.2	.400	1.063	13.65	15.12	16.52	19.39	22.40	33.60
05TC224	.22	.400	1.063	13.65	15.12	16.52	19.39	22.40	33.60
05TC274	.27	.400	1.063	14.24	16.25	17.55	20.22	23.53	35.30
05TC334	.33	.500	1.125	14.24	16.25	17.55	20.22	23.53	35.30
05TC394	.39	.500	1.125	15.54	18.01	19.24	21.23	25.09	37.64
05TC474	.47	.562	1.125	16.20	18.72	20.22	21.90	25.92	38.88
05TC504	.5	.562	1.125	16.20	18.72	20.22	21.90	25.92	38.88
05TC684	.68	.562	1.125	21.00	23.52	25.02	26.70	30.48	45.72
05TC105	1.0	.67	1.375	23.40	25.92	28.32	33.24	37.32	55.98
05TC205	2.0	.67	1.875	40.44	45.48	47.88	50.52	57.48	86.22

TL TEFLON CAPACITORS

TL Teflon capacitors are used in many military and industrial computer applications where the temperature range is beyond the capability of polystyrene and a relatively low loss capacitor is needed. Type TL teflon capacitors are screened to **LEVEL C** specifications shown on Flow Plan Page 19. For higher reliability see type TA teflon.

TL SPECIFICATIONS

OPERATING TEMPERATURE —62°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE ± 1% Max —55°C to 125°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
—10°C to 85°C	0.05% Max
—62°C to 125°C	0.25% Max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	1,000,000	1,000,000	500,000	250,000	100,000
Greater than 0.1 mfd (in megohms ÷ mfd)	100,000	100,000	50,000	25,000	10,000

DIELECTRIC ABSORPTION 0.1% Max at 25°C

DISSIPATION FACTOR 0.15% Max at 1KHz and 25°C

DIELECTRIC STRENGTH 200% of rated voltage

CONSTRUCTION — Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case. Leads are solderable gold-plated nickel or tinned copper-weld as available from stock at time of shipment.

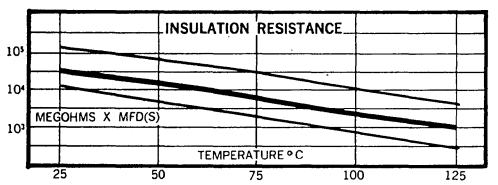
SEAL TEST — 1 x 10^{-5} ATM-CC/SEC max leak rate.

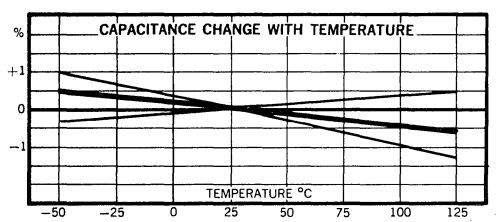
FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION SECTION, PAGE 3

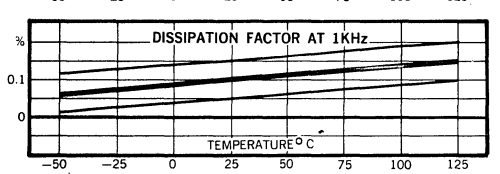
LEVEL "C" QUALITY ASSURANCE

"TL" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C, procedure III A.
2. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.
3. Insulation resistance at rated voltage and 25°C.
4. Capacitance tolerance at 1 KHz and 25°C.
5. Dissipation factor at 1 KHz and 25°C.
6. Visual inspection for dimensions, marking, and packaging.







50V TL *ADD TOLERANCE LETTER AFTER PART NO.				PRICES 1-6					
Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
05TL102	.001	.235	.687	$3.00	$3.32	$3.92	$4.68	$6.00	$7.96
05TL122	.0012	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
05TL152	.0015	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
05TL182	.0018	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
05TL202	.002	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
05TL222	.0022	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL272	.0027	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL332	.0033	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL472	.0047	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL502	.005	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL682	.0068	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL822	.0082	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL103	.01	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL123	.012	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL153	.015	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL183	.018	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL203	.02	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL223	.022	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
05TL273	.027	.312	.687	3.24	3.50	4.04	4.80	6.24	8.68
05TL333	.033	.312	.687	3.24	3.50	4.04	4.80	6.24	8.68
05TL393	.039	.312	.687	3.32	3.73	4.28	5.08	6.60	8.76
05TL473	.047	.312	.687	3.49	3.94	4.60	5.40	6.84	8.84
05TL503	.05	.312	.687	3.49	3.94	4.60	5.40	6.84	8.84
05TL563	.056	.312	.813	3.65	4.23	5.56	6.32	7.28	8.92
05TL683	.068	.312	.813	3.75	4.62	5.92	6.72	8.24	9.44
05TL823	.082	.312	.937	4.76	5.52	6.36	7.16	8.76	10.48
05TL104	.1	.312	.937	4.76	5.52	6.36	7.16	8.76	10.48
05TL124	.12	.312	1.063	5.23	5.94	6.88	7.68	9.32	11.60
05TL154	.15	.312	1.063	5.23	5.94	6.88	7.68	9.32	11.60
05TL204	.2	.400	1.063	6.86	7.80	8.64	9.44	11.08	12.80
05TL224	.22	.400	1.063	6.86	7.80	8.64	9.44	11.08	12.80
05TL274	.27	.400	1.063	7.71	8.76	10.00	10.80	12.44	14.48
05TL334	.33	.500	1.125	7.71	8.76	10.00	10.80	12.44	14.48
05TL394	.39	.500	1.125	8.51	9.56	11.08	11.84	13.68	15.44
05TL474	.47	.562	1.125	9.50	10.80	12.48	13.48	14.60	17.28
05TL504	.5	.562	1.125	9.50	10.80	12.48	13.48	14.60	17.28
05TL684	.68	.562	1.125	11.90	14.00	15.68	16.68	17.80	20.32
05TL105	1.0	.67	1.375	13.73	15.60	17.28	18.88	22.16	24.88
05TL205	2.0	.67	1.875	23.73	26.96	30.32	31.92	33.68	38.32

100V TL *ADD TOLERANCE LETTER AFTER PART NO.				PRICES 1-6					
Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
1TL102	.001	.235	.687	$3.00	$3.32	$3.92	$4.68	$6.00	$7.96
1TL122	.0012	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
1TL152	.0015	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
1TL182	.0018	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
1TL202	.002	.235	.687	3.00	3.32	3.92	4.68	6.00	7.96
1TL222	.0022	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL272	.0027	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL332	.0033	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL472	.0047	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL502	.005	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL682	.0068	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL822	.0082	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL103	.01	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL123	.012	.235	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL153	.015	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL183	.018	.312	.687	3.00	3.32	3.92	4.68	8.00	7.97
1TL203	.02	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL223	.022	.312	.687	3.00	3.32	3.92	4.68	6.00	7.97
1TL273	.027	.312	.813	3.24	3.50	4.04	4.80	6.24	8.68
1TL333	.033	.312	.813	3.24	3.50	4.04	4.80	6.24	8.68
1TL393	.039	.312	.813	3.32	3.73	4.28	5.08	6.60	8.76
1TL473	.047	.400	.813	3.49	3.94	4.60	5.40	6.84	8.84
1TL503	.05	.400	.813	3.49	3.94	4.60	5.40	6.84	8.84
1TL563	.056	.400	.813	3.65	4.23	5.56	6.32	7.28	8.92
1TL683	.068	.400	.813	3.75	4.62	5.92	6.72	8.24	9.44
1TL823	.082	.400	1.063	4.76	5.52	6.36	7.16	8.76	10.48
1TL104	.1	.400	1.063	4.76	5.52	6.36	7.16	8.76	10.48
1TL124	.12	.400	1.063	5.23	5.94	6.88	7.68	9.32	11.60
1TL154	.15	.500	1.125	5.23	5.94	6.88	7.68	9.32	11.60
1TL204	.2	.562	1.125	6.86	7.80	8.64	9.44	11.08	12.80
1TL224	.22	.562	1.125	6.86	7.80	8.64	9.44	11.08	12.80
1TL274	.27	.562	1.125	7.71	8.76	10.00	10.80	12.44	14.48
1TL334	.33	.562	1.125	7.71	8.76	10.00	10.80	12.44	14.48
1TL394	.39	.562	1.125	8.51	9.56	11.08	11.84	13.68	15.44
1TL474	.47	.670	1.375	9.50	10.80	12.48	13.48	14.60	17.28
1TL504	.5	.670	1.375	9.50	10.80	12.48	13.48	14.60	17.28
1TL684	.68	.670	1.875	11.90	14.00	15.68	16.68	17.80	20.32
1TL105	1.0	.670	1.875	13.73	15.60	17.28	18.88	22.16	24.88
1TL205	2.0	1.0	1.875	23.73	26.96	30.32	31.92	33.68	38.32

TU TEFLON CAPACITORS

TU Teflon foil capacitors are unexcelled for high insulation resistance, low dielectric absorption and low dissipation factor over a wide temperature range. The TU capacitors are reliability screened per **LEVEL "B"** shown on Flow Plan Page 19; however, specials are available with Level "A" screening. We can also supply very high quality custom capacitors in any value from 100 Pf to 100 MFD and at higher voltages for research or production applications.

TU SPECIFICATIONS

OPERATING TEMPERATURE — −62°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE

+0.8% Max at	−55°C	0.0% Reference at	25°C
+0.6% Max at	−25°C	−0.2% Max at	55°C
+0.3% Max at	−10°C	−0.5% Max at	85°C
+0.2% Max at	0°C	−0.8% Max at	125°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
−10°C to 85°C	0.05% Max
−62°C to 125°C	.25% Max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	10,000,000	5,000,000	3,000,000	1,500,000	300,000
Greater than 0.1 mfd (in megohms ÷ mfd)	1,000,000	500,000	300,000	150,000	30,000

DIELECTRIC ABSORPTION — 0.01% Max at 25°C.

DISSIPATION FACTOR—0.005% Max as 1KHz and 25°C

DIELECTRIC STRENGTH — 200% of rated volts.

CONSTRUCTION — Teflon dielectric, extended foil electrodes, hermetically sealed, leads isolated from case, leads are nickel, gold-plated, per Mil Std 1276 Type N2.

SEAL TEST — 1 x 10^{-6} ATM-CC/SEC Max leak rate.

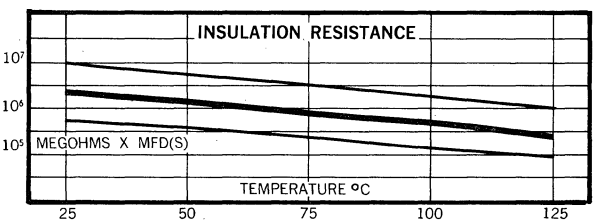
ENVIRONMENTAL — Capacitors shall be capable of meeting all applicable requirements of MIL-C-39022/9A including high frequency vibration.

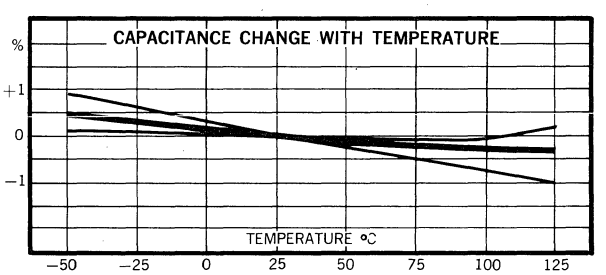
FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION SECTION, PAGE 3

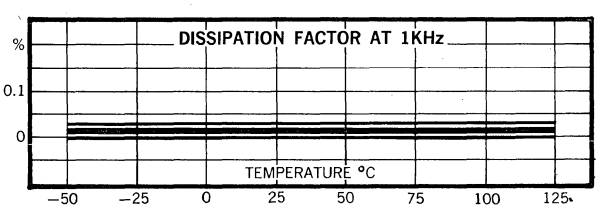
LEVEL "B" QUALITY ASSURANCE

"TU" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. Stabilization by temperature cycling from −62°C to 125°C, 5 cycles minimum.
2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C. procedure III A.
3. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.
4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1KHz and 25°C.
6. Dissipation factor at 1KHz and 25°C.
7. Visual inspection for dimensions, marking, and packaging.
8. Traceability to production and test records by permanent marking of parts with lot control number.
9. Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.







100V TU

*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN	0.1% tol. *AN
1TU102	.001	.235	.813	$4.59	$5.10	$5.70	$7.50	$9.95	$15.00
1TU202	.002	.235	.813	4.59	5.10	5.70	7.50	9.95	15.00
1TU502	.005	.235	.813	4.59	5.10	5.70	7.50	9.95	15.00
1TU103	.01	.235	.813	4.59	5.10	5.70	7.50	9.95	15.00
1TU153	.015	.312	.813	4.86	5.40	6.00	7.75	9.95	15.50
1TU223	.022	.312	.813	5.13	5.70	6.30	8.35	9.95	16.70
1TU333	.033	.400	.813	5.61	6.23	7.20	8.95	10.85	17.90
1TU393	.039	.400	1.063	5.94	6.60	7.50	9.60	11.80	19.20
1TU473	.047	.400	1.063	5.94	6.60	7.50	9.60	11.80	19.20
1TU503	.05	.400	1.063	6.21	6.90	7.80	9.90	12.10	19.80
1TU683	.068	.400	1.063	7.52	8.35	9.50	11.50	13.10	23.00
1TU104	.1	.562	1.125	8.91	9.90	10.75	12.75	14.95	25.50
1TU154	.15	.562	1.375	9.99	11.10	12.00	14.00	16.00	28.00
1TU224	.22	.562	1.875	12.51	13.90	14.90	16.85	18.80	33.70
1TU334	.33	.670	1.875	15.08	16.75	17.75	19.75	21.60	39.50
1TU474	.47	.750	1.875	18.75	20.83	21.95	23.95	25.85	47.90
1TU504	.5	.750	1.875	18.75	20.83	21.95	23.95	25.85	47.90
1TU105	1.0	1.00	2.250	28.13	31.25	32.93	35.93	38.78	71.86

200V TU

*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN	0.1% tol. *AN
2TU102	.001	.235	.813	$4.59	$5.10	$5.70	$7.50	$9.95	$15.00
2TU202	.002	.235	.813	4.59	5.10	5.70	7.50	9.95	15.00
2TU502	.005	.235	.813	4.59	5.10	5.70	7.50	9.95	15.00
2TU103	.01	.312	.813	4.59	5.10	5.70	7.50	9.95	15.00
2TU153	.015	.312	.813	4.86	5.40	6.00	7.75	9.95	15.50
2TU223	.022	.400	.813	5.13	5.70	6.30	8.35	9.95	16.70
2TU333	.033	.400	1.063	5.61	6.23	7.20	8.95	10.85	17.90
2TU393	.039	.400	1.063	5.94	6.60	7.50	9.60	11.80	19.20
2TU473	.047	.400	1.063	5.94	6.60	7.50	9.60	11.80	19.20
2TU503	.05	.400	1.063	6.21	6.90	7.80	9.90	12.10	19.80
2TU683	.068	.562	1.125	7.52	8.35	9.50	11.50	13.10	23.00
2TU104	.1	.562	1.375	8.91	9.90	10.75	12.75	14.95	25.50
2TU154	.15	.562	1.875	9.99	11.10	12.00	14.00	16.00	28.00
2TU224	.22	.670	1.875	12.51	13.90	14.90	16.85	18.80	33.70
2TU334	.33	.75	1.875	15.08	16.75	17.75	19.75	21.60	39.50
2TU474	.47	1.00	2.250	18.75	20.83	21.95	23.95	25.85	47.90
2TU504	.5	1.00	2.250	18.75	20.83	21.95	23.95	25.85	47.90

TF TEFLON CAPACITORS

TF Teflon foil capacitors are extremely low loss capacitors for use over a wide temperature range. The TF capacitors are reliability screened per **LEVEL "C"** shown on Flow Plan Page 19. Custom capacitors can be furnished with special values, higher voltage ratings and special case configuration. See Type TU for higher, Level "B" reliability.

TF SPECIFICATIONS

OPERATING TEMPERATURE

—62°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE

25°C reference ± 1.2% maximum from —62°C to 125°C.

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
—10°C to 85°C	0.1% Max
—62°C to 125°C	0.25% Max

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	3,000,000	2,000,000	1,000,000	500,000	100,000
Greater than 0.1 mfd (in megohms ÷ mfd)	300,000	200,000	100,000	50,000	10,000

DIELECTRIC ABSORPTION — 0.03% at 25°C

DISSIPATION FACTOR — 0.02% Max at 1KHz and 25°C

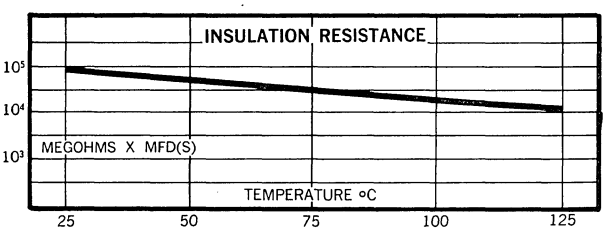
DIELECTRIC STRENGTH — 200% of rated volts

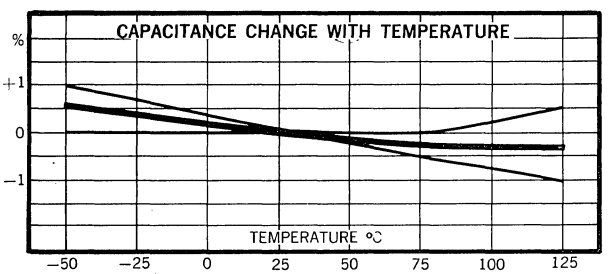
CONSTRUCTION— "FEP" teflon dielectric film, extended foil electrodes, hermetically sealed with leads isolated from case, leads are tinned copperweld.

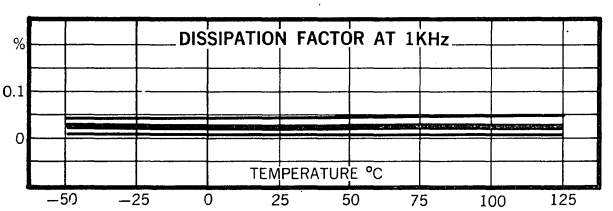
SEAL TEST — 1 x 10^{-5} ATM-CC/SEC max leak rate.

ENVIRONMENTAL — Capacitors shall be capable of meeting all applicable requirements of MIL-C-39022/9A including high frequency vibration.

FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION SECTION, PAGE 3







100 VOLT TF TEFLON
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
1TF102	.001	.235	.813	$2.99	$3.32	$3.92	$4.68	$6.00	$9.36
1TF202	.002	.235	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF502	.005	.235	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF682	.0068	.235	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF103	.01	.312	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF153	.015	.312	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF203	.02	.312	.813	2.99	3.32	3.92	4.68	6.00	9.36
1TF223	.022	.312	1.063	2.99	3.32	3.92	4.68	6.00	9.36
1TF303	.03	.400	1.063	2.99	3.32	3.92	4.68	6.00	9.36
1TF333	.033	.400	1.063	3.15	3.50	4.50	5.50	6.90	11.00
1TF393	.039	.400	1.063	3.15	3.50	4.50	5.50	6.90	11.00
1TF473	.047	.400	1.063	3.38	3.75	4.75	5.75	7.15	11.50
1TF503	.05	.400	1.063	3.38	3.75	4.75	5.75	7.15	11.50
1TF683	.068	.562	1.125	3.60	4.00	5.00	6.00	7.40	12.00
1TF104	.1	.562	1.375	3.83	4.25	5.28	6.25	7.65	12.50
1TF154	.15	.562	1.875	4.28	4.75	5.55	6.45	8.25	12.90
1TF204	.2	.670	1.875	4.91	5.45	6.10	6.60	8.80	13.20
1TF224	.22	.670	1.875	5.00	5.55	6.20	6.75	9.05	13.50
1TF334	.33	.750	1.875	5.49	6.10	6.75	7.41	9.65	14.82
1TF474	.47	.750	1.875	6.48	7.20	8.10	8.75	11.30	17.50
1TF504	.5	.750	1.875	6.48	7.20	8.10	8.75	11.30	17.50
1TF105	1.0	1.0	2.25	9.09	10.10	11.11	12.22	14.85	24.44
1TF205	2.0	Bathtub Case 2x2x	1.125	18.00	19.00	20.80	22.50	26.00	45.00

LEVEL "C" QUALITY ASSURANCE

"TF" TEFLON CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. *Stabilization by temperature cycling from —62°C to 125°C, 5 cycles minimum.*
2. *Mass spectrometer hermetic seal per MIL-STD-202, Method 112, condition C, procedure III A.*
3. *Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.*
4. *Insulation resistance at rated voltage and 25°C.*
5. *Capacitance tolerance at 1KHz and 25°C.*
6. *Dissipation factor at 1KHz and 25°C.*
7. *Visual inspection for dimensions, marking, and packaging.*
8. *Traceability to production and test records by permanent marking of parts with lot control number.*
9. *Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.*

PL POLYCARBONATE
AC TESTED CAPACITORS

NEW

Our 30 volt 03PL and 50 volt 05PL capacitors are now available per MIL-C-39022/9A as CHROIB and CHROIE styles. See catalog pages 1 and 2.

Our 100 volt, 200 volt, and 400 volt PL Polycarbonte capacitors are now being tested for eventual qualification to MIL-C-39022/9A. After completion of qualification for the 100 volt and higher ratings, our PL catalog specifications will be revised to conform to MIL-C-39022/9A. For further information concerning equivalent CRC part numbers per MIL-C-39022/9A, please contact our sales office.

PL SPECIFICATIONS

OPERATING TEMPERATURE —62°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE

−1.5%	Max. at −55°C
−0.5%	Max. at −25°C
−0.35%	Max. at −10°C
−0.25%	Max. at 0°C
0.0%	Reference at 25°C
+0.2%	Max. at 55°C
+0.5%	Max. at 85°C
+1.0%	Max. at 125°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
−10°C to 85°C	0.05% Max.
−62°C to 125°C	0.25% Max.

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

MINIMUM IR TYPE 03PL, 05PL, 1PL					
Range	**25°C**	**55°C**	**85°C**	**105°C**	**125°C**
.001 to 0.1 mfd (in megohms)	3,000,000	2,000,000	1,000,000	300,000	10,000
Greater than 0.1 mfd (in megohms ÷ mfd)	300,000	200,000	100,000	30,000	1,000

MINIMUM IR TYPE 2PL, 4PL					
Range	**25°C**	**55°C**	**85°C**	**105°C**	**125°C**
.001 to 0.1 mfd (in megohms)	4,000,000	2,500,000	500,000	200,000	10,000
Greater than 0.1 mfd (in megohms ÷ mfd)	400,000	250,000	50,000	20,000	1,000

DIELECTRIC ABSORPTION — 0.2% Max. at 25°C.

DISSIPATION FACTOR — 0.2% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

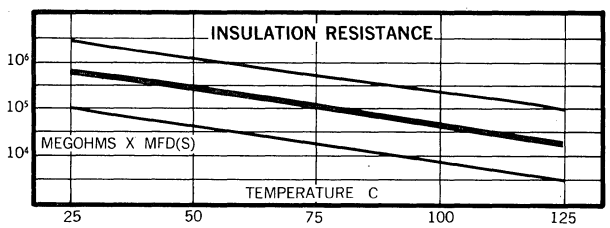
DIELECTRIC STRENGTH — 200% of rated volts.

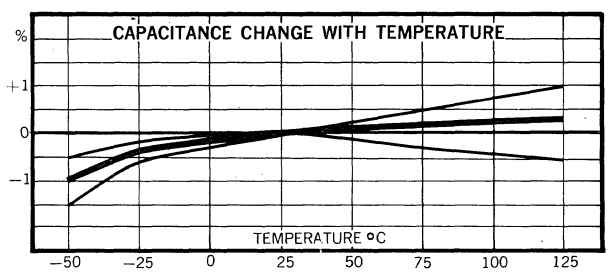
CONSTRUCTION — Polycarbonate dielectric, extended metal film electrodes, hermetically sealed, leads isolated from case. Leads may be tinned copperweld or gold-plated nickel per Mil Std 1276 type N2.

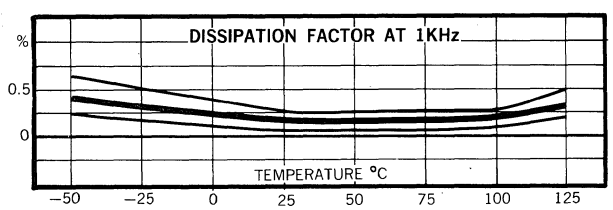
SEAL TEST — 1 x 10^{-6} ATM-CC/SEC Max leak rate.

ENVIRONMENTAL — Capacitors shall meet all applicable requirements of MIL-C-39022/9A.

FOR ADDITIONAL DETAILS SEE PAGES; 1, 2, 3, 12, 13, 14, 15, 16, 17







LEVEL "B" QUALITY ASSURANCE

"PL" Polycarbonate Capacitors are 100% processed and tested as follows:

1. Stabilization by temperature cycling from −62°C to 125°C, 5 cycles minimum.
2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C, procedure IIIA.
3. DC Dielectric Strength—apply 200% of rated DC from lead to lead and leads to case for one minute.

3A. AC Dielectric Strength—apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute.

4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1 KHz and 25°C.
6. Dissipation factor at 25°C.
7. Visual inspection for dimensions, marking, and packaging.
8. Traceability to production and test records by permanent marking of parts with lot control number.
9. Process and inspection data is maintained on file per NPC-200-3 and MIL-Q-9858 quality control standards.

PL POLYCARBONATE
AC TESTED CAPACITORS

COMPONENT RESEARCH
MIL-C-39022/9

30 VOLT PL
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *KN	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
03PL102	.001	.170	.500	$3.74	$4.15	$4.90	$5.85	$7.50	$9.80
03PL122	.0012	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL152	.0015	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL182	.0018	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL202	.002	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL222	.0022	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL272	.0027	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL332	.0033	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL472	.0047	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL502	.005	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL682	.0068	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL822	.0082	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL103	.01	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL123	.012	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL153	.015	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL183	.018	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL203	.02	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL223	.022	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
03PL273	.027	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL333	.033	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL393	.039	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL473	.047	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL503	.05	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL563	.056	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
03PL683	.068	.170	.687	3.74	4.15	4.90	5.85	7.50	9.80
03PL823	.082	.170	.687	3.74	4.15	4.90	5.85	7.50	9.80
03PL104	.1	.193	.687	3.83	4.25	4.95	5.90	7.60	9.90
03PL124	.12	.193	.687	3.93	4.37	5.05	6.00	7.80	10.10
03PL154	.15	.235	.562	3.93	4.37	5.05	6.00	7.80	10.10
03PL204	.2	.235	.687	4.01	4.46	5.15	6.15	8.05	10.30
03PL224	.22	.235	.687	4.01	4.46	5.15	6.15	8.05	10.30
03PL274	.27	.235	.687	4.32	4.80	5.60	6.60	8.40	11.20
03PL334	.33	.235	.687	4.43	4.92	5.75	6.75	8.55	11.50
03PL394	.39	.235	.687	4.76	5.29	6.20	7.20	9.10	12.40
03PL474	.47	.312	.687	4.76	5.29	6.20	7.20	9.10	12.40
03PL504	.5	.312	.687	4.76	5.29	6.20	7.20	9.10	12.40
03PL684	.68	.312	.687	4.94	5.49	6.50	7.50	9.40	13.00
03PL824	.82	.312	.813	5.09	5.65	6.80	7.80	9.75	13.60
03PL105	1.0	.312	.813	5.20	5.78	7.40	8.40	10.30	14.80
03PL155	1.5	.400	.813	6.21	6.90	7.95	8.95	10.95	15.90
03PL205	2.0	.400	.813	6.69	7.43	8.60	9.60	11.65	17.20
03PL305	3.0	.400	1.063	7.74	8.60	9.65	10.65	12.70	19.30
03PL405	4.0	.400	1.375	8.78	9.75	10.80	11.80	13.85	21.60
03PL505	5.0	.500	1.375	9.85	10.95	12.50	13.50	15.55	24.48
03PL805	8.0	.562	1.375	12.15	13.50	15.60	16.85	18.25	28.19
03PL106	10.0	.562	1.375	15.17	16.85	18.95	19.95	21.05	31.10
03PL156	15.0	.562	1.875	17.55	19.50	21.60	23.60	27.70	34.82
03PL206	20.0	.670	1.875	19.71	21.90	25.00	27.00	31.10	42.10

50 VOLT PL
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
05PL102	.001	.170	.500	$3.74	$4.15	$4.90	$5.85	$7.50	$9.80
05PL122	.0012	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL152	.0015	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL182	.0018	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL202	.002	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL222	.0022	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL272	.0027	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL332	.0033	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL472	.0047	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL502	.005	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL682	.0068	.170	.500	3.74	4.15	4.90	5.85	7.50	9.80
05PL822	.0082	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL103	.01	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL123	.012	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL153	.015	.170	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL183	.018	.193	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL203	.02	.193	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL223	.022	.193	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL273	.027	.193	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL333	.033	.193	.562	3.74	4.15	4.90	5.85	7.50	9.80
05PL393	.039	.170	.687	3.74	4.15	4.90	5.85	7.50	9.80
05PL473	.047	.170	.687	3.74	4.15	4.90	5.85	7.50	9.80
05PL503	.05	.170	.687	3.74	4.15	4.90	5.85	7.50	9.80
05PL563	.056	.193	.687	3.74	4.15	4.90	5.85	7.50	9.80
05PL683	.068	.193	.687	3.74	4.15	4.90	5.85	7.50	9.80
05PL823	.082	.193	.813	3.74	4.15	4.90	5.85	7.50	9.80
05PL104	.1	.193	.813	3.83	4.25	4.95	5.90	7.60	9.90
05PL124	.12	.235	.687	3.93	4.37	5.05	6.00	7.80	10.10
05PL154	.15	.235	.687	3.93	4.37	5.05	6.00	7.80	10.10
05PL204	.2	.235	.813	4.01	4.46	5.15	6.15	8.05	10.30
05PL224	.22	.235	.813	4.01	4.46	5.15	6.15	8.05	10.30
05PL274	.27	.312	.687	4.32	4.80	5.60	6.60	8.40	11.20
05PL334	.33	.312	.687	4.43	4.92	5.75	6.75	8.55	11.50
05PL394	.39	.312	.813	4.76	5.29	6.20	7.20	9.10	12.40
05PL474	.47	.312	.813	4.76	5.29	6.20	7.20	9.10	12.40
05PL504	.5	.400	.813	4.76	5.29	6.20	7.20	9.10	12.40
05PL684	.68	.400	.813	4.94	5.49	6.50	7.50	9.40	13.00
05PL824	.82	.400	1.063	5.09	5.65	6.80	7.80	9.75	13.60
05PL105	1.0	.400	1.063	5.20	5.78	7.40	8.40	10.30	14.80
05PL155	1.5	.400	1.063	6.21	6.90	7.95	8.95	10.95	15.90
05PL205	2.0	.500	1.125	6.69	7.43	8.60	9.60	11.65	17.20
05PL305	3.0	.500	1.375	7.74	8.60	9.65	10.65	12.70	19.30
05PL405	4.0	.562	1.375	8.78	9.75	10.80	11.80	13.85	21.60
05PL505	5.0	.670	1.375	9.85	10.95	12.50	13.50	15.55	24.48
05PL805	8.0	.670	1.875	12.15	13.50	15.60	16.85	18.25	28.19
05PL106	10.0	.670	1.875	15.17	16.85	18.95	19.95	21.05	31.10

100 VOLT PL
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
1PL102	.001	.170	.500	$3.38	$3.75	$4.50	$5.50	$6.90	$9.00
1PL122	.0012	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL152	.0015	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL182	.0018	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL202	.002	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL222	.0022	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL272	.0027	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL332	.0033	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL472	.0047	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL502	.005	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
1PL682	.0068	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL822	.0082	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL103	.01	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL123	.012	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL153	.015	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL183	.018	.193	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL203	.02	.193	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL223	.022	.193	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL273	.027	.193	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL333	.033	.193	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL393	.039	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL473	.047	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL503	.05	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL563	.056	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
1PL683	.068	.235	.813	3.38	3.75	4.50	5.50	6.90	9.00
1PL823	.082	.312	.687	3.51	3.90	4.60	5.60	7.10	9.20
1PL104	.1	.312	.687	3.51	3.90	4.60	5.60	7.10	9.20
1PL124	.12	.312	.687	3.65	4.05	4.70	5.70	7.15	9.40
1PL154	.15	.312	.813	3.65	4.05	4.70	5.70	7.15	9.40
1PL204	.2	.312	.813	3.69	4.10	4.75	5.75	7.15	9.50
1PL224	.22	.312	.813	3.69	4.10	4.75	5.75	7.15	9.50
1PL274	.27	.312	1.063	3.74	4.15	4.75	5.75	7.15	9.50
1PL334	.33	.312	1.063	3.92	4.36	4.90	5.90	7.20	9.60
1PL394	.39	.400	1.063	3.92	4.39	5.10	5.95	7.40	10.20
1PL474	.47	.400	1.063	3.95	4.39	5.10	5.95	7.40	10.20
1PL504	.5	.400	1.063	3.95	4.39	5.10	5.95	7.40	10.20
1PL684	.68	.500	1.125	4.07	4.52	5.25	6.13	7.50	10.51
1PL824	.82	.500	1.125	4.22	4.69	5.32	6.32	7.60	10.64
1PL105	1.0	.562	1.125	4.22	4.69	5.32	6.32	7.60	10.64
1PL155	1.5	.562	1.375	4.67	5.19	5.95	6.95	8.05	11.90
1PL205	2.0	.670	1.375	4.91	5.45	6.50	7.50	8.50	13.00
1PL305	3.0	.670	1.875	5.36	5.95	6.98	7.98	8.98	13.96
1PL405	4.0	.75	1.875	5.90	6.55	7.65	8.25	9.35	15.30
1PL505	5.0	.75	1.875	6.32	7.02	8.12	9.20	10.30	16.24
1PL805	8.0	1.0	2.375	0.26	9.10	10.50	11.05	12.95	21.00
1PL106	10.0	1.0	2.375	8.26	9.18	10.50	11.85	12.95	21.00

200 VOLT PL
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
2PL102	.001	.170	.562	$3.38	$3.75	$4.50	$5.50	$6.90	$9.00
2PL202	.002	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
2PL502	.005	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
2PL103	.01	.193	.562	3.38	3.75	4.50	5.50	6.90	9.00
2PL153	.015	.235	.562	3.38	3.75	4.50	5.50	6.90	9.00
2PL223	.022	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
2PL333	.033	.312	.687	3.38	3.75	4.50	5.50	6.90	9.00
2PL473	.047	.312	.687	3.38	3.75	4.50	5.50	6.90	9.00
2PL503	.05	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
2PL683	.068	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
2PL104	.10	.312	.813	3.51	3.90	4.60	5.60	7.10	9.20
2PL154	.15	.400	1.063	3.65	4.05	4.70	5.70	7.15	9.40
2PL224	.22	.400	1.375	3.69	4.10	4.75	5.75	7.15	9.50
2PL334	.33	.500	1.375	3.92	4.36	4.90	5.90	7.20	9.60
2PL474	.47	.500	1.375	3.95	4.39	5.10	5.95	7.40	10.20
2PL504	.50	.500	1.375	3.95	4.39	5.10	5.95	7.40	10.20
2PL105	1.0	.562	1.875	4.22	4.69	5.32	6.32	7.60	10.64
2PL155	1.5	.670	1.875	4.67	5.19	5.95	6.95	8.05	11.90
2PL205	2.0	.750	1.875	4.91	5.45	6.50	7.50	8.50	13.00
2PL255	2.5	.750	1.875	5.16	5.72	6.83	7.88	8.93	13.65
2PL305	3.0	1.00	1.875	5.36	5.95	6.98	7.98	8.98	13.96
2PL405	4.0	1.00	2.375	5.90	6.55	7.65	8.25	9.35	15.30

400 VOLT PL
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
4PL102	.001	.193	.562	$3.38	$3.75	$4.50	$5.50	$6.90	$9.00
4PL202	.002	.193	.562	3.38	3.75	4.50	5.50	6.90	9.00
4PL502	.005	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
4PL103	.01	.235	.687	3.38	3.75	4.50	5.50	6.90	9.00
4PL153	.015	.235	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL223	.022	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL273	.027	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL333	.033	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL393	.039	.312	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL473	.047	.400	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL503	.05	.400	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL683	.068	.400	.813	3.38	3.75	4.50	5.50	6.90	9.00
4PL823	.082	.400	1.063	3.51	3.90	4.60	5.60	7.10	9.20
4PL104	.10	.400	1.063	3.51	3.90	4.60	5.60	7.10	9.20
4PL154	.15	.400	1.375	3.65	4.05	4.70	5.70	7.15	9.40
4PL224	.22	.500	1.375	3.69	4.10	4.75	5.75	7.15	9.50
4PL334	.33	.562	1.375	3.92	4.36	4.90	5.90	7.20	9.60
4PL474	.47	.562	1.875	3.95	4.39	5.10	5.95	7.40	10.20
4PL504	.50	.562	1.875	3.95	4.39	5.10	5.95	7.40	10.20
4PL105	1.0	.750	1.875	4.91	5.45	6.50	7.50	8.50	13.00
4PL205	2.0	1.00	2.375	5.86	6.51	7.48	8.18	9.15	14.96

PK POLYCARBONATE
AC TESTED CAPACITORS

NEW **Our 50 volt 05PK capacitors are now available per MIL-C-39022/9A as CHROID style. See catalog pages 1 and 2.**

Our 100 volt, 200 volt, and 400 volt PK Polycarbonate capacitors are now being tested for eventual qualification to MIL-C-39022/9A. After completion of qualification for the 100 volt and higher ratings, our PK catalog specifications will be revised to conform to MIL-C-39022/9A. For further information concerning the equivalent CRC part numbers per MIL-C-39022/9A, please contact our sales office.

PK SPECIFICATIONS

OPERATING TEMPERATURE
−62°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE — 25°C Reference

−0.75% ±0.25% at −55°C	+0.05% ±0.1% at 55°C
−0.35% ±0.15% at −25°C	+0.15% ±0.15% at 85°C
−0.25% ±0.15% at −10°C	+0.25% ±0.25% at 125°C
−0.15% ±0.1% at 0°C	

STABILITY
Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
−10°C to 85°C	0.03% Max
−62°C to 125°C	0.2% Max

INSULATION RESISTANCE — measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	3,000,000	2,000,000	1,000,000	300,000	20,000
Greater than 0.1 mfd (in megohms ÷ mfd)	300,000	200,000	100,000	30,000	2,000

DIELECTRIC ABSORPTION — 0.2% Max at 25°C.

DISSIPATION FACTOR — 0.2% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

DIELECTRIC STRENGTH — 200% of rated voltage.

CONSTRUCTION — Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case, leads may be tinned copperweld or nickel, gold plated per Mil-Std 1276, Type N2.

SEAL TEST — 1 x 10^{-6} ATM-CC/SEC Max leak rate.

ENVIRONMENTAL — Capacitors shall meet all applicable requirements of MIL-C-39022/9A.

FOR ADDITIONAL DETAILS, SEE PAGES: 1, 2, 3, 11, 12, 14, 15, 16, 17

PK Polycarbonate Capacitors are high reliability screened per **LEVEL "A"** shown on Flow Plan Page 19 and are in widespread use in space and other critical applications. All capacitors receive a high stress AC square wave voltage of approximately 300% higher peak to peak voltage than their DC ratings for additional screening purposes. The PK capacitors are available in all the voltage ratings and case sizes listed for Type PL Polycarbonate Capacitors on Page 12. Contact us for special capacitors selected for zero TC ±30 PPM from −10°C to 125°C in these same case sizes.

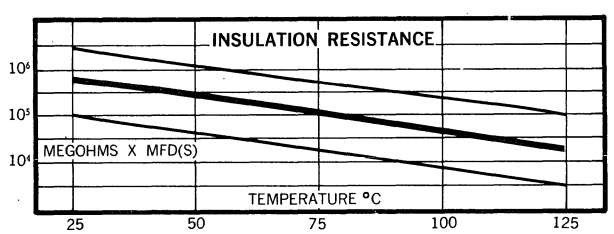
LEVEL "A" QUALITY ASSURANCE

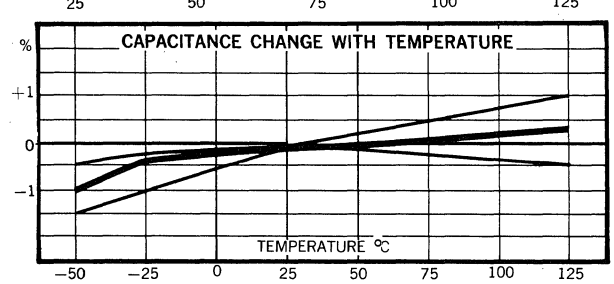
PK Polycarbonate Capacitors are 100% processed and tested as follows:

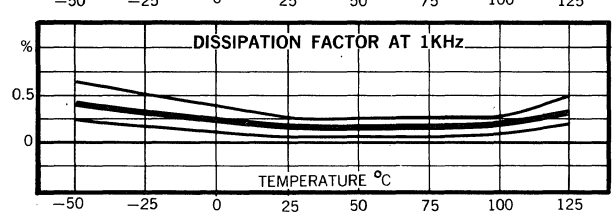
RELIABILITY SCREENING
1. Stabilization by temperature cycling from −62°C to 125°C, 5 cycles minimum.
2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C. procedure 111A.
3. DC dielectric strength—apply 200% of rated DC from lead to lead and from leads to case for one minute.
3A. AC dielectric strength—apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute.
4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1 KHz and 25°C.
6. Dissipation factor at 25°C.

POWER AGING AND STABILIZATION
7. Burn-in at 125°C and 140% of rated voltage for a minimum of 48 hours.
8. Verification of stability by temperature cycling from −62°C to 125°C, 5 cycles minimum.

PERFORMANCE CERTIFICATION
9. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.
10. Insulation resistance at rated voltage and 25°C.
11. Capacitance tolerance at 1 KHz and 25°C.
12. Dissipation factor at 25°C.
13. Temperature coefficient measured from −55°C to 125°C at a minimum of 5 temperature points. (Performed on lot sampling basis, minimum 10 pieces per lot.)
14. Visual inspection for dimensions, marking, and packaging.
15. Traceability to production and test records by permanent marking of parts with lot control number.
16. Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.
17. Capacitors are serialized and packaged with certified test data to accompany each shipment.







50 VOLT PK
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
05PK103	.01	.170	.562	$7.47	$8.82	$10.53	$13.50	$17.64
05PK153	.015	.170	.562	7.47	8.82	10.53	13.50	17.64
05PK223	.022	.193	.562	7.47	8.82	10.53	13.50	17.64
05PK273	.027	.193	.562	7.47	8.82	10.53	13.50	17.64
05PK333	.033	.193	.562	7.47	8.82	10.53	13.50	17.64
05PK393	.039	.170	.687	7.47	8.82	10.53	13.50	17.64
05PK473	.047	.170	.687	7.47	8.82	10.53	13.50	17.64
05PK503	.05	.170	.687	7.47	8.82	10.53	13.50	17.64
05PK683	.068	.193	.687	7.47	8.82	10.53	13.50	17.64
05PK823	.082	.193	.813	7.47	8.82	10.53	13.50	17.64
05PK104	.10	.193	.813	7.65	8.91	10.62	13.68	17.82
05PK154	.15	.235	.687	7.87	9.09	10.80	14.06	18.18
05PK224	.22	.235	.813	8.03	9.27	11.07	14.49	18.54
05PK274	.27	.312	.687	8.64	10.08	11.88	15.12	20.16
05PK334	.33	.312	.687	8.86	10.35	12.15	15.39	20.70
05PK474	.47	.312	.813	9.52	11.16	12.96	16.38	22.32
05PK504	.50	.400	.813	9.52	11.16	12.96	16.38	22.32
05PK105	1.0	.400	1.063	10.40	13.32	15.12	18.54	26.64
05PK155	1.5	.400	1.063	12.42	14.31	16.11	19.71	28.62
05PK205	2.0	.500	1.125	13.37	15.48	17.28	20.97	30.96
05PK305	3.0	.500	1.375	15.48	17.37	19.17	22.86	34.74
05PK405	4.0	.562	1.375	17.55	19.44	21.24	24.93	36.88
05PK505	5.0	.670	1.375	19.71	22.50	24.30	27.99	39.90
05PK106	10.0	.670	1.875	30.33	34.11	35.91	37.89	48.86

PV POLYCARBONATE
AC TESTED CAPACITORS

COMPONENT RESEARCH
MIL-C-39022/9

NEW

Our 30 volt 03PV Polycarbonate capacitors are now available per MIL-C-39022/9A as CHROIA style. See catalog pages 1 and 2. For further information concerning the equivalent CRC part numbers per MIL-C-39022/9A, please contact our sales office.

TYPE 03PV POLYCARBONATE FILM CAPACITORS are high reliability screened in accordance with the Level "A" flow plan shown on Page 19. In addition, we have added a special AC square wave stress test, shown in the Quality Assurance section, to improve the 03PV capacitor reliability for pulsating voltage applications.

The 03PV capacitors are the highest performance, highest reliability film capacitors available in subminiature size and are in widespread use in space, aircraft, and missile systems.

Custom capacitors can be provided with selected temperature coefficient, higher insulation resistance and special case styles. See Type PK for higher voltage rated types.

PV SPECIFICATIONS

OPERATING TEMPERATURE —55°C to 100°C at 30VDC. Derate linearly by 50% to 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE

—1.2% Max. at —55°C	±.15% Max. at 55°C
—0.25% Max. at —10°C	±.25% Max. at 85°C
0% Ref. at 25°C	±.50% Max. at 125°C

STABILITY—Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
—10°C to 85°C	0.03% Max.
—62°C to 125°C	0.2% Max.

INSULATION RESISTANCE—measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	4,000,000	2,000,000	1,000,000	500,000	50,000
Greater than 0.1 mfd (in megohms ÷ mfd)	‡ 1,000,000	‡ 400,000	100,000	50,000	5,000

‡Need not exceed IR values for 0.1 mfd or less.

DIELECTRIC ABSORPTION—0.2% Max. at 25°C.

DISSIPATION FACTOR—0.2% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

DIELECTRIC STRENGTH—400% of rated voltage.

CONSTRUCTION—Polycarbonate dielectric, extended metal film electrodes, hermetically sealed, leads isolated from case. Leads are gold plated nickel per Mil Std 1276 type N2.

SEAL TEST—1 x 10^{-6} ATM-CC/SEC Max leak rate.

ENVIRONMENTAL — Capacitors shall meet all applicable requirements of MIL-C-39022/9A.

FOR ADDITIONAL DETAILS, SEE PAGES; 1, 2, 3, 11, 12, 13, 15, 16, 17

LEVEL "A" QUALITY ASSURANCE

"PV" Polycarbonate capacitors are 100% processed & tested as follows:

RELIABILITY SCREENING

1. Stabilization by temperature cycling from —62°C to 125°C, 5 cycles minimum.
2. Mass spectrometer hermetic seal test per MIL-STD-202, method 112, condition C, procedure 111A.
3. DC Dielectric strength test—apply 300% of rated DC volts from lead to lead and leads to case.

3A. AC Dielectric strength test—apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 400% of rated DC voltage for one minute.

4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1 KHz and 25°C.
6. Dissipation factor at 25°C.

POWER AGING AND STABILIZATION

7. Burn-in at 125°C and 140% of rated voltage for a minimum of 48 hours.
8. Verification of stability by temperature cycling from —62°C to 125°C, 5 cycles minimum.

PERFORMANCE CERTIFICATION

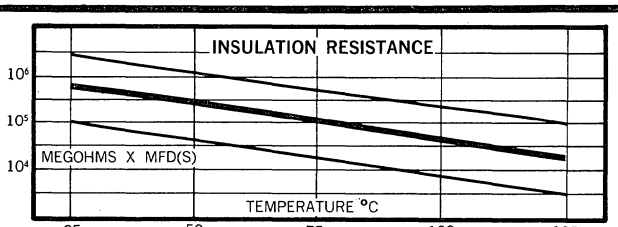
9. Dielectric strength test at a minimum of 400% of rated voltage lead to lead and leads to case.
10. Insulation resistance at rated voltage and 25°C.
11. Capacitance tolerance at 1 KHz and 25°C.
12. Dissipation factor at 25°C.
13. Temperature coefficient measured from —55°C to 125°C at a minimum of 5 temperature points. (Performed on lot sampling basis, minimum 10 pieces per lot.)
14. Visual inspection for dimensions, marking, and packaging.
15. Traceability to production and test records by permanent marking of parts with lot control number.
16. Process and inspection data is maintained on file per NPC-200-3 and Mil-Q-9858 quality control standards.
17. Capacitors are serialized and packaged with certified test data to accompany each shipment.

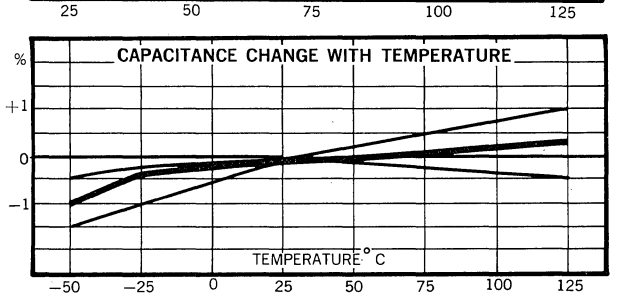
30 VOLT PV

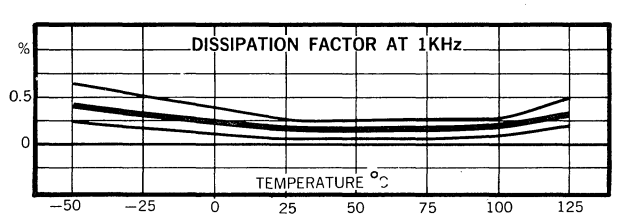
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	5% tol. *JN	2% tol. *GN	1% tol. *FN	½% tol. *DN	¼% tol. *BN
03PV103	.01	.170	.500	$7.47	$8.82	$10.53	$13.50	$17.64
03PV153	.015	.170	.500	7.47	8.82	10.53	13.50	17.64
03PV223	.022	.170	.500	7.47	8.82	10.53	13.50	17.64
03PV273	.027	.170	.562	7.47	8.82	10.53	13.50	17.64
03PV333	.033	.170	.562	7.47	8.82	10.53	13.50	17.64
03PV393	.039	.170	.562	7.47	8.82	10.53	13.50	17.64
03PV473	.047	.170	.562	7.47	8.82	10.53	13.50	17.64
03PV503	.05	.170	.562	7.47	8.82	10.53	13.50	17.64
03PV683	.068	.170	.687	7.47	8.82	10.53	13.50	17.64
03PV823	.082	.170	.687	7.47	8.82	10.53	13.50	17.64
03PV104	.1	.193	.687	7.65	8.91	10.62	13.68	17.82
03PV154	.15	.235	.562	7.87	9.09	10.80	14.06	18.18
03PV224	.22	.235	.687	8.03	9.27	11.07	14.49	18.54
03PV274	.27	.235	.687	8.64	10.08	11.88	15.12	20.16
03PV334	.33	.235	.687	8.86	10.35	12.15	15.39	20.70
03PV474	.47	.312	.687	9.52	11.16	12.96	16.38	22.32
03PV504	.5	.312	.687	9.52	11.16	12.96	16.38	22.32
03PV105	1.0	.312	.813	10.40	13.32	15.12	18.54	26.64
03PV155	1.5	.400	.813	12.42	14.31	16.11	19.71	28.62
03PV205	2.0	.400	.813	13.37	15.48	17.28	20.97	30.96
03PV305	3.0	.400	1.063	15.48	17.37	19.17	22.86	34.74
03PV405	4.0	.400	1.375	17.55	19.44	21.24	24.93	36.88
03PV505	5.0	.500	1.375	19.71	22.50	24.30	27.99	39.90
03PV805	8.0	.562	1.375	27.21	30.53	32.46	34.82	46.33
03PV106	10.0	.562	1.375	30.33	34.11	35.91	37.89	48.86
03PV156	15.0	.562	1.875	33.70	37.90	39.90	42.10	51.84
03PV206	20.0	.670	1.875	39.00	43.20	45.76	47.20	56.40







PG POLYCARBONATE CAPACITORS
AC TESTED AND RATED

NEW **Our 30 volt 03PG and 50 volt 05PG capacitors are now available per MIL-C-39022/9A as CHROIC and CHROIF styles. See catalog pages 1 and 2.**

Our 100 volt, 200 volt, and 400 volt **PG** Polycarbonate capacitors are now being tested for eventual qualification to MIL-C-39022/9A. After completion of qualification for the 100 volt and higher ratings, our **PG** catalog specifications will be revised to conform to MIL-C-39022/9A. For further information concerning the equivalent CRC part numbers per MIL-C-39022/9A, please contact our sales office.

PG POLYCARBONATE CAPACITORS exceed MIL-Specification quality capacitors and are widely used for industrial and military applications. The PG capacitors utilize the patented CRC supported winding and stress-free lead design which has been fully qualified in many extensive test programs. The PG capacitors are reliability screened per **LEVEL "C"** shown on Flow Plan Page 19. See Types PL, PK, and PV for higher reliability level.

PG SPECIFICATIONS

OPERATING TEMPERATURE — −62°C to 100°C at full rated voltage, derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE —

± 2% max −55°C to 125°C
± 1% max −25°C to 85°C
±0.5% max 0°C to 55°C

STABILITY — Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

Range	Retrace
−10°C to 85°C	0.25% max
−62°C to 125°C	0.50% max

INSULATION RESISTANCE—measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

	MINIMUM IR				
Range	25°C	55°C	85°C	105°C	125°C
.001 to 0.1 mfd (in megohms)	1,000,000	500,000	100,000	50,000	10,000
Greater than 0.1 mfd (in megohms ÷ mfd)	100,000	50,000	10,000	5,000	1,000

DIELECTRIC ABSORPTION — 0.2% max at 25°C.

DISSIPATION FACTOR — 0.3% max at 1 KHz and 25°C. Values greater than 1 mfd measure at 0.1 KHz.

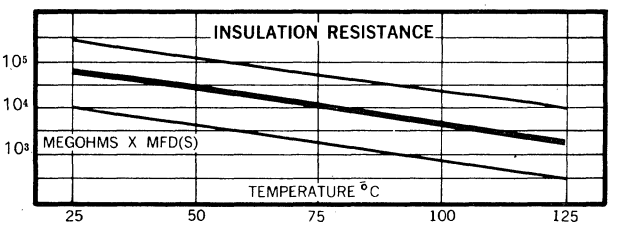
DIELECTRIC STRENGTH — 200% of rated volts.

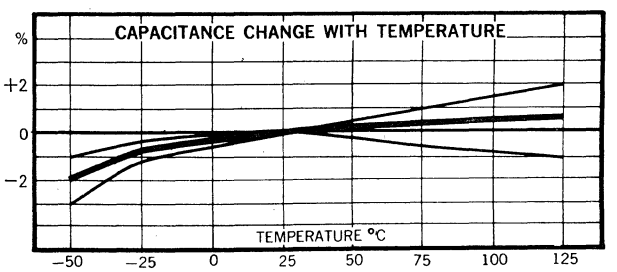
CONSTRUCTION — Polycarbonate dielectric, extended metal film electrodes, hermetically sealed, leads isolated from case. Leads may be tinned copperweld or gold-plated nickel per Mil Std 1276 type N2.

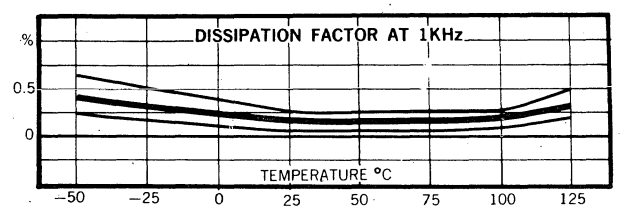
SEAL TEST — 1×10^{-5} ATM-CC/SEC max leak rate.

ENVIRONMENTAL — Capacitors shall meet all applicable requirements of MIL-C-39022/9A.

FOR ADDITIONAL DETAILS, SEE PAGES; 1, 2, 3, 11, 12, 13, 14, 16, 17







LEVEL "C" QUALITY ASSURANCE

"PG" POLYCARBONATE CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. *Stabilization by temperature cycling from −62°C to 125°C, 2 cycles minimum.*
2. *Mass spectrometer hermetic seal test per MIL-STD-202, method 112, condition C, procedure III A.*
3. *Dielectric strength test at a minimum of 200% of rated voltage, lead to lead, leads to case.*
4. *Insulation resistance at rated voltage and 25°C.*
5. *Capacitance tolerance at 1 KHz and 25°C.*
6. *Dissipation factor at 25°C.*
7. *Visual inspection for dimensions, marking and packaging.*

PG POLYCARBONATE CAPACITORS
AC TESTED AND RATED

COMPONENT RESEARCH
MIL-C-39022/9

30V PG
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
03PG102	.001	.170	.500	$3.38	$3.75	$4.50	$5.50	$6.90	$9.00
03PG122	.0012	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG152	.0015	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG182	.0018	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG202	.002	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG222	.0022	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG272	.0027	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG332	.0033	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG472	.0047	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG502	.005	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG682	.0068	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG822	.0082	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG103	.01	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG123	.012	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG153	.015	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG183	.018	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG203	.02	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG223	.022	.170	.500	3.38	3.75	4.50	5.50	6.90	9.00
03PG273	.027	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG333	.033	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG393	.039	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG473	.047	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG503	.05	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG563	.056	.170	.562	3.38	3.75	4.50	5.50	6.90	9.00
03PG683	.068	.170	.687	3.38	3.75	4.50	5.50	6.90	9.00
03PG823	.082	.170	.687	3.42	3.80	4.55	5.55	6.90	9.10
03PG104	.10	.193	.687	3.51	3.90	4.60	5.60	6.95	9.20
03PG124	.12	.193	.687	3.65	4.05	4.65	5.65	7.00	9.30
03PG154	.15	.235	.562	3.65	4.05	4.65	5.65	7.00	9.30
03PG204	.20	.235	.687	3.69	4.10	4.70	5.70	7.10	9.40
03PG224	.22	.235	.687	3.69	4.10	4.70	5.70	7.10	9.40
03PG274	.27	.235	.687	3.92	4.36	4.80	5.90	7.20	9.60
03PG334	.33	.235	.687	3.92	4.36	4.80	5.90	7.20	9.60
03PG394	.39	.235	.687	3.95	4.39	5.20	5.95	7.40	10.40
03PG474	.47	.312	.687	3.95	4.39	5.20	5.95	7.40	10.40
03PG504	.50	.312	.687	3.95	4.39	5.20	5.95	7.40	10.40
03PG684	.68	.312	.687	4.03	4.48	5.30	6.07	7.55	10.61
03PG824	.82	.312	.813	4.22	4.69	5.32	6.32	7.60	11.30
03PG105	1.0	.312	.813	4.22	4.69	5.32	6.32	7.60	11.30
03PG155	1.5	.400	.813	4.67	5.19	5.95	6.95	8.35	11.90
03PG205	2.0	.400	.813	4.91	5.45	6.50	7.50	8.50	13.00
03PG305	3.0	.400	1.063	5.36	5.95	6.98	7.98	8.98	13.96
03PG405	4.0	.400	1.375	5.90	6.55	7.65	8.25	9.35	15.30
03PG505	5.0	.500	1.375	6.32	7.02	8.12	9.20	10.30	16.24
03PG805	8.0	.562	1.375	7.74	8.60	9.65	10.70	12.40	19.30
03PG106	10.0	.562	1.375	8.26	9.18	10.90	12.15	13.95	21.00
03PG156	15.0	.562	1.875	10.71	11.90	13.96	15.96	17.96	27.92
03PG206	20.0	.670	1.875	12.64	14.04	16.24	18.40	20.60	32.48

50V PG

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
05PG102	.001	.170	.500	$2.99	$3.32	$3.92	$4.68	$6.00	$7.84
05PG122	.0012	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG152	.0015	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG182	.0018	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG202	.002	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG222	.0022	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG272	.0027	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG332	.0033	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG472	.0047	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG502	.005	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG682	.0068	.170	.500	2.99	3.32	3.92	4.68	6.00	7.84
05PG822	.0082	.170	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG103	.01	.170	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG123	.012	.170	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG153	.015	.170	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG183	.018	.193	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG203	.02	.193	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG223	.022	.193	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG273	.027	.193	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG333	.033	.193	.562	2.99	3.32	3.92	4.68	6.00	7.84
05PG393	.039	.170	.687	2.99	3.32	3.92	4.68	6.00	7.84
05PG473	.047	.170	.687	2.99	3.32	3.92	4.68	6.00	7.84
05PG503	.05	.170	.687	2.99	3.32	3.92	4.68	6.00	7.84
05PG563	.056	.193	.687	2.99	3.32	3.92	4.68	6.00	7.84
05PG683	.068	.193	.687	2.99	3.32	3.92	4.68	6.00	7.84
05PG823	.082	.193	.813	2.99	3.32	3.92	4.68	6.00	7.84
05PG104	.1	.193	.813	3.06	3.40	3.96	4.72	6.08	7.92
05PG124	.12	.235	.687	3.15	3.50	4.04	4.80	6.24	8.08
05PG154	.15	.235	.687	3.15	3.50	4.04	4.80	6.24	8.08
05PG204	.2	.235	.813	3.21	3.57	4.12	4.92	6.44	8.24
05PG224	.22	.235	.813	3.21	3.57	4.12	4.92	6.44	8.24
05PG274	.27	.312	.687	3.36	3.73	4.28	5.08	6.60	8.56
05PG334	.33	.312	.687	3.55	3.94	4.60	5.40	6.84	9.20
05PG394	.39	.312	.813	3.81	4.23	4.96	5.76	7.28	9.92
05PG474	.47	.312	.813	3.81	4.23	4.96	5.76	7.28	9.92
05PG504	.5	.400	.813	3.81	4.23	4.96	5.76	7.28	9.92
05PG684	.68	.400	.813	4.01	4.45	5.25	6.05	7.60	10.50
05PG824	.82	.400	1.063	4.03	4.48	5.30	6.07	7.55	10.61
05PG105	1.0	.400	1.063	4.03	4.48	5.30	6.07	7.55	10.61
05PG155	1.5	.400	1.063	4.67	5.19	5.95	6.95	8.35	11.90
05PG205	2.0	.500	1.125	4.91	5.45	6.50	7.50	8.50	13.00
05PG305	3.0	.500	1.375	5.36	5.95	6.98	7.98	8.98	13.96
05PG405	4.0	.562	1.375	5.90	6.55	7.65	8.25	9.35	15.30
05PG505	5.0	.670	1.375	6.32	7.02	8.12	9.20	10.30	16.24
05PG805	8.0	.670	1.875	7.74	8.60	9.65	10.70	12.40	19.30
05PG106	10.0	.670	1.875	8.26	9.18	10.90	12.15	13.93	21.00

100V PG
*ADD TOLERANCE LETTER AFTER PART NO.

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
1PG102	.001	.170	.500	$2.70	$3.00	$3.60	$4.40	$6.00	$7.20
1PG122	.0012	.170	.500	2.70	3.00	3.60	4.40	6.00	7.20
1PG152	.0015	.170	.500	2.70	3.00	3.60	4.40	6.00	7.20
1PG182	.0018	.170	.500	2.70	3.00	3.60	4.40	6.00	7.20
1PG202	.002	.170	.500	2.70	3.00	3.60	4.40	5.76	7.20
1PG222	.0022	.170	.500	2.70	3.00	3.60	4.40	5.76	7.20
1PG272	.0027	.170	.500	2.70	3.00	3.60	4.40	5.76	7.20
1PG332	.0033	.170	.500	2.70	3.00	3.60	4.40	5.76	7.20
1PG472	.0047	.170	.500	2.70	3.00	3.60	4.40	5.76	7.20
1PG502	.005	.170	.500	2.70	3.00	3.60	4.40	5.60	7.20
1PG682	.0068	.170	.687	2.70	3.00	3.60	4.40	5.60	7.20
1PG822	.0082	.170	.687	2.70	3.00	3.60	4.40	5.60	7.20
1PG103	.01	.170	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG123	.012	.170	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG153	.015	.170	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG183	.018	.193	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG203	.02	.193	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG223	.022	.193	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG273	.027	.193	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG333	.033	.193	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG393	.039	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG473	.047	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG503	.05	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG563	.056	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
1PG683	.068	.235	.813	2.70	3.00	3.60	4.40	5.52	7.20
1PG823	.082	.312	.687	2.74	3.04	3.60	4.40	5.52	7.20
1PG104	.1	.312	.687	2.81	3.12	3.68	4.48	5.56	7.36
1PG124	.12	.312	.687	2.92	3.24	3.72	4.52	5.60	7.44
1PG154	.15	.312	.813	2.92	3.24	3.72	4.52	5.60	7.44
1PG204	.2	.312	.813	2.95	3.28	3.76	4.56	5.68	7.52
1PG224	.22	.312	.813	2.95	3.28	3.76	4.56	5.68	7.52
1PG274	.27	.312	1.063	2.99	3.32	3.80	4.60	5.68	7.60
1PG334	.33	.312	1.063	3.14	3.49	3.84	4.72	5.76	7.68
1PG394	.39	.400	1.063	3.16	3.51	4.16	4.76	5.92	8.32
1PG474	.47	.400	1.063	3.16	3.51	4.16	4.76	5.92	8.32
1PG504	.5	.400	1.063	3.16	3.51	4.16	4.76	5.92	8.32
1PG684	.68	.500	1.125	3.38	3.75	4.26	5.06	6.08	8.52
1PG824	.82	.500	1.125	3.38	3.75	4.26	5.06	6.08	8.52
1PG105	1.0	.562	1.125	3.38	3.75	4.26	5.06	6.08	8.52
1PG155	1.5	.562	1.375	3.74	4.15	4.76	5.56	6.44	9.52
1PG205	2.0	.670	1.375	3.92	4.36	5.20	6.00	6.44	10.40
1PG305	3.0	.670	1.875	4.28	4.76	5.58	6.38	7.18	11.16
1PG405	4.0	.75	1.875	4.72	5.24	6.12	6.60	7.48	12.24
1PG505	5.0	.75	1.875	5.06	5.62	6.50	7.36	8.24	13.00
1PG805	8.0	1.0	2.375	6.61	7.34	8.40	9.48	10.36	16.80
1PG106	10.0	1.0	2.375	6.61	7.34	8.40	9.48	10.36	16.80

200V PG

PRICES 1-6

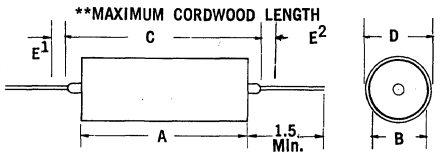
Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
2PG102	.001	.170	.562	$2.70	$3.00	$3.60	$4.40	$5.52	$7.20
2PG202	.002	.170	.562	2.70	3.00	3.60	4.40	5.52	7.20
2PG502	.005	.170	.562	2.70	3.00	3.60	4.40	5.52	7.20
2PG103	.01	.193	.562	2.70	3.00	3.60	4.40	5.52	7.20
2PG153	.015	.235	.562	2.70	3.00	3.60	4.40	5.52	7.20
2PG223	.022	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
2PG333	.033	.312	.687	2.70	3.00	3.60	4.40	5.52	7.20
2PG473	.047	.312	.687	2.70	3.00	3.60	4.40	5.52	7.20
2PG503	.05	.312	.813	2.70	3.00	3.60	4.40	5.52	7.20
2PG683	.068	.312	.813	2.74	3.04	3.60	4.40	5.52	7.20
2PG104	.1	.312	.813	2.81	3.12	3.68	4.48	5.56	7.36
2PG154	.15	.400	1.063	2.92	3.24	3.72	4.52	5.60	7.44
2PG224	.22	.400	1.375	2.95	3.28	3.76	4.56	5.68	7.52
2PG334	.33	.500	1.375	3.14	3.49	3.84	4.72	5.76	7.68
2PG474	.47	.500	1.375	3.30	3.67	4.24	5.00	6.08	8.48
2PG504	.5	.500	1.375	3.30	3.67	4.24	5.00	6.08	8.48
2PG105	1.0	.562	1.875	3.45	3.83	4.39	5.27	6.32	8.78
2PG155	1.5	.670	1.875	3.81	4.23	4.84	5.64	6.56	9.68
2PG205	2.0	.750	1.875	4.10	4.55	5.32	6.11	6.96	10.64
2PG255	2.5	.750	1.875	4.46	4.95	5.72	6.56	7.28	11.44
2PG305	3.0	1.00	1.875	4.90	5.44	6.28	6.76	7.64	12.56
2PG405	4.0	1.00	2.375	5.33	5.92	6.80	7.44	8.32	13.60

400V PG

PRICES 1-6

Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	¼% tol. *B
4PG102	.001	.193	.562	$2.70	$3.00	$3.60	$4.40	$5.52	$7.20
4PG202	.002	.193	.562	2.70	3.00	3.60	4.40	5.52	7.20
4PG502	.005	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
4PG103	.01	.235	.687	2.70	3.00	3.60	4.40	5.52	7.20
4PG153	.015	.235	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG223	.022	.312	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG273	.027	.312	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG333	.033	.312	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG393	.039	.312	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG473	.047	.400	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG503	.05	.400	.813	2.70	3.00	3.60	4.40	5.52	7.20
4PG683	.068	.400	.813	2.74	3.04	3.60	4.40	5.52	7.20
4PG823	.082	.400	1.063	2.74	3.04	3.60	4.40	5.52	7.20
4PG104	.10	.400	1.063	2.92	3.24	3.72	4.52	5.60	7.44
4PG154	.15	.400	1.375	2.95	3.28	3.76	4.56	5.68	7.52
4PG224	.22	.500	1.375	3.14	3.49	3.84	4.72	5.76	7.68
4PG334	.33	.562	1.375	3.30	3.67	4.24	5.00	6.08	8.48
4PG474	.47	.562	1.875	3.45	3.83	4.39	5.27	6.32	8.78
4PG504	.50	.562	1.875	3.45	3.83	4.39	5.27	6.32	8.78
4PG105	1.0	.750	1.875	4.46	4.95	5.72	6.56	7.28	11.44
4PG205	2.0	1.00	2.375	5.33	5.92	6.80	7.44	8.32	13.60

PQ POLYCARBONATE • CORDWOOD CAPACITORS • TQ TEFLON
HERMETICALLY SEALED



MECHANICAL TOLERANCES AND NOTES

- **A** Length "A" is ±.03" max.
- **B** Diameter "B" is ±.01" max. (without mylar sleeving)
- **C** Max. cordwood length (see tables)
- **D** Diameter "D" is .01" max. greater than "B" (when sleeving is put on case)
- **E** Length "E" is maximum of .062" that solder wick may run up gold plated leads from solder bead.

PQ POLYCARBONATE

Type PQ Polycarbonate Capacitors, the most compact high reliability film capacitors available, have a reduced bead to bead length for cordwood applications.

PQ SPECIFICATIONS—Same as for Type PG, see Page 15.

RELIABILITY — Similar to CHROIC, CHROIF Styles. See Pages 1 and 2 of this catalog.

LEAD MATERIAL—Tinned copper clad steel is standard. Also available with gold plated nickel. See Page 3.

SPECIALS—Higher reliability screening including AC HiPot testing can be supplied.

TQ TEFLON

Type 05TQ Teflon Capacitors, the smallest high quality teflon film capacitors available, have a reduced bead to bead length for cordwood applications.

05TQ SPECIFICATIONS—Same as 05TA, see Page 5, except for slightly higher temperature coefficient and a maximum dissipation factor of 0.05%. Specials are also available at higher voltage ratings.

RELIABILITY—Level "B." See Flow Plan Page 19.

LEAD MATERIAL—Gold plated nickel is standard. Also available with tinned copper-clad steel leads. See Page 3.

30V PQ POLYCARBONATE
*ADD TOLERANCE LETTER AFTER PART NO.

Part No.	MFD	±.01 Diam.	±.03 Length	**Max. Cordwood Length	PRICES 1-6 10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D
03PQ102	.001	.170	.500	.600	$3.74	$4.15	$4.90	$5.85	$7.50
03PQ122	.0012	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ152	.0015	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ182	.0018	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ202	.002	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ222	.0022	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ272	.0027	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ332	.0033	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ472	.0047	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ502	.005	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ682	.0068	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ822	.0082	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ103	.01	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ123	.012	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ153	.015	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ183	.018	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ203	.02	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ223	.022	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ273	.027	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ333	.033	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ393	.039	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ473	.047	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ503	.05	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
03PQ563	.056	.170	.562	.670	3.74	4.15	4.90	5.85	7.50
03PQ683	.068	.170	.562	.670	3.74	4.15	4.90	5.85	7.50
03PQ823	.082	.193	.562	.670	3.74	4.15	4.90	5.85	7.50
03PQ104	.1	.193	.562	.670	3.83	4.25	4.95	5.90	7.60
03PQ124	.12	.193	.687	.750	3.93	4.37	5.05	6.00	7.80
03PQ154	.15	.193	.687	.750	3.93	4.37	5.05	6.00	7.80
03PQ184	.18	.193	.687	.750	4.01	4.46	5.15	6.15	8.05
03PQ204	.2	.193	.687	.750	4.01	4.46	5.15	6.15	8.05
03PQ224	.22	.193	.687	.750	4.01	4.46	5.15	6.15	8.05
03PQ274	.27	.235	.687	.750	4.32	4.80	5.60	6.60	8.40
03PQ334	.33	.235	.687	.750	4.43	4.92	5.75	6.75	8.55
03PQ394	.39	.235	.687	.750	4.76	5.29	6.20	7.20	9.10
03PQ474	.47	.235	.687	.750	4.76	5.29	6.20	7.20	9.10
03PQ504	.5	.235	.687	.750	4.76	5.29	6.20	7.20	9.10
03PQ564	.56	.312	.687	.750	4.94	5.49	6.50	7.50	9.40
03PQ684	.68	.312	.687	.750	4.94	5.49	6.50	7.50	9.40
03PQ824	.82	.312	.687	.750	5.09	5.65	6.80	7.80	9.75
03PQ105	1.0	.312	.687	.750	5.20	5.78	7.40	8.40	10.30
03PQ155	1.5	.312	.937	1.00	6.21	6.90	7.95	8.95	10.95
03PQ205	2.0	.312	1.063	1.10	6.69	7.43	8.60	9.60	11.65
03PQ305	3.0	.400	.937	1.00	7.74	8.60	9.65	10.65	12.70
03PQ405	4.0	.400	1.063	1.10	8.78	9.75	10.80	11.80	13.85
03PQ505	5.0	.400	1.375	1.45	9.85	10.95	12.50	13.50	15.55
03PQ805	8.0	.500	1.375	1.45	12.15	13.50	15.60	16.85	18.25
03PQ106	10.0	.500	1.375	1.45	15.17	16.85	18.95	19.95	21.05

50V TQ TEFLON
*ADD TOLERANCE LETTER AFTER PART NO.

Part No.	MFD	±.01 Diam.	±.03 Length	**Max. Cordwood Length	PRICES 1-6 5% tol. *JN	2% tol. *GN	1% tol. *FN	¼% tol. *BN
05TQ102	.001	.193	.562	.600	$4.59	$5.10	$5.70	$9.95
05TQ152	.0015	.193	.562	.600	4.59	5.10	5.70	9.95
05TQ202	.002	.193	.562	.600	4.59	5.10	5.70	9.95
05TQ222	.0022	.193	.562	.600	4.59	5.10	5.70	9.95
05TQ332	.0033	.193	.562	.600	4.59	5.10	5.70	9.95
05TQ392	.0039	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ472	.0047	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ502	.005	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ682	.0068	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ822	.0082	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ103	.01	.235	.562	.600	4.59	5.10	5.70	9.95
05TQ123	.012	.235	.562	.600	4.66	5.35	6.35	9.95
05TQ153	.015	.235	.625	.670	4.86	5.40	6.00	9.95
05TQ223	.022	.235	.625	.670	5.13	5.70	6.30	9.95
05TQ333	.033	.312	.625	.670	5.61	6.23	7.20	10.85
05TQ393	.039	.312	.625	.670	5.94	6.60	7.50	11.80
05TQ473	.047	.312	.625	.670	5.94	6.60	7.50	11.80
05TQ503	.05	.312	.625	.670	5.94	6.60	7.50	11.80
05TQ683	.068	.312	.625	.670	7.52	8.35	9.50	13.10
05TQ823	.082	.312	.625	.670	8.28	9.20	10.35	14.95
05TQ104	.1	.312	.625	.670	8.91	9.90	10.75	14.95
05TQ154	.15	.312	.937	1.00	9.99	11.10	12.00	16.00
05TQ204	.2	.400	.937	1.00	12.02	13.35	14.25	18.10
05TQ224	.22	.400	.937	1.00	12.51	13.90	14.90	18.80

50V PQ POLYCARBONATE
*ADD TOLERANCE LETTER AFTER PART NO.

Part No.	MFD	±.01 Diam.	±.03 Length	**Max. Cordwood Length	PRICES 1-6 10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D
05PQ102	.001	.170	.500	.600	$3.74	$4.15	$4.90	$5.85	$7.50
05PQ122	.0012	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ152	.0015	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ182	.0018	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ202	.002	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ222	.0022	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ272	.0027	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ332	.0033	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ472	.0047	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ502	.005	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ682	.0068	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ822	.0082	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ103	.01	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ123	.012	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ153	.015	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ183	.018	.170	.500	.600	3.74	4.15	4.90	5.85	7.50
05PQ203	.02	.193	.562	.600	3.74	4.15	4.90	5.85	7.50
05PQ223	.022	.193	.562	.600	3.74	4.15	4.90	5.85	7.50
05PQ273	.027	.193	.562	.600	3.74	4.15	4.90	5.85	7.50
05PQ333	.033	.193	.562	.600	3.74	4.15	4.90	5.85	7.50
05PQ393	.039	.193	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ473	.047	.193	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ503	.05	.193	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ563	.056	.193	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ683	.068	.235	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ823	.082	.235	.625	.670	3.74	4.15	4.90	5.85	7.50
05PQ104	.1	.235	.625	.670	3.83	4.25	4.95	5.90	7.60
05PQ124	.12	.235	.625	.670	3.93	4.37	5.05	6.00	7.80
05PQ154	.15	.312	.625	.670	3.93	4.37	5.05	6.00	7.80
05PQ184	.18	.312	.625	.670	4.01	4.46	5.15	6.15	8.05
05PQ224	.22	.312	.625	.670	4.01	4.46	5.15	6.15	8.05
05PQ274	.27	.312	.625	.670	4.01	4.46	5.15	6.15	8.05
05PQ334	.33	.312	.687	.750	4.43	4.92	5.75	6.75	8.55
05PQ394	.39	.312	.687	.750	4.76	5.29	6.20	7.20	9.10
05PQ474	.47	.312	.687	.750	4.76	5.29	6.20	7.20	9.10
05PQ504	.50	.312	.687	.750	4.76	5.29	6.20	7.20	9.10
05PQ684	.68	.400	.687	.750	4.94	5.49	6.50	7.50	9.40
05PQ824	.82	.400	.687	.750	5.09	5.65	6.80	7.80	9.75
05PQ105	1.0	.400	.687	.750	5.20	5.78	7.40	8.40	10.30

*SEE PAGE 3

PA POLYSTYRENE CAPACITORS

PA Polystyrene capacitors reliability screened per Level "B" Flow Plan shown on Page 19, are used in operational amplifiers and networks because of their high insulation resistance, low dielectric absorption and long term stability. These PA capacitors are available at higher working voltages and in special case styles as required by the customer. Banks of precision capacitors, up to 100 MFD in value, have been supplied for space instrumentation applications.

Level "A" capacitors with burn-in and high reliability screening can also be supplied. For advance information on a new high temperature polystyrene capacitor see Pages 21 and 22.

PA SPECIFICATIONS

OPERATING TEMPERATURE: —55°C to 85°C at full rated volts.

TEMPERATURE COEFFICIENT: (See special notes below)

Values 0.001 MFD to 0.0082 MFD —80 ±50 PPM/°C
0.01 MFD to 2.0 MFD —60 ±50 PPM/°C

STABILITY: 0.1% maximum drift with 5 cycles from —62°C to 85°C.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 MFD, allow an additional minute/MFD charge time.

MINIMUM IR			
Range	25°C	55°C	85°C
0.001 to 0.1 MFD (in megohms)	5,000,000	2,500,000	500,000
Greater than 0.1 MFD (in megohms ÷ MFD)	‡ 1,000,000	‡ 500,000	‡ 100,000

‡ Need not exceed IR values for 0.1 mfd or less

DIELECTRIC ABSORPTION: 0.02% maximum at 25°C.

DISSIPATION FACTOR: 0.02% maximum at 25°C. Values to 1 MFD at 1 KHz, above 1 MFD at 0.1 KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Polystyrene dielectric, extended foil electrodes, hermetically sealed. Leads isolated from case. Leads are tinned copperweld.

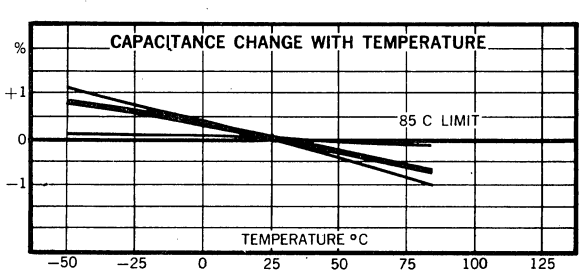
SEAL TEST: 1 x 10^{-6} ATM-CC/SEC. maximum leak rate.

ENVIRONMENTAL: Shall meet all applicable requirements of MIL-C-19978, including Grade 3 vibration.

FOR ADDITIONAL DETAILS, SEE GENERAL INFORMATION SECTION, PAGE 3.

NOTES:

SPECIAL PA CAPACITORS can be supplied with a negative coefficient of —20 to —100 PPM/°C that is linear to ±30 PPM/°C, ±20 PPM/°C and ±10 PPM/°C. **A WIDE SELECTION** is available of larger MFD values in bathtub and custom cases. **A SPECIAL HIGH TEMPERATURE,** high reliability type polystyrene capacitor is currently available and under test, see Pages 21 and 22.



LEVEL "B" QUALITY ASSURANCE

"PA" POLYSTYRENE CAPACITORS ARE 100% PROCESSED AND TESTED AS FOLLOWS:

1. Temperature cycling from —62°C to 85°C, 5 cycles minimum.
2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C. Procedure IIIA.
3. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.
4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1 KHz and 25°C.
6. Dissipation factor at 1 KHz and 25°C.
7. Visual inspection for dimensions, marking, and packaging.
8. Traceability to production and test records by permanent marking of parts with lot control number.
9. Process and inspection data is maintained on file per NPC-200-3 and MIL-Q-9858 Quality Control Standards.

50 VOLT PA *ADD TOLERANCE LETTER AFTER PART NO.				PRICES 1-6					
Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	0.1% tol. *A
05PA102	.001	.193	.687	$3.37	$3.75	$4.50	$5.50	$6.90	$13.80
05PA182	.0018	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA222	.0022	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA332	.0033	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA472	.0047	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA502	.005	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA682	.0068	.193	.687	3.37	3.75	4.50	5.50	6.90	13.80
05PA822	.0082	.193	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA103	.01	.193	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA153	.015	.235	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA223	.022	.312	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA333	.033	.312	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA393	.039	.312	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA473	.047	.312	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA503	.05	.312	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA683	.068	.400	.813	3.37	3.75	4.50	5.50	6.90	13.80
05PA823	.082	.400	1.063	3.37	3.75	4.50	5.50	6.90	13.80
05PA104	.10	.400	1.063	3.37	3.75	4.50	5.50	6.90	13.80
05PA154	.15	.400	1.375	3.46	3.85	4.60	5.60	7.00	14.00
05PA224	.22	.500	1.375	3.51	3.90	4.65	5.65	7.05	14.10
05PA334	.33	.562	1.375	3.55	3.95	4.70	5.70	7.10	14.20
05PA474	.47	.562	1.875	3.69	4.10	4.85	5.85	7.25	14.50
05PA504	.50	.562	1.875	3.69	4.10	4.85	5.85	7.25	14.50
05PA105	1.0	.750	1.875	4.68	5.20	6.10	7.15	9.10	18.20
05PA205	2.0	1.0	2.250	7.06	7.85	8.30	9.10	11.40	22.80

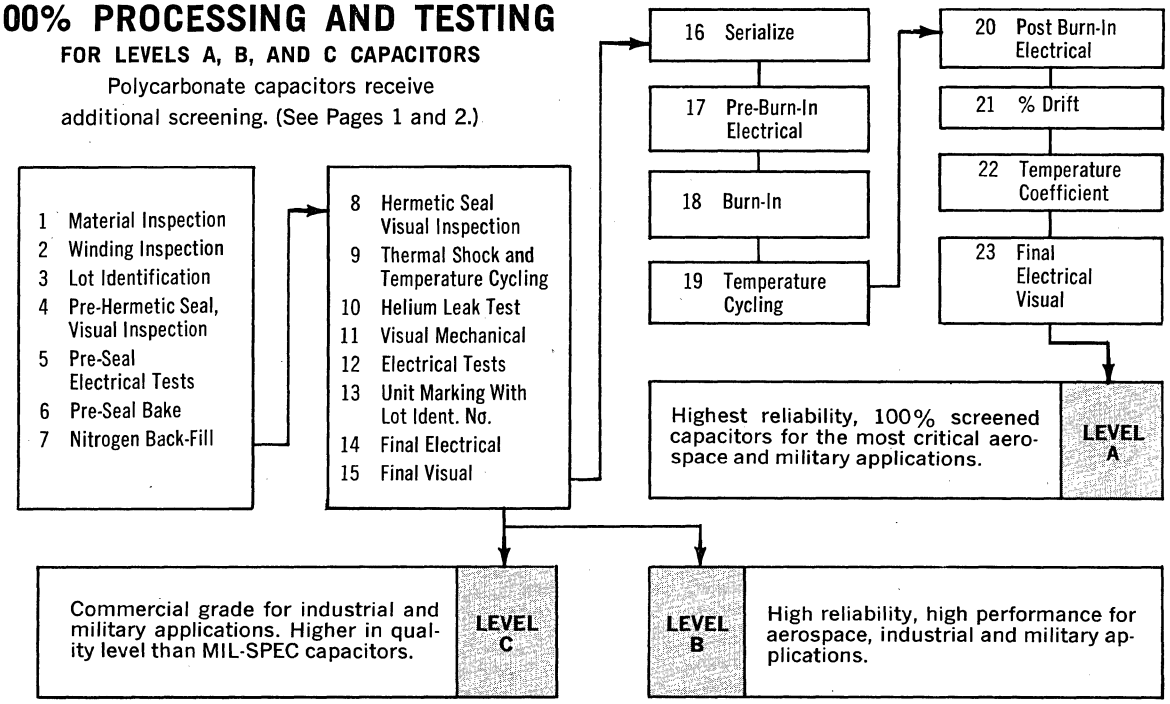
100 VOLT PA *ADD TOLERANCE LETTER AFTER PART NO.				PRICES 1-6					
Part No.	MFD	±.01 Diam.	±.03 Length	10% tol. *K	5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	0.1% tol. *A
1PA102	.001	.193	.687	$3.75	$4.13	$4.95	$6.05	$7.59	$15.18
1PA182	.0018	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA222	.0022	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA332	.0033	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA472	.0047	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA502	.005	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA682	.0068	.193	.687	3.75	4.13	4.95	6.05	7.59	15.18
1PA822	.0082	.193	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA103	.01	.193	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA153	.015	.235	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA223	.022	.312	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA333	.033	.312	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA393	.039	.400	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA473	.047	.400	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA503	.05	.400	.813	3.75	4.13	4.95	6.05	7.59	15.18
1PA683	.068	.400	1.063	3.75	4.13	4.95	6.05	7.59	15.18
1PA823	.082	.400	1.063	3.75	4.13	4.95	6.05	7.59	15.18
1PA104	.10	.400	1.375	3.75	4.13	4.95	6.05	7.59	15.18
1PA154	.15	.400	1.375	3.85	4.24	5.06	6.16	7.70	15.40
1PA224	.22	.562	1.375	3.90	4.29	5.12	6.22	7.76	15.51
1PA334	.33	.562	1.875	3.95	4.35	5.17	6.27	7.81	15.62
1PA474	.47	.670	1.875	4.10	4.51	5.34	6.44	7.98	15.95
1PA504	.50	.670	1.875	4.10	4.51	5.34	6.44	7.98	15.95
1PA105	1.0	1.0	1.875	5.20	5.72	6.71	7.87	10.01	20.02

HIGH RELIABILITY FLOW PLAN

100% PROCESSING AND TESTING

FOR LEVELS A, B, AND C CAPACITORS

Polycarbonate capacitors receive additional screening. (See Pages 1 and 2.)



"MM" AND "MA" MYLAR CAPACITORS

SPECIFICATIONS

OPERATING TEMPERATURE — −62°C to 85°C full rated volts. Derate linearly to 50% of rated volts at 125°C.

CAPACITANCE vs TEMPERATURE	−55°C	−5% Max.	55°C	+1% Max.
	−25°C	−3% Max.	85°C	+3% Max.
	0°C	−1.5% Max.	125°C	+15% Max.

STABILITY — 0.1% maximum with −10°C to 85°C cycle.

INSULATION RESISTANCE	25°C	50,000 meg ÷ mfd min.	100,000 megs max.
	85°C	5,000	10,000
	125°C	100	400

DIELECTRIC ABSORPTION — 0.5%

DISSIPATION FACTOR — 0.8% max.

CONSTRUCTION — Hermetically sealed, extended metal film electrodes, leads isolated from case, tinned copper clad steel leads.

SEE PAGE 3 FOR ADDITIONAL INFORMATION.

OBSOLESCENCE NOTE

Type MA and MM Mylar capacitors have been used in many space and military applications due to their high reliability and small size, but may be eventually discontinued as a catalog item because of the superior performance of our Polycarbonate and Polysulfone capacitors. Although our Polysulfone capacitors are not listed as a standard item as yet in this catalog issue, they are available in the same case sizes as the Mylar capacitors as replacement units. Please contact us for more complete information.

LEVEL "B" QUALITY ASSURANCE

1. Stabilization by temperature cycling from −62°C to 125°C, 5 cycles minimum
2. Mass spectrometer hermetic seal test per MIL-STD-202, Method 112, condition C, procedure III A.
3. Dielectric strength test at a minimum of 200% of rated voltage, lead to lead and leads to case.

3A. AC dielectric strength — apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 X rated DC voltage for one minute.

4. Insulation resistance at rated voltage and 25°C.
5. Capacitance tolerance at 1 KHz and 25°C.
6. Dissipation factor at 25°C.
7. Visual inspection for dimensions, marking and packaging.
8. Traceability to production and test records by permanent marking of parts with lot control number.
9. Process and inspection data is maintained on file per NPC-200-3 and MIL-Q-9858 quality control standards.

100 VOLT MA MYLAR — *ADD TOLERANCE LETTER AFTER PART NO. — 200 VOLT MM MYLAR

Part No.	MFD	± .01 Diam.	± .03 Length	PRICES 1-6 5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D	Part No.	MFD	± .01 Diam.	± .03 Length	PRICES 1-6 5% tol. *J	2% tol. *G	1% tol. *F	½% tol. *D
1MA103	.01	.170	.562	$3.75	$4.50	$5.50	$6.90	2MM103	.01	.193	.562	$4.15	$4.90	$5.85	$7.50
1MA153	.015	.170	.562	3.75	4.50	5.50	6.90	2MM153	.015	.193	.562	4.15	4.90	5.85	7.50
1MA223	.022	.170	.562	3.75	4.50	5.50	6.90	2MM223	.022	.235	.562	4.15	4.90	5.85	7.50
1MA333	.033	.193	.562	3.75	4.50	5.50	6.90	2MM333	.033	.235	.562	4.15	4.90	5.85	7.50
1MA393	.039	.193	.562	3.75	4.50	5.50	6.90	2MM393	.039	.235	.687	4.15	4.90	5.85	7.50
1MA473	.047	.193	.687	3.75	4.50	5.50	6.90	2MM473	.047	.235	.687	4.15	4.90	5.85	7.50
1MA503	.05	.193	.687	3.75	4.50	5.50	6.90	2MM503	.05	.235	.813	4.15	4.90	5.85	7.50
1MA683	.068	.193	.687	3.75	4.50	5.50	6.90	2MM683	.068	.235	.813	4.15	4.90	5.85	7.50
1MA104	.1	.235	.687	3.90	4.60	5.60	6.95	2MM104	.1	.312	.687	4.25	4.95	5.90	7.60
1MA154	.15	.312	.687	4.05	4.65	5.65	7.00	2MM154	.15	.312	.813	4.37	5.05	6.00	7.80
1MA224	.22	.312	.687	4.10	4.70	5.70	7.10	2MM224	.22	.312	.813	4.46	5.15	6.15	8.05
1MA334	.33	.312	.813	4.36	4.80	5.90	7.20	2MM334	.33	.312	.813	4.92	5.75	6.75	8.55
1MA474	.47	.400	.813	4.39	5.20	5.95	7.40	2MM474	.47	.400	1.063	5.29	6.20	7.20	9.10
1MA504	.5	.400	.813	4.39	5.20	5.95	7.40	2MM504	.5	.500	1.125	5.29	6.20	7.20	9.10
1MA105	1.0	.400	1.063	4.69	5.32	6.32	7.60	2MM105	1.0	.562	1.125	5.78	7.40	8.40	10.30
1MA155	1.5	.500	1.125	5.19	5.95	6.95	8.05	2MM155	1.5	.562	1.375	6.90	7.95	8.95	10.95
1MA205	2.0	.500	1.125	5.45	6.50	7.50	8.50	2MM205	2.0	.670	1.375	7.43	8.60	9.60	11.65
1MA305	3.0	.562	1.125	5.95	6.98	7.98	8.98	2MM305	3.0	.670	1.625	8.60	9.65	10.65	12.70
1MA505	5.0	.670	1.375	7.02	8.12	9.20	10.30	2MM505	5.0	.750	1.875	10.95	12.50	13.50	15.55
1MA106	10.0	.670	1.875	9.18	10.50	11.85	12.95	2MM106	10.0	1.0	2.375	16.85	18.95	19.95	21.05

RELIABILITY INFORMATION

FAILURE ANALYSIS • LIFE TESTING • SIMULATION TESTING

CASE HISTORY RN-042

OPEN CIRCUIT CONDITION OF 100 VDC RATED CAPACITOR IN LOW VOLTAGE APPLICATION.

DETAILS: Customer discovered that existing voltage transients exceeding 100 volts, ultimately damaged several capacitors during system environmental checkout. No room was available for a larger size capacitor without costly re-tooling.

CORRECTIVE ACTION: A series of screening tests was conducted by CRC on both capacitors from the same lot, and a newer CRC type with the same characteristics but capable of withstanding more severe current surges. These tests were designed, in a step-by-step method to induce failure modes, under the customer's worst case conditions. Capacitance, IR and DF measurements taken after each step served to monitor all possible degradation trends. Following are the screening tests:

TEST STEP	TEST CONDITIONS
1	48 hours Burn-In @ 125°C/140 VDC.
2	20 Cycles from —62°C/125°C.
3	62 hours Burn-In @ 85°C/400 Hz/100 VRMS Sine Wave.
4	HiPot Test @ 600 VDC for 1 minute and @ 600 volts peak-to-peak @ 60 Hz square wave for 1 minute.
5	24 hours Burn-In @ 85°C/400 Hz/100 VRMS Sine Wave.
6	5.5 hours @ 85°C/60 Hz/400V peak-to-peak square wave.
7	23 hours Burn-In @ 125°C/300 VDC.
8	3 Cycles from —62°C/125°C.
9	23 hours Burn-In @ 125°C/400 VDC.
10	3 Cycles from —62°C/125°C.
11	37.5 hours Burn-In @ 85°C/60 Hz/300V peak-to-peak.

TEST DATA

SAMPLE NO.	TOTAL % CAPAC. DRIFT	FINAL % DF @ 1 KHz	FINAL % DF @ 10 KHz	FINAL LEAKAGE CURRENT IN PICO-AMPS @ 90 VDC
1	—.14%	<.01%	<.01%	1
2	—.19%	<.01%	<.01%	2
3	—.05%	<.01%	<.01%	2
4	—.06%	<.01%	<.09%	2
5	—.01%	<.01%	<.01%	1
6	+.01%	<.01%	<.10%	1
7	—.01%	<.01%	<.01%	1
8	—.08%	<.01%	<.01%	1
9	0.0%	<.01%	<.01%	5
10	—.09%	<.01%	<.01%	1

TEST CONCLUSIONS

Original capacitors used passed Step 3, but with significant increases of dissipation factor, then opened after Step 4. CRC replacement capacitors made with special electrodes (patent pending) survived all tests. Results for 10 samples are shown above.

CRC test capacitors are extremely stable with the major capacitance shift occurring after the conditioning of Step 1.

ADDITIONAL INFORMATION — 5 Picoamperes leakage current at 90 volts is equivalent to 18,000,000 megohms insulation resistance. CRC capacitors are therefore, remarkably high in insulation resistance after all screening tests.

CRC capacitors tested above were a special 1TJ103 Teflon type similar to those listed on Page 4 of our catalog. Larger values were also tested with equivalent results.

For AC applications, it is imperative that the customer conduct reliability screening tests utilizing pulsed voltages to avoid failures. Contact our Reliability Department for assistance in this matter.

RELIABILITY STUDY XT-294

HIGH VOLTAGE CAPACITORS

Customers have requested that CRC supply high reliability capacitors of both light-weight construction and minimum size. These units must withstand the most rigorous environmental conditions and yet perform electrically as precision capacitors. The following typical life test is only one of many conducted constantly to verify the outstanding performance of CRC capacitors, regardless of specialized application.

APPLICATION: A capacitor 0.25 MFD ±5% is required in a .670 x 1.875 hermetically sealed case to operate at 1500 VDC.

TEST PLAN: To determine whether the CRC type and size capacitor could be considered reliable for a long term space flight application, CRC decided to life test 26 samples at 2300 volts DC and 85°C. In order to study any possible failure modes, readings with extremely accurate measurement equipment were taken of capacitance, DF and IR, initially and at periodic intervals. The following data was available on 3-18-70, at the time of catalog preparation. Continued testing is planned to 10,000 hours.

TEST DATA XT-294		% Dissipation Factor @ 1 KHz		Insulation Resistance in Megohms @ 500 Volts and 25°C	
Sample No.	% Capac. Change After 1500 Hours	Initial	After 1500 Hours	Initial	After 1500 Hours
1	—.14	.06%	.07%	2,800,000	2,700,000
2	—.14	.05%	.07%	2,600,000	2,700,000
3	—.07	.06%	.07%	2,700,000	2,700,000
4	+.69	.06%	.07%	2,600,000	2,600,000
5	—.31	.06%	.06%	2,800,000	2.700,000
6	—.35	.06%	.08%	2,700,000	2,600,000
7	—.10	.04%	.09%	2,900,000	2,800,000
8	—.10	.06%	.08%	2,700,000	2,700,000
9	—.35	.06%	.08%	2,700,000	2,700,000
10	+.02	.06%	.08%	2,600,000	2,500,000
11	—.60	.05%	.12%	2,700,000	2,600,000
12	—.10	.05%	.08%	2,500,000	2,500,000
13	—.04	.06%	.08%	2,600,000	2,500,000
14	—.03	.05%	.07%	2,700,000	2,500,000
15	—.50	.05%	.08%	2,600,000	2,500,000
16	—.39	.06%	.08%	2,900,000	2,800,000
17	—.38	.06%	.08%	2,700,000	2,500,000
18	—.54	.05%	.12%	2,500,000	2,600,000
19	—.55	.06%	.08%	2,300,000	2,200,000
20	—.43	.06%	.07%	2,300,000	2,200,000
21	—.24	.06%	.07%	2,000,000	2,200,000
22	—.22	.05%	.08%	2,200,000	2,300,000
23	—.40	.05%	.10%	2,200,000	2,300,000
24	—.22	.06%	.08%	2,300,000	2,300,000
25	—.41	.07%	.09%	700,000	400,000
26	—.55	.05%	.07%	2,200,000	2,300,000

TEST CONCLUSIONS

1. In order to establish failure criteria more severe and sophisticated than existing high reliability military specifications, CRC decided to establish the following as failures during or at end of test:
   A) An open or short circuit condition.
   B) Capacitance shift exceeding ±2%.
   C) % Dissipation factor must not exceed 0.2%.
   D) Insulation resistance must not fall below 100,000 megohms.
2. At the end of 1500 hours of test, results were as follows:
   CONDITION:
   A) No failures.
   B) Maximum capacitance shift was +.69%
   C) Maximum dissipation factor was .12%
   D) Minimum insulation resistance was 400,000 megohms.
3. By means of extrapolation based on the test data above, the failure rate is 0.0005%/10^3 hours at a 95% LCL confidence level.

ADDITIONAL INFORMATION—The capacitor described above is a specially modified polycarbonate extended metal film electrode capacitor and is capable of operation from —55°C to 125°C. It is also excellent for sinusoidal AC applications. Larger test batches will be tested at various stress levels and temperatures to study the unusual performance of these remarkable capacitors.

SPECIAL PRODUCTS SECTION
TEMPERATURE COEFFICIENT DATA

HIGH TEMPERATURE POLYSTYRENE CAPACITORS

CRC has developed miniature polystyrene capacitors that can safely be operated above 85°C. This has been made possible by the use of a combination of the CRC patented winding and termination construction, and special metal film electrodes (patent applied for), which support the polystyrene dielectric in a stress-free manner at temperatures above 85°C.

One hundred capacitors ranging from 0.001 to 0.1 MFD and rated at 50 volts were burned-in at 105°C and 140% of rated voltage for 72 hours, without failure. Some of the capacitors were also tested for insulation resistance at 45 volts from 25°C to 125°C without any shorts or opens occurring. CRC will conduct life tests at 85°C, 105°C and 125°C to determine the proper ratings for these unusual capacitors.

TC TRACKING OF MATCHED SETS

Recently a customer requested that we supply our 30 volt "PL" Polycarbonate capacitors in five values from .0022 MFD to 1 MFD so that the TC slopes track within ±0.25% of each other from —55°C to 125°C. We tested on a sample basis and found that our standard catalog type met this requirement. In addition, the customer requested the five capacitors to be 1% in tolerance but to be assorted and packaged in groups of five matched to 0.1%. We have been supplying thousands of such sets on a routine basis ever since.

In a more extreme example, a customer requested 0.1 MFD capacitors supplied in pairs so that they track within 0.01% from —10°C to 85°C. We found that our best polystyrene units in stock were limited to 0.02% and that selected "1TJ" Teflon capacitors met the 0.01% maximum requirement.

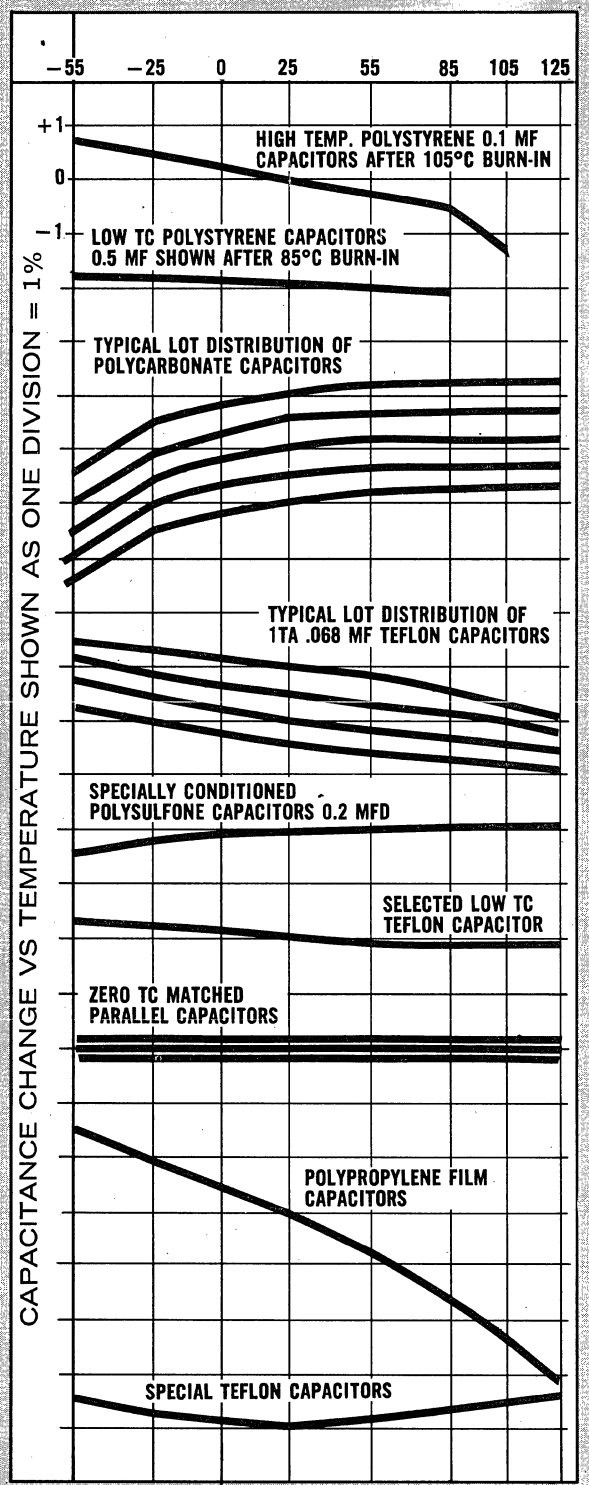
ZERO TC

We can match opposing coefficients of capacitors, such as polysulfone and teflon, to ±0.25% maximum from —55°C to +125°C. It is possible to match to ±0.1% for more limited temperature ranges. With the state of our art growing so rapidly, we may be able to guarantee closer limits on a production basis soon.

HIGH NEGATIVE TEMPERATURE COEFFICIENT

Our new "MP" extended metal film electrode polypropylene capacitors have a linear TC of —250 to —350 PPM/°C. The capacitors can be operated from —55°C to 125°C. The capacitors can be supplied in approximately the same case sizes as Type "05PA" Polystyrene, shown on Page 18 of the catalog. This new addition to our family of TC curves will provide design engineers with circuit capabilities not previously possible.

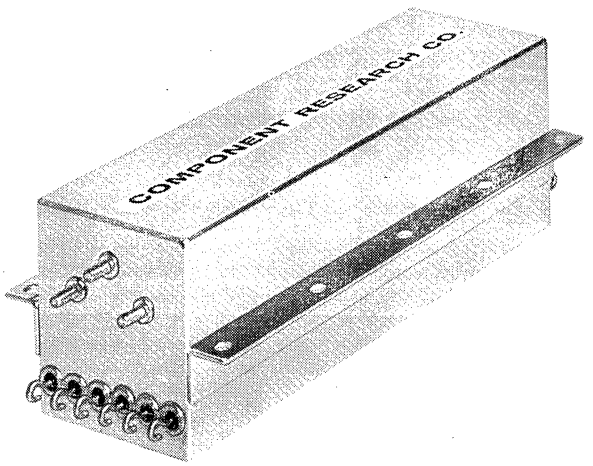
% CAPACITANCE VS TEMPERATURE



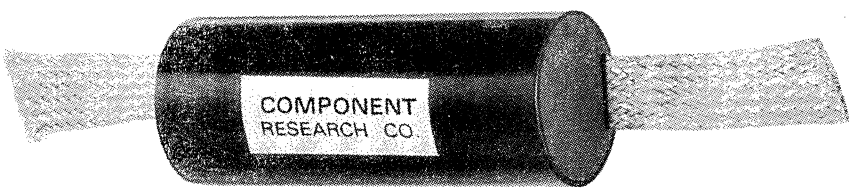
SCR COMMUTATION AND SPECIAL AC CAPACITOR APPLICATIONS

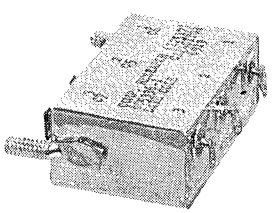
Capacitors designed for AC applications by CRC have very low equivalent series resistance and are remarkably cool and efficient for their size. The capacitor shown contains eight 1.2 MFD sections that operate up to 25 KHz at 170 volts AC RMS maximum with 25 amps at 25% duty cycle for each capacitor.

CRC was selected as the manufacturer to produce this special capacitor because of the extreme reliability required for a weapons program.

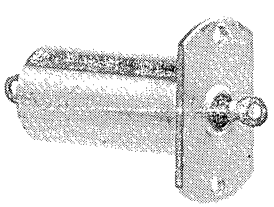


This epoxy cased capacitor is provided with heavy copper braided leads to handle the high peak and RMS currents when operated in SCR commutation circuits. Capacitors of polycarbonate, polypropylene and polysulfone have been used in applications from 400 Hz to 15 KHz.

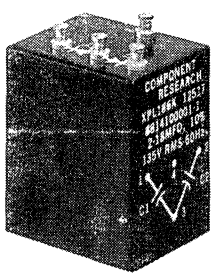




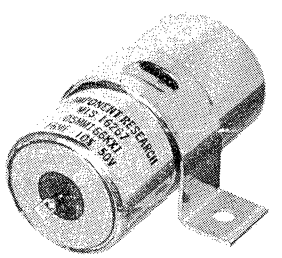
This high temperature filter contains two standard teflon capacitors and one feed-through teflon capacitor in a compact, efficient, case configuration.



A space application required high quality, small size, feed-through capacitors to handle 50 amps RMS. CRC designed solid copper terminations which provide lowest possible loss and excellent filter characteristics.



An airborne navigation system needed an extremely compact filter to replace a tantalum capacitor without increase in size. Specially processed polycarbonate capacitors that are 100% tested with square wave power supplies and then burned-in with sine wave voltages, provide the answer to a difficult problem.



Our customer required a capacitor capable of withstanding extreme shock and vibration without impairing high quality performance. Special potting techniques were used to maintain the capacitor characteristics, which was proven after extensive screening and qualification testing.

SELECTED CAPACITORS FOR HIGH INSULATION RESISTANCE & LOW DIELECTRIC ABSORPTION

CRC receives inquiries for capacitors that have a higher insulation resistance or a lower dielectric absorption than listed in the catalog specifications for our standard types. By means of 100% test and selection, capacitors of unusual performance can be supplied to meet your most exacting requirements.

The readings shown are typical of the "blue ribbon" quality capacitors of every lot. Up to 30% of the capacitors in a lot generally meet these "blue Ribbon" specifications.

"BLUE RIBBON" SELECTED

Insulation Resistance in Megohms for 0.1 MFD Capacitors at 30 VDC using a 5 minute charge time.

TYPE	SIZE	25°C	55°C	85°C	105°C	125°C
50V TEFLON	.312 x .937	15,000,000	15,000,000	15,000,000	6,000,000	3,000,000
30V POLYCARBONATE	.193 x .687	6,000,000	3,000,000	1,000,000	100,000	30,000
100V POLYSULFONE	.312 x .687	5,000,000	2,000,000	500,000	100,000	30,000
50V POLYSTYRENE (Standard)	.400 x 1.063	15,000,000	7,000,000	1,000,000	—	—
50V POLYSTYRENE (High Temp.)	.400 x 1.063	15,000,000	7,000,000	3,000,000	500,000	50,000
50V POLYPROPYLENE	.400 x 1.063	15,000,000	5,000,000	3,000,000	1,000,000	30,000
200V TEFLON	.500 x 1.125	15,000,000	15,000,000	15,000,000	6,000,000	3,000,000
400V POLYCARBONATE	.400 x 1.063	10,000,000	5,000,000	4,000,000	500,000	250,000

COMPONENT RESEARCH CO., INC. 1717 19th Street, Santa Monica, Calif. 90404 • Phone: (213) 393-3755 • TWX: (910) 343-6864

CORNING ELECTRONICS / Houghton Park, Corning, New York 14830 / Phone 607, 962-4444

We make capacitors for guys who can't stand failures

CORNING® CYFM Capacitors give you environment-proof performance at substantial savings. They provide economical stability and reliability in coupling, decoupling, filtering, timing, switching, and many other critical circuits. The CYFM's are electrically and environmentally interchangeable with the CYFR type. We have boiled them in salt water, immersed them in saturated steam and subjected them to 96-hour salt spray and 1200 hours of moisture resistance tests without failure or degradation.

CORNING® CYFR Capacitors give you guaranteed reliability. They have contributed, and continue to contribute to marked improvement in MTBF in many military and space programs such as Titan, Surveyor, Syncom, Mariner, Apollo, and Gemini. Over 64-million unit-hours from lot acceptance tests over a five year period for Minuteman have demonstrated the reliability and reproducibility of the CYFR capacitor from a process under control.

CORNING® TYO Capacitors are ideal for printed circuit applications because of their miniaturization and radial lead configuration. Their design permits upright, flush mounting on circuit boards. Standard gold plated Dumet leads give reliable soldering or welding, and are spaced symmetrically with the case on .1" grids for fast installation on printed circuit boards. The lower prices of CORNING TYO Capacitors now provide a glass capacitor at comparable ceramic prices.

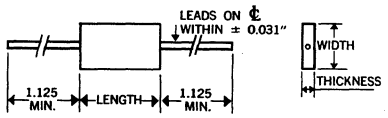
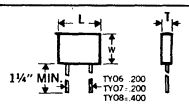
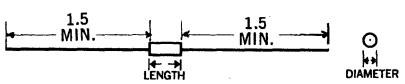
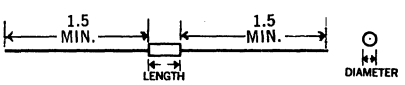
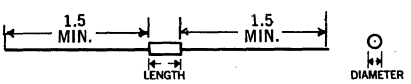
CORNING® CY60 and CY70 Capacitors are excellent for a large variety of radio frequency applications. They are used for power amplifiers, low power transmitters, and many electronic devices in grid, plate coupling, tank, and bypass functions. Because of their small size and minimum weight, these CORNING Capacitors are also suited for airborne equipment and all types of mobile transmitters.

The Glass-K is a miniature stable capacitor that exhibits a high capacitance-to-volume ratio. It offers the size advantages of ceramic types and the consistent performance associated with glass dielectrics.

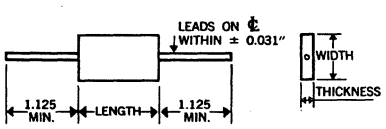
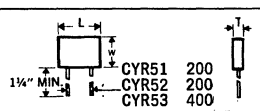
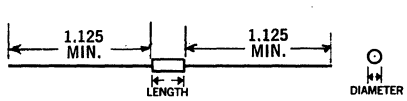
The Glass-K's physical size and values of capacitance meet the requirements of both military and commercial applications. The larger capacitance values are suitable for point-of-use filtering in computers, and for bypassing and coupling elements in miniaturized circuitry. The smaller capacitance values are suitable for more critical circuit functions.

The Glass-K is designed for general purpose use in bypass, coupling, and filtering applications where the miniature size of ceramics is required and where **better performance** characteristics are desired at **competitive prices.**

PRECISION, SEMI-PRECISION AND GENERAL PURPOSE CAPACITORS

	CORNING STYLE	MIL TYPE	MIL SPEC (MIL-C-)	VOLTAGE RATING (DC)
	CYFM10	CY10		500 300
	CYFM15	CY15		500 300
			11272	
	CYFM20	CY20		500 300
	CYFM30	CY30		500 300
	TY06	CY06		
	TY07	CY07	11272	300
	TY08	CY08		
	CYK01BT	CK31BT		
	CYK01BU	CK31BU		
	CYK01BV	CK31BV		
			11015	50
	CYK02BT	CK32BT		
	CYK02BU	CK32BU		
	CYK02BV	CK32BV		
	CYK12BX	CK12BX		100 50
	CYK13BX	CK13BX	11015	100 50
	CYK14BX	CK14BX		100
	CYK14BR	CK14BR		100
	CGC 2	—		
	CGC 3	—		
				50
	CGC 4	—		
	CGC 5	—		

ESTABLISHED RELIABILITY CAPACITORS

	CYR10	CYR10		500 300
	CYR15	CYR15		500 300
			23269	
	CYR20	CYR20		500 300
	CYR30	CYR30		500 300
	CYR51	CYR51		
	CYR52	CYR52	23269	300
	CYR53	CYR53		
	CYKR11BX	CKR11BX		100 50
	CYKR12BX	CKR12BX		100 50
			39014	
	CYKR14BX	CKR14BX		100 50
	CYKR14BR	CKR14BR		100

NOTES: (1) Tolerance shall in no case be less than ±0.25 pf.

(2) For values of 100 pf and below, D.F. = 0.2% max.

(3) Voltage rating dependent on capacitance value; peak working voltage.

* Corning is QPL to MIL-C-23269 and MIL-C-39014

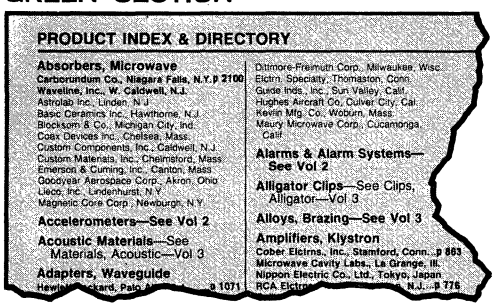
CAPACITANCE RANGE (pf)	STD. TOL. (±%)	LENGTH (IN.)	WIDTH (IN.)	THICK. or DIA. (IN.)	LEAD DIA. (IN.)	COEFFICIENT TEMPERATURE	D.F. (MAX.)	INSULATION RESISTANCE (MEGOHMS, MIN.)	LOAD LIFE DC MAX.	MOIST. RESIST. DC MAX.	CORNING STYLE
0.5-200 220-300		.2969-.3906	.1406-.2031	.0469-.1093	.020						CYFM10
220-510 560-1,200		.4219-.5156	.2344-.2968	.0625-.1562	.020						CYFM15
	1, 2, 5, 10					+140, ±25 ppm/°C	.1%	100,000	0.5% or 0.5 pf	0.5% or 0.5 pf	
560-3,300 3,600-5,100		.6718-.7968	.3750-.4687	.0938-.1875	.025						CYFM20
3,600-6,200 6,800-10,000		.7032-.8281	.6719-.8281	.0938-.1875	.025						CYFM30
1.0-560		.295-.305	.190-.210	.110-.120							TY06
620-1,000	1, 2, 5, 10, 20	.295-.305	.290-.310	.110-.120	.020	+140, ±25 ppm/°C	.1% (2)	100,000	0.5% or 0.5 pf	0.5% or 0.5 pf	TY07
1,100-2,400		.495-.505	.290-.310	.110-.120							TY08
270-10,000	5, 10, 20					+2%, −15%	1.0%		2%	2%	CYK01BT
12,000-20,000	10, 20	.230-.250	——	.080-.100		+20%, −45%	1.5%		5%	2%	CYK01BU
22,000-51,000	10, 20					+2%, −10%	3.0%		20%	5%	CYK01BV
					.016			100,000 or 1,000 megxmfd			
12,000-20,000	5, 10, 20					+2%, −15%	1.0%		2%	2%	CYK02BT
22,000-39,000	10, 20	.230-.250	——	.120-.140		+20%, −45%	1.5%		5%	2%	CYK02BU
56,000-100,000	10, 20					+2%, −10%	3.0%		20%	5%	CYK02BV
10-4,700 5,600-10,000		.150-.170	——	.080-.100	.016						CYK12BX
5,600-10,000 12,000-22,000	10, 20	.240-.260	——	.080-.100	.016	+15%, −15%	2.5%	100,000 or 1,000 megxmfd	—	—	CYK13BX
12,000-47,000		.380-4.00	——	.130-.150	.025						CYK14BX
56,000-100,000		.380-4.00	——	.130-.150	.025						CYK14BR
10-20,000		.150-.170	——	.080-.100	.016	+22%, −56%					CGC 2
10,000-56,000		.240-.260	——	.080-.100	.016	(−55°C - +85°C)					CGC 3
	20					(−55°- +125°C)†	3.5%	10,000 or 100 megxmfd	—	—	
51,000-120,000		.230-.250	——	.120-.140	.016						CGC 4
100,000-270,000		.380-.400	——	.130-.150	.025						CGC 5
0.5-200 220-300		.2969-.3906	.1406-.2031	.0469-.1093	.020						CYR10
220-510 560-1,200		.4219-.5156	.2344-.2968	.0625-.1562	.020						CYR15
	1, 2, 5					+140, ±25 ppm/°C	.1%	100,000	0.5% or 0.5 pf	0.5% or 0.5 pf	
560-3,300 3,600-5,100		.6718-.7968	.3750-.4687	.0938-.1875	.025						CYR20
3,600-6,200 6,800-10,000		.7032-.8281	.6719-.8281	.0938-.1875	.025						CYR30
1.0-560		.295-.305	.190-.210	.110-.120							CYR51
620-1,000	1, 2, 5	.295-.305	.290-.310	.110-.120	.020	+140, ±25 ppm/°C	.1% (2)	100,000	0.5% or 0.5 pf	0.5% or 0.5 pf	CYR52
1,100-2,400		.495-.505	.290-.310	.110-.120							CYR53
10-4,700 5,600-10,000		.150-.170	——	.080-.100	.016						CYKR11BX
5,600-10,000 12,000-22,000		.240-.260	——	.080-.100	.016						CYKR12BX
	10, 20					+15%, −15%	2.5%	100,000 or 1,000 megxmfd	20%	10%	
12,000-47,000 56,000-100,000		.380-4.00	——	.130-.150	.025						CYKR14BX
56,000-100,000		.380-4.00	——	.130-.150	.025						CYKR14BR

† With 50% Voltage Derating.

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
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Ditmore-Freimuth Corp., Milwaukee, Wisc.
Eichn. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

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Cober Elctrns., Inc., Stamford, Conn. ... p 863
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electron ... N.J. ... p 776

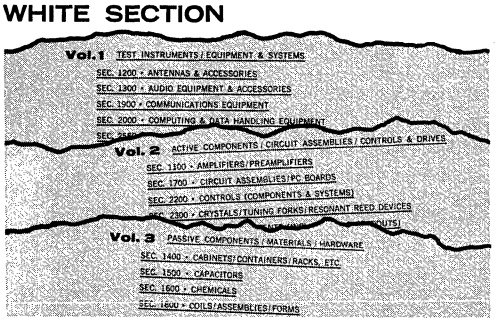
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

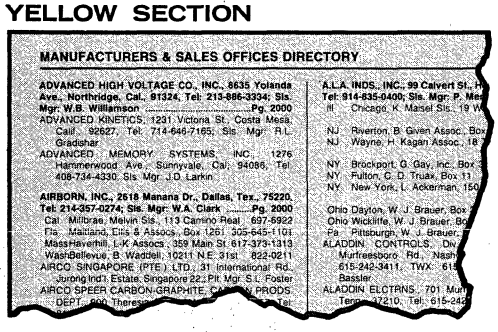
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2618 Menana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real, 697-5922
Fla: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St, 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st, 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22, Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, C... PRODS. DEPT., 900 Theres... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mes...
Ill: Chicago, K. Marsel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242-...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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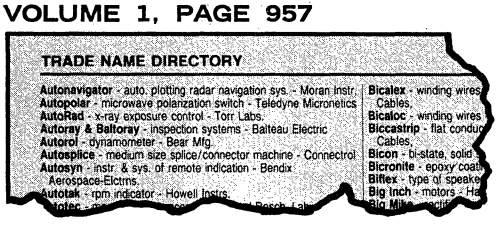
TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Voter ... Porch ...

Bicalex - winding wires, Cables.
Bicaloc - winding wires
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid...
Bicronite - epoxy coat...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

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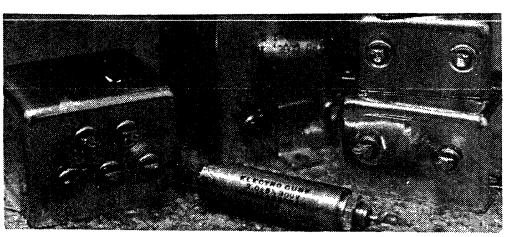
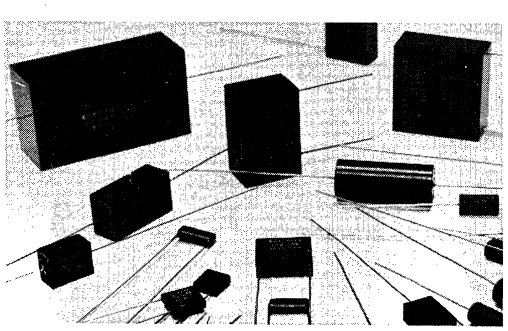
For substantial package size reductions, Electro Cube can supply a full line of 50VDC capacitors using .00008 gauge metallized polycarbonate. Specially designed manufacturing equipment and rigid controls give these units reliability equivalent to heavier gauge 100 volt metallized polycarbonate capacitors. Capacitance ratings from .001 mfd to 50 mfd are available in a variety of case styles.

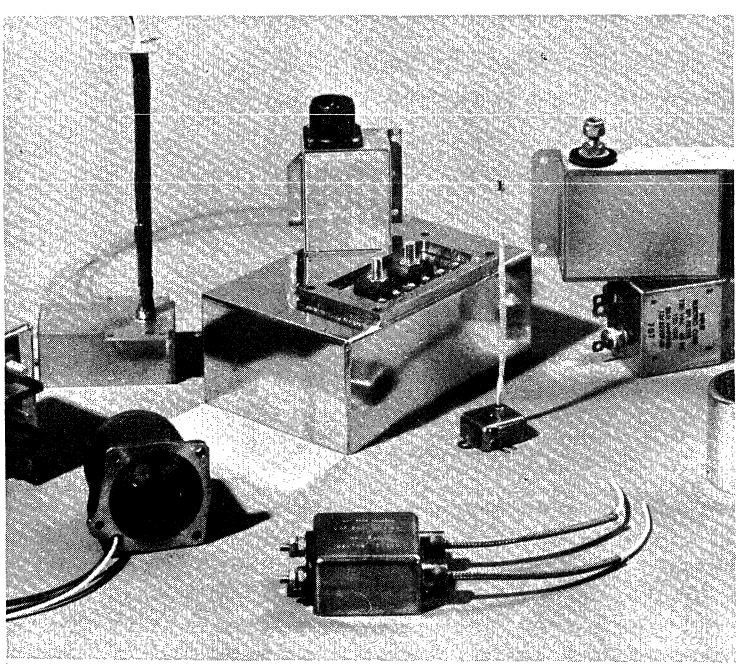
We also design and produce RC networks and RFI filters for a wide range of applications. Electro Cube filters have been used in such projects as Apollo, Minuteman and the C-5A.

Electro Cube manufactures wire wound and foil wound transformers, both laminated and C core, toroids and special inductors. Through company funded development and testing, Electro Cube introduced the first commercially available autotransformers in 10KVA and lower ratings, and has developed processing techniques that make these devices reliable and economical. Electro Cube also can supply aluminum foil chokes with advantages similar to those of foil wound transformers. See page 2950 for data on transformers.

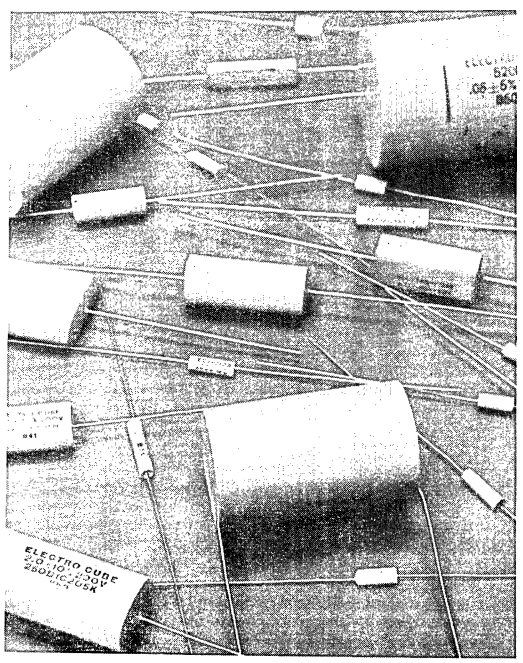
	METALLIZED POLYCARBONATE	MINIATURE HIGH VOLTAGE
Capacitor (mfd) Range (Average)	.001 μf to 50.0 μf	.001 μf to .2 μf
Tolerances	20%, 10%, 5%, 2%, 1%	20%, 10%, 5%, 2%, 1%
Voltages (DC)	50, 100, 200, 300, 400, 600	1KV, 2KV, 3KV, 5KV, 8KV, 10KV, 12KV 15KV, 20KV, 25KV, 30KV
Temperature Range	—55°C to +125°C	—55°C to +85°C, to +125°C with 60% voltage derating
Dissipation Factor	0.3% at 25°C	1.0% at 25°C
Insulation Resistance	Temp. / Meg x Mfd / Need Not Exceed 25°C / 50,000 / 100,000 megohms 85°C / 5,000 / 10,000 megohms 125°C / 100 / 200 megohms	Temp. / Meg x Mfd / Need Not Exceed at 25°C / 20,000 / 100,000 megohms
Dielectric Strength (not to exceed 1 min. at 25°C)	200% of rated voltage	200% of rated voltage
Available as Wrap and fill	Oval AXIAL 625B; Flat AXIAL 625C; Round AXIAL 625D	Oval AXIAL 520B; Round AXIAL 520D
Epoxy Encapsulated	Rectnglr RADIAL 636A; Rectnglr AXIAL 627A; Round AXIAL 627D	Round AXIAL 525D
Hermetically Sealed	Rectnglr AXIAL 632A; Round AXIAL 628D	
Typical sizes (Nominal) (Wrap & fill, oval)	.001 mfd, 50VDC – .09 x .18 x .40 .01 mfd, 50VDC – .09 x .18 x .40 .1 mfd, 50VDC – .12 x .21 x .40 1.0 mfd, 50VDC – .22 x .31 x .68 10.0 mfd, 50VDC – .42 x .59 x 1.17 50.0 mfd, 50VDC – .87 x 1.08 x 1.70	.001 mfd, 1000VDC – .12 x .32 x 1.0 .01 mfd, 1000VDC – .30 x .50 x 1.0 .1 mfd, 1000VDC – .60 x .80 x 1.5 .2 mfd, 1000VDC – .75 x .95 x 1.8

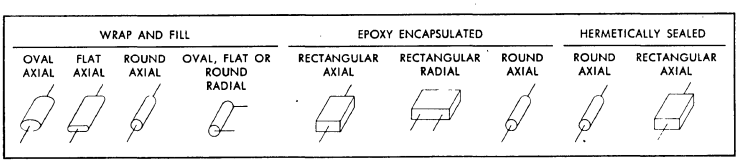






POLYSTYRENE	MYLAR* AND FOIL	METALLIZED MYLAR	METALLIZED PAPER RESIN IMPREGNATED	METALLIZED PAPER WAX IMPREGNATED
.001 μf to 1.0μf	.001 μf to 5.0μf	.001 μf to 20.0μf	.001 μf to 20.0μf	.001 μf to 20.0μf
20%, 10%, 5%, 2%, 1%	20%, 10%, 5%, 2%, 1%	20%, 10%, 5%, 2%, 1%	20%, 10%, 5%	20%, 10%, 5%
100, 200, 400, 600	200, 300, 400, 600	100, 200, 300, 400, 600	50, 100, 200, 400, 600	50, 100, 200, 400, 600
—55°C to +85°C	—55°C to +100°C, to +125°C with 50% voltage derating	—55°C to +100°C, to +125°C with 50% voltage derating	—55°C to +100°C, to +125°C with 50% voltage derating	—55°C to +85°C
0.1% at 25°C	0.5% at 25°C	1.0% at 25°C	1.5% at 25°C	1.5% at 25°C
Temp. / Meg x Mfd / Need Not Exceed 25°C 100,000 100,000 megohms 85°C 50,000 50,000 megohms	Temp. / Meg x Mfd / Need Not Exceed 25°C 50,000 100,000 megohms 85°C 5,000 10,000 megohms 125°C 100 200 megohms	Temp. / Meg x Mfd / Need Not Exceed 25°C 50,000 100,000 megohms 85°C 5,000 10,000 megohms 125°C 100 200 megohms	Voltage Rating / Meg x Mfd / Need Not Exceed 50-200 @ 25°C 500 1,500 megohms 400-600 1,500 3,000 megohms	Voltage Rating / Meg x Mfd / Need Not Exceed 50-200 @ 25°C 500 1,500 megohms 400-600 1,500 3,000 megohms
200% of rated voltage	200% of rated voltage	200% of rated voltage	150% of rated voltage	150% of rated voltage
Oval AXIAL 410B Flat AXIAL 410C Round AXIAL 410D	Oval AXIAL 250B Flat AXIAL 250C Round AXIAL 250D	Oval AXIAL 210B Flat AXIAL 210C Round AXIAL 210D	Oval AXIAL 112A Round AXIAL 112D	Oval AXIAL 141A Round AXIAL 141D
Rectnglr RADIAL 414A Round AXIAL 412D	Rectnglr RADIAL 258A Rectnglr AXIAL 254A Round AXIAL 252D	Flat RADIAL 217A Rectnglr AXIAL 212A Round AXIAL 212D	Rectnglr RADIAL 116A Rectnglr AXIAL 110A Round AXIAL 110D	Rectnglr AXIAL 140A Round AXIAL 140D
Round AXIAL 411D	Rectnglr AXIAL 260A Round AXIAL 251D	Rectnglr AXIAL 201A Round AXIAL 211D	Round AXIAL 114D	Round AXIAL 142D
.001 mfd, 100VDC – .13 x .20 x .68 .01 mfd, 100VDC – .14 x .22 x .68 .1 mfd, 100VDC – .21 x .38 x 1.18 .47 mfd, 100VDC – .45 x .60 x 1.68 1.0 mfd, 100VDC – .63 x .80 x 1.68	.01 mfd, 100VDC – .11 x .20 x .53 .1 mfd, 100VDC – .21 x .31 x .81 1.0 mfd, 100VDC – .41 x .57 x 1.45 2.0 mfd, 100VDC – .59 x .75 x 1.68	.001 mfd, 100VDC – .09 x .18 x .40 .01 mfd, 100VDC – .09 x .18 x .40 .1 mfd, 100VDC – .11 x .24 x .53 1.0 mfd, 100VDC – .23 x .34 x .95 10.0 mfd, 100VDC – .49 x .65 x 1.70 *DuPont Trade Name	.001 mfd, 50VDC – .09 x .18 x .40 .01 mfd, 50VDC – .09 x .18 x .40 1.0 mfd, 50VDC – .28 x .40 x .90 10.0 mfd, 50VDC – .63 x .74 x 1.45	.001 mfd, 50VDC – .09 x .18 x .40 .01 mfd, 50VDC – .09 x .18 x .40 1.0 mfd, 50VDC – .28 x .40 x .90 10.0 mfd, 50VDC – .63 x .74 x 1.45





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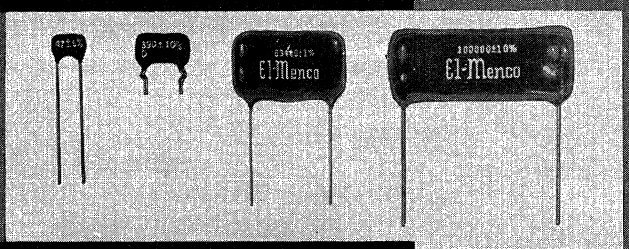
- Exceed all electrical requirements of military specification MIL-C-5A.



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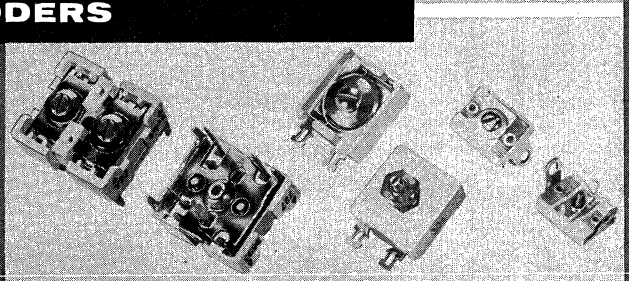
Design Versatility!

- Available in 350 VDC and 500 VDC as well as other test voltages.
- All bases are of low-loss steatite.
- Special lugs are obtainable for printed circuitry.
- Miniature units are available.
- Solder Lugs can be bent in any position without affecting the capacity setting due to the rigid construction.
- Various types of mounting brackets are available for all trimmers.
- Units can be constructed for special applications.



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Only 1 Failure in 14,336,000 Unit-Hours!

- Life tests at 105°C with rated voltage applied have yielded only 1 FAILURE PER 1,433,600 UNIT-HOURS for 1 MFD. Since the number of unit-hours for these capacitors is inversely proportional to the capacitance, 0.1 MFD Mylar-Paper Dipped capacitors will yield only 1 FAILURE PER 14,336,000 UNIT-HOURS!
- Working volts DC: 200, 400, 600, 1000 and 1600.
- Durez phenolic resin impregnated.
- Tolerances: ± 10% and ± 20% (closer tolerances available).
- Dielectric strength: 2 or 2½ times rated voltage, depending upon working voltage.
- Exceed all electrical requirements of E.I.A. specification RS-164 and military specifications MIL-C-91A and MIL-C-25A.

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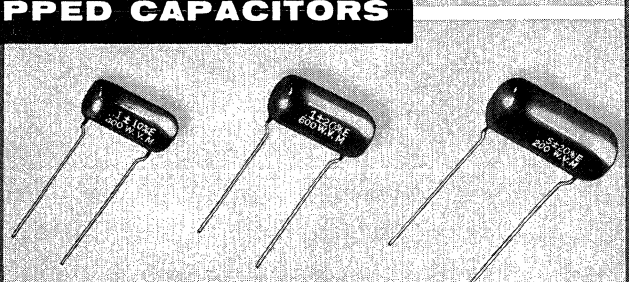

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- Unmatched for excellent stability, dielectric strength, high insulation resistance, extremely high "Q" and correspondingly low power factor.
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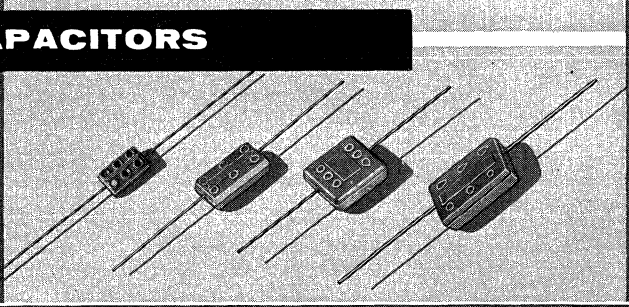

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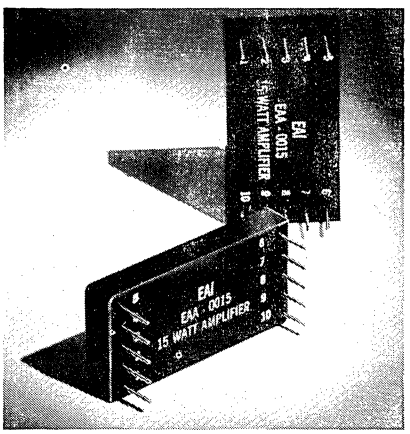
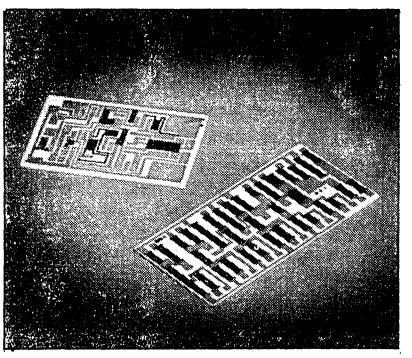


- Rated output power 15W (RMS) @ Tc <50°C TC <50°C
- Frequency Response: Flat 25 Hz to 20 KHz.
- External Component Count Minimized.
- Output Quiescent Current: 7 ma Typical
- Distortion at 1 KHz and P. = 15W: 0.5% Typical
- Input Impedance: 18K Typical
- Noise Output Relative to P. = 15W (input open, BW = 50Hz to 10KHz): −70 db Typical
- $9.05 (100 Lots)

FILTERS AND NETWORKS



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- Specifically Suitable for Data Communications Equipment
- Functionally Trimmed to Operational Characteristics
- Low Pass, Band Pass: From .001Hz to 100KHz
- Ladder Networks
- R-C Networks: To 0.01% Precision

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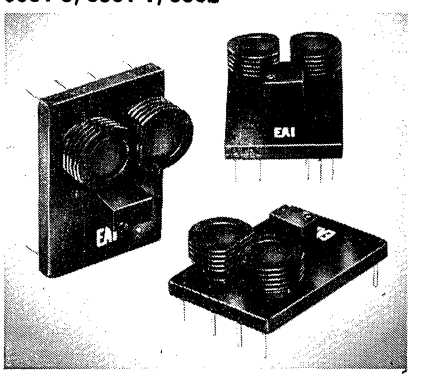

Designed specifically for computer analog signal processing and instrumentation applications.

- High DC Gain: 154 db Typical
- Wide Full Signal Bandwidth: 4MHz Typical (unity gain inverter)
- High Slewing Rate: 200V/μs Typical
- High Output Current: 50ma Minimum
- Input Characteristics: Single and Differential
- FET with Pico Amp Input Current and Low T.C. Voltage Coefficient
- Prices Start as Low as $12.00 Each

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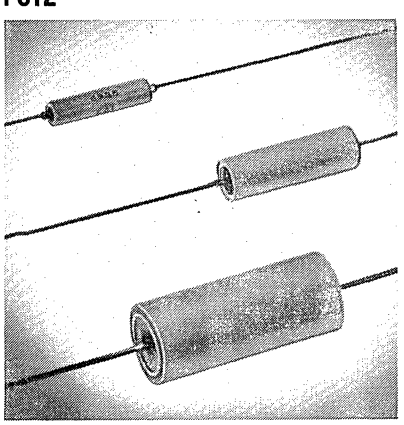
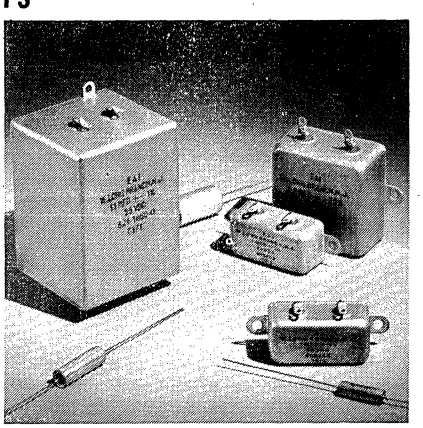


- Temperature Coefficient: As Low as 0 ±10 ppm per Deg. C
- Long Term Stability: Less than 0.05% Deviation per 1 Year
- Operating Temperature Range: Up to 95°C
- Tolerance: As Close as ±.01%
- Typical Price: .033 mfd, ±10%, 100V — $3.54 (100 Lots)

WRAP & FILL CONSTRUCTION MHW & PSW

- Capacitance Tolerance: ±20%, thru ±.5%
- Temperature Range: May be Operated at Rated Voltage from −55°C to +85°C
- Humidity Resistance Meets Requirements of Mil-C-27287, Para. 3.12, in Accordance with Mil Std. 202C, Method 103B, Condition B
- Temperature Coefficient: 100 ±30 ppm/°C Standard, 0 ±30 ppm/°C Upon Request
- Stability: .05% per Year

POLYSTYRENE PS



- Temperature Coefficient: As Low as 0 ±10 ppm/°C
- Insulation Resistance: As High as 10^{12} Ohms per Microfarad
- Dielectric Absorption: Less than 0.01%
- Long Term Stability: Less than 0.01% Deviation in Value Over a Period of One Year
- Operating Temperature Range: Up to 95°C
- Tolerance: As Close as ±0.05%
- Matching Tolerance to ±.01%

F-DYNE ELECTRONICS CO.

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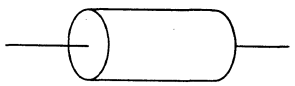
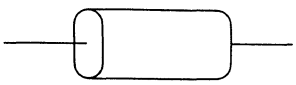
Listed is a sampling from F-Dyne's large assortment of film dielectric capacitors.





POLYESTER (MYLAR) FOIL

Cap. Range: .0003-10 mfds
Volt. Range: 50-1000 vdc
Temp. Range: −55 to 125°C
IR: 50 K (meg) (mfds) or 100 K megs
DF: .75% max.

WRAP AND FILL — ROUND — PE 1 SERIES

Cap.	50 D	50 L	100 D	100 L	200 D	200 L
.01	.156x	.375	.187x	.375	.187x	.50
.1	.265x	.50	.281x	.50	.281x	.75
.47	.296x1.125		.375x1.125		.484x1.25	
1.0	.500x1.125		.562x1.125		.641x1.687	

WRAP AND FILL — FLAT — PE 2 SERIES

Cap.	100 T	100 W	100 L	200 T	200 W	200 L
.001	.109x	.218x	.375	.109x	.218x	.375
.022	.109x	.218x	.375	.125x	.234x	.375
.1	.171x	.281x	.500	.203x	.312x	.500
.15	.234x	.343x	.500	.203x	.312x	.625

METALLIZED POLYESTER

Cap. Range: .01-50 mfds
Volt. Range: 50 vdc-10 kvdc
Temp. Range: −55 to 125°C
IR: 25 k (meg) (mfds) or 50 K megs
DF: 1% max.

MPE 1 SERIES

	80	150	200
.1	.218x .437	.218x .500	.265x .500
.47	.312x .625	.375x .625	.343x .875
1.0	.375x .750	.421x .875	.421x1.187
5.0	.562x1.312	.687x1.562	.750x1.562

MPE 2 SERIES

	80	150
.1	.140x.234x .500	.140x.250x .500
.47	.234x.343x .625	.281x.421x .625
1.0	.281x.421x .750	.328x.468x .875
5.0	.484x.625x1.25	.578x.718x1.5

POLYCARBONATE FOIL

Cap. Range: .0003-5 mfds
Volt. Range: 25-1000 vdc
Temp. Range: −55 to 125°C
IR: 75 K (meg) (mfds) or 500 K megs
DF: .2% max.

PC 1 SERIES

	50	100	200
.01	.187x .375	.187x .500	.187x .500
.1	.296x .500	.281x .750	.343x1.0
.47	.500x1.0	.475x1.25	.550x1.25
1.0	.531x1.625	.687x1.75	.687x2.0

PC 2 SERIES

	50	100
.01	.109x.218x .375	.125x.218x .500
.1	.171x.281x .625	.218x.312x .750
.47	.406x.531x1.0	.375x.531x1.25
1.0	.435x.560x1.625	.594x.734x1.75

METALLIZED POLYCARBONATE

Cap. Range: .01-50 mfds
Volt. Range: 50-1000 vdc
Temp. Range: −55 to 125°C
IR: 30 K (meg) (mfds) or 150 K megs
DF: .3% max.

MPC 1 SERIES

	80	150	200
.1	.218x .437	.218x .500	.265x .500
.47	.312x .625	.390x .625	.359x .875
1.0	.375x .750	.437x .875	.437x1.187
5.0	.578x1.312	.718x1.562	.781x1.562

MPC 2 SERIES

	80	150
1.	.140x.234x .437	.140x.250x .500
.47	.234x.343x .625	.296x.437x .625
1.0	.281x.421x .750	.343x.484x .875
5.0	.484x.625x1.250	.609x.750x1.5

POLYPROPYLENE FOIL

Cap. Range: .0005-5 mfds
Volt. Range: 50-1000 vdc
Temp. Range: −55 to 105°C
IR: 100 K (meg) (mfds) or 500 K megs
DF: .1% max.

PP 1 SERIES

Cap.	100 D	100 L	200 D	200 L	400 D	400 L
.01	.234x	.375	.203x	.5	.218x	.625
.1	.328x	.75	.375x	.875	.484x	.875
.47	.468x1.125		.656x1.125		.750x1.437	
1.0	.671x1.125		.734x1.687		1.0 x1.687	

PP 2 SERIES

Cap.	100 T	100 W	100 L	200 T	200 W	200 L
.01	.107x	.232x	.500	.123x	.248x	.500
.1	.264x	.389x	.750	.295x	.420x	.875
.47	.451x	.576x	1.125	.576x	.701x	1.125
1.0	.607x	.732x	1.125	.654x	.779x	1.687

METALLIZED POLYPROPYLENE

Cap. Range: .01-50 mfds
Volt. Range: 50 V-10,000 vdc
Temp. Range: −55 to 105°C
IR: 50 K (meg) (mfds) or 100 K megs
DF: .2% max.

MPP 1 SERIES

	100	200	400
.1	.250x .500	.312x .500	.375x1.06
.47	.390x .750	.421x .875	.562x1.56
1.0	.406x1.125	.500x1.187	.750x1.875
5.0	.750x1.81	.875x1.875	

MPP 2 SERIES

	100	200
.1	.170x.295x .500	.232x.357x .500
.47	.310x.435x .750	.341x.466x .875
1.0	.326x.451x1.125	.420x.545x1.875
5.0	.670x.795x1.81	.795x.920x1.875

POLYSULFONE FOIL

Cap. Range: .0003-5 mfds
Volt. Range: 25-1000 vdc
Temp. Range: −55 to 150°C
IR: 75 K (meg) (mfds) or 500 K megs
DF: .2% max.

PF 1 SERIES

	50	100	200
.01	.187x .375	.187x .500	.250x .500
.1	.312x .500	.297x .750	.375x .812
.47	.531x1.0	.484x1.25	.500x1.562
1.0	.562x1.625	.75 x1.75	.75 x2.0

PF 2 SERIES

	50	100
.01	.107x.232x .375	.107x.232x .500
.1	.232x.357x .500	.217x.342x .750
.47	.451x.576x1.0	.404x.529x1.25
1.0	.482x.607x1.625	.670x.795x1.75

METALLIZED POLYSULFONE

Cap. Range: .01-50 mfds
Volt. Range: 50 V to 600 vdc
Temp. Range: −55 to 150°C
IR: 30 K (meg) (mfds) or 150 K megs
DF: .3% max.

MPF 1 SERIES

	80	150	200
.1	.234x .500	.234x .500	.281x .500
.47	.312x .625	.406x .625	.375x .875
1.0	.406x .750	.468x .875	.500x1.187
5.0	.625x1.312	.750x1.562	.812x1.562

MPF 2 SERIES

	80	150
.1	.154x.279x .500	.154x.279x .500
.47	.232x.357x .625	.326x.451x .625
1.0	.326x.451x .750	.388x.513x .875
5.0	.545x.670x1.312	.670x.795x1.562

POLYSTYRENE FOIL

Cap. Range: .0005-5 mfds
Volt. Range: 50-600 vdc
Temp. Range: −55 to 85°C
IR: 100 K (meg) (mfds) or 500 K megs
DF: .1% max.

PS 1 SERIES

	100	200	400
.01	.219x .500	.234x .625	.281x .750
.1	.406x .875	.468x1.0	.578x1.25
.47	.687x1.25	.750x1.562	
1.0	.875x1.5		

For complete catalog listings — call (203) 367-4442 or write F-Dyne Electronics Co., 449 Howard Avenue, Bridgeport, Conn. 06605.

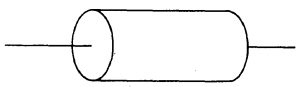
MINIATURE FILM CAPACITORS

F-DYNE ELECTRONICS CO. • BRIDGEPORT, CONN. 06605

F-DYNE

MINIATURE FILM DIELECTRIC CAPACITORS

449 HOWARD AVE., BRIDGEPORT, CONN. 06605



MOLDED — ROUND

PE 3 SERIES

Cap.	100 D	100 L	200 D	200 L
.01	.250x	.625	.250x	.625
.1	.375x	.875	.437x	.875
.47	.625x	1.25	.750x	1.25
1.0	.750x	1.5	.875x	1.75

MPE 3 SERIES

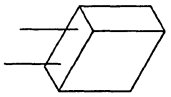
	80	150
.1	.250x .625	.250x .625
.47	.375x .625	.437x .750
1.0	.437x .750	.500x .875
5.0	.625x1.375	.750x1.562

PC 3 SERIES

	100	200
.01	.250x .687	.312x .687
.1	.437x1.187	.500x1.312
.47	.750x1.562	.875x1.937
1.0	.875x2.062	1.0 x2.437

MPC 4 SERIES

	80	150
.1	.250x .5	.250x .625
.47	.375x .750	.437x .750
1.0	.500x .875	.625x1.0
5.0	.750x1.375	.875x1.625



MOLDED — RECTANGULAR — RADIAL

PE 4 SERIES

Cap.	100 T	100 H	100 L	200 T	200 H	200 L
.01	.095x	.325x	.375	.125x	.275x	.375
.1	.165x	.525x	.585	.195x	.585x	.885
.47	.250x	.825x	.985	.295x	1.10 x	1.25
1.0	.295x	1.0 x	1.5	.295x	1.0 x	1.75

MPE 4 SERIES

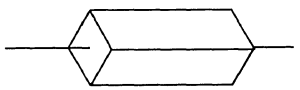
	100			200		
.01	.100x	.330x	.330	.100x	.330x	.330
.1	.150x	.500x	.500	.150x	.500x	.500
.47	.250x	.500x	.675	.250x	.500x	.875
1.0	.250x	.500x	.875	.312x	.750x	1.0

PC 4 SERIES

	50			100		
.01	.095x	.325x	.375	.180x	.330x	.550
.1	.150x	.500x	.600	.250x	.500x	.675
.47	.500x	.750x	1.0	.750x	.750x	1.25
1.0	.750x	.750x	1.25	.570x	.740x	1.75

MPC 4 SERIES

	100			200		
.01	.100x	.330x	.330	.100x	.395x	.395
.1	.150x	.500x	.500	.150x	.500x	.600
.47	.250x	.500x	.675	.250x	.750x	1.0
1.0	.250x	.500x	1.0	.750x	.750x	1.25



MOLDED — RECTANGULAR

PE 5 SERIES

Cap.	100 T	100 W	100 L	200 T	200 W	200 L
.01	.17 x	.29 x	.57	.17 x	.29 x	.57
.1	.29 x	.42 x	.75	.29 x	.42 x	1.06
.47	.56 x	.72 x	.88	.56 x	.72 x	1.17
1.0	.56 x	.72 x	1.56	.56 x	.72 x	1.81

MPE 5 SERIES

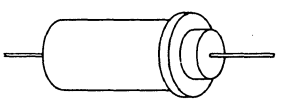
	100	200
.1	.170x.290x .570	.290x.420x .570
.47	.290x.420x .670	.390x.540x .820
1.0	.390x.540x .82	.390x.540x1.19
2.0	.390x.540x1.04	.560x.720x1.75

PC 5 SERIES

	50	100
.01	.160x.240x .420	.170x.290x .550
.1	.185x.465x .680	.290x.420x .820
.47	.390x.540x1.040	.390x.540x1.25
1.0	.560x.720x1.50	.560x.720x1.95

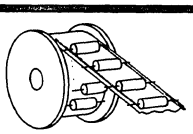
MPC 5 SERIES

	100	200
01	.160x.240x .420	.160x.240x .550
.1	.290x.420x .570	.290x.420x .820
.47	.390x.540x1.04	.560x.720x1.24
1.0	.390x.540x1.24	.560x.720x1.750

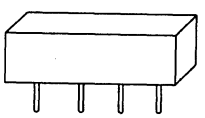


FEED THRU ASSEMBLY

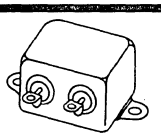
In addition to the above standard line capacitors, F-Dyne also manufactures a number of custom designs and services as illustrated below.



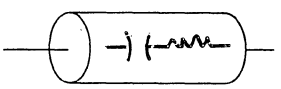
REEL PACK



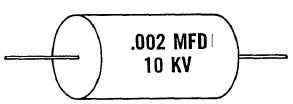
MULTIPLE CAPACITOR ASSEMBLIES



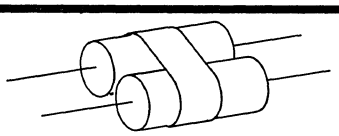
METAL CASED RECTANGULAR



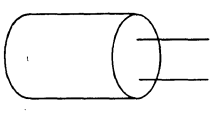
R/C NETWORKS



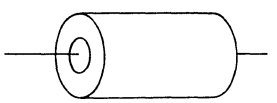
HIGH VOLTAGE



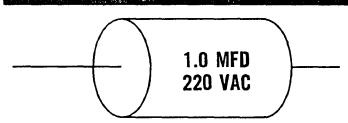
MATCHED CAPACITORS



PC TYPE — TUBULAR



METAL CASED TUBULAR



AC DESIGNS

"0" TC and controlled capacitance change for stability or matching with pot cores and resistors.

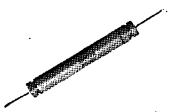
TEMPERATURE COMPENSATING

F-Dyne high quality film dielectric capacitors are designed and manufactured to provide the very best electrical characteristics in the smallest size consistant with reliable performance.

F-Dyne capacitors are readily available in 10 pf capacitance increments, i.e., 430 pf, 440 pf or .18763, .18764, etc. Tolerances may be as low as .25% or .1% with matched pairs.

For fast delivery of standard or special film dielectric capacitors, call F-Dyne — (203) 367-4442.

CAPACITORS



29F

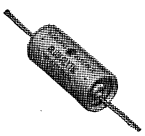
29F

6K, 16K

69F, 69F2000

69F

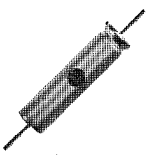
62F, 69F900



43F

87F

86F, 88F, 92F



76F, 77F, 78F

75F

Application	Catalog Type	Description	Voltage Range	UF Range	Temperature Range	Bulletin Reference	Market Usage
For polar and nonpolar coupling, filtering, decoupling, bypass, energy storage and timing in military and high-performance industrial amplifiers, transmitters, receivers, servo systems, and navigation systems. Hermetic seal available.	29F	Standard and high-voltage tantalum foil; MIL-C-3965: CL20, CL21, CL22, CL23, CL24, CL25, CL26, CL27, CL30, CL31, CL32, CL33, CL34, CL35, CL36, CL37 CL51, CL52, CL53, CL54 Tubular and rectangular	Up to 450 VDC	0.15 to 3500 μf	−55C to 85C or 125C	GEC-1812	Military, Industrial
High-reliability type for military or aerospace use where hermetic seal and extreme reliability are prime factors.	16K	Hermetic seal available	Up to 150 VDC	0.75 to 580 μf	−55C to 125C	Consult GE Sales Engineer	Military
For polar only — where no reverse voltage is expected — coupling, decoupling, filtering, bypass, energy storage and timing in military and high-performance industrial amplifiers, transmitters, receivers, servo systems, and navigation systems.	69F 69F2000	Tantalum porous anode; MIL-C-3965: CL64, CL65, CL55 Tubular and rectangular	Up to 150 VDC	1.7 to 2400 μf	−55C to 85C or 125C	GEC-1814 GEC-1842	Military, Industrial
	69F900	Subminiature tantalum porous anode	Up to 60 VDC	3.3 to 450 μf	−55C to 85C	GEC-1841	
For polar only—where no reverse voltage is expected—coupling, filtering, decoupling, bypass, energy storage and timing in standard and high-performance industrial and entertainment amplifiers, transmitters, receivers, servo systems, and navigation systems, within temperature capabilities.	62F	Porous anode tantalum electrolytic Subminiature Lightest weight Highest volumetric efficiency	Up to 60 VDC	0.01 to 325 μf	−55C to 85C	GEC-1840	Industrial, Entertainment
For bulk filtering and energy storage in military and high-performance or standard industrial power supplies, including computer usage and welding equipment.	86F	High performance, high volumetric efficiency	Up to 450 VDC	75 to 540,000 μf	−40C to 65C, 85C	GEC-1813	Industrial
	88F 92F	Long life, high ripple current	Up to 150 VDC	170 to 150,000 μf	−40C to 85C	Consult GE Sales Engineer	Industrial
For polar coupling, filtering, decoupling, bypass, energy storage and timing in standard and high-performance industrial and entertainment amplifiers, transmitters, receivers, servo systems, and navigation systems, within temperature capabilities.	76F 77F 78F	Miniature aluminum electrolytic	Up to 150 VDC	1 to 790 μf	−20C/ −40C to 85C	GEC-1798 GEC-1843 GEC-1844	Industrial, Entertainment
For filtering, bypass, decoupling, and coupling in entertainment-type radio, TV, high-fidelity systems, and in industrial instruments and test equipment.	43F 87F	Can style and Tubular Aluminum electrolytics for radio, TV, and other communications equipment	Up to 450 VDC	5 to 15,000 μf	−20C to 85C	GEC-1798	Industrial, Entertainment
For circuits in test, measurement, control, and communications equipment of all types, where high-quality film-foil units are an economic choice.	75F	Polyester film-foil roll is epoxy-encapsulated. Welded radial leads. Units have mounting feet and precise dimensions, for high-density packaging.	50 to 600V	.0010 to 1 μf	−55C to 125C	GEC-1816	Industrial

For complete information contact your nearby GE Sales Office, or write to General Electric Co., Section 998-80. Schenectady, N. Y. 12305.

GENERAL ELECTRIC

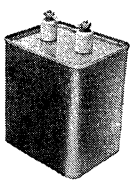
CAPACITORS

65F

61F, 63F, 74F51, AE

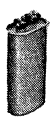
BA, 74F01

23F

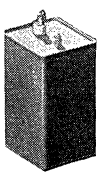


23F

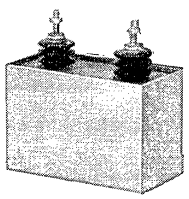
28F



45F



14F



14F

Application	Catalog Type	Description	Voltage Range	UF Range	Temperature Range	Bulletin Reference	Market Usage
For printed-circuit board circuitry where size, weight, cost, and reliability give advantage over metallized film capacitors.	65F	Polyester film and aluminum foil roll, compressed and packaged in a regular epoxy case with radial leads.	50V only	.0010 to 1.5 μf	−55C to 85C	GEC-1834	Industrial
For use where size, weight, cost, and reliability give advantage over metal-clad tubulars, molded, or ceramic case units.	61F 63F AE	Polyester film-foil roll, wrap and-pot, with axial leads. 63F only meets performance requirements of MIL-C-27287.	Up to 300V	.0010 to 2 μf	−55C to 125C	GEC-1833 GEC-1819	Industrial, Military
	74F51	Same as 61F except with polycarbonate film dielectric	100 or 200V	0010 to 1 μf	−55C to 125C	GEC-1798	Industrial
For manufacturing and test equipment, electronic timers and control, communications equipment, and other forms of industrial electronic equipment.	BA	Metallized polyester film roll, wrap-and-pot, with axial leads.	100 or 200V	.010 to 10 μf	−55C to 125C	GEC-1815	Industrial
	74F01	Same as BA except with metallized polycarbonate film.	200V	.010 to 10 μf	−55C to 125C	GEC-1798	Industrial
For energy storage for gas discharge tubes, such as camera attachments.	85F	Aluminum electrolytic photoflash energy-storage capacitors to provide low d-c leakage current and low ESR.	300 to 550 VDC	5 to 700 μf	−20C to 45C	Consult GE Sales Engineer	Industrial, Entertainment
General-purpose d-c capacitors for filtering, blocking, bypass, and arc-suppression in power supplies, control circuits, and other d-c circuit functions.	23F	Paper/Pyranol® in drawn steel cases.	400 to 12,500 VDC, 236 to 1900 VAC	0.05 to 35 μf	−55C to 85C	GEC-1798	Industrial
Specially designed for such SCR applications as phase control, frequency multipliers and changers, power supply filters, time ratio controls, inverters, and rectifier spike suppression.	28F	Paper, metallized paper, and polycarbonate film dielectrics with very low internal losses and high peak current carrying capability.	200 to 2000 VDC, 115 to 700 VAC	0.25 to 150 μf	−55C to 80C	GEA-8688	Industrial
General-purpose a-c capacitors for motor and transformer applications. New Pyranol II impregnant multiplies life and increases reliability.	45F	Paper/Pyranol II in drawn oval cases.	200 to 720 VDC	0.5 to 55 μf	−30C to 70C	GEA-8691	Industrial
For high-voltage d-c rectifier power supply filters, and high-voltage blocking and bypass in communications, radar and other high-voltage circuits.	14F	Paper/Mylar* oil impregnated in all-welded steel rectangular case of leak-proof construction.	5000 to 20,000 VDC	0.67 to 150 μf	−40C to 105C	GEC-1798	Industrial
For light-duty energy storage-discharge duty, such as photoflash applications.	14F	Paper/Pyranol in fabricated steel cases.	1000 to 10,000 VDC	12.5 to 640 μf	0 to 40C	GEC-1798	Industrial

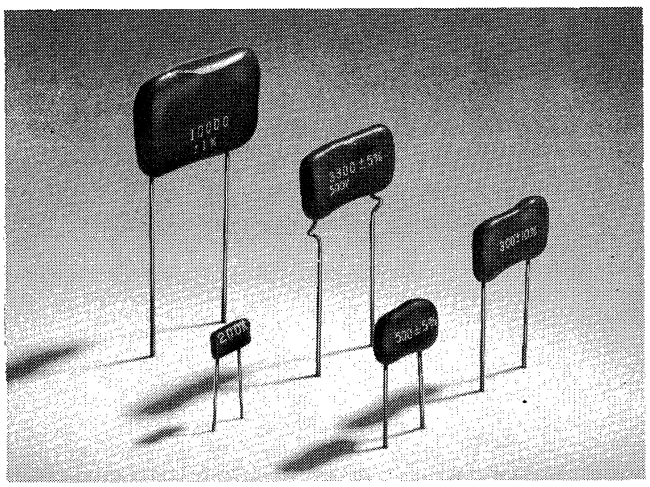
* *Trade-mark of DuPont Co.*

For complete information contact your nearby GE Sales Office, or write to General Electric Co., Section 998-80. Schenectady, N. Y. 12305.

GENERAL ELECTRIC

GENERAL INSTRUMENT

DIPPED SILVER-MICA CAPACITORS MIL-C-5D AND COMMERCIAL GRADES



General Instrument dipped silver-mica capacitors meet or exceed MIL-C-5D and EIA-RS153 requirements. MIL types and RDM types have multiple epoxy-resin coatings for maximum environmental protection. The single dip SRDM type may be used where space is critical and subsequent encapsulation of the circuit will be applied.

The range of standard types and ratings is shown in the table below. Complete technical details appear in Bulletin MC-2.

Production quantities are available from General Instrument Corporation, Capacitor Group, Walnut St., Tazewell, Va. 24651 (Phone 703-988-5551). Contact Miconic Industries, Inc.,135 Eileen Way, Syosett, N.Y. 11791, for the name of the G.I.-Miconics distributor nearest you.

HOW TO SPECIFY:

Commercial MIL-C-5D	*RDM 10 CMO4	B	D	121	K	O	3
	STYLE	**CHARACTERISTIC**	**VDC**	**CAP pF**	**TOL.**	**TEMP °C**	**VIB**
	See Standard Ratings	**Temp. Coeff. (PPM)** / **% Capacitance Drift** B Not Specified / Not Specified C −200 to +200 / ±.5 + .1 pF D −100 to +100 / ±.3 + .1 pF E −20 to +100 / ±.1 to .1 pF F 0 to +70 / ±.05 + .1 pF	A = 100 C = 300 D = 500 F = 1000 H = 1500 J = 2000	First 2 digits significant 3rd digit indicates zeroes	D = ±½ pF E = ±0.5% F = ±1% G = ±2% H = ±3% J = ±5% K = ±10% M = ±20%	M = −55 + 70 N = −55 + 85 O = −55 + 125 P = −55 + 150	(Hertz) 1 = 10-55 3 = 10-2000

*For crimped leads, add prefix "1" to RDM and SRDM. CMO9, 10, 11 and 12 have crimped leads.

STANDARD RATINGS: MIL-C-5, RDM, SRDM

CAPACITANCE IN PICOFARADS (pF)

TYPE	100V	300V	500V	1000V	1500V	2000V
*RDM5	1-200	1-120	NA	NA	NA	NA
*RDM10/CM04-09	1-1000	1-360	1-270	NA	NA	NA
*RDM12	400-1500	NA	NA	NA	NA	NA
*RDM15/CM05-10	1-1500	1-1200	1-750	NA	NA	NA
*RDM16	100-1800	100-1450	100-750	NA	NA	NA
*RDM19/CM06-11	100-8200	100-6800	100-5100	1-3000	NA	NA
*RDM20	100-18000	100-12000	100-10000	1-5600	1-1600	NA
*RDM30/CM07-12	470-30000	470-24000	470-20000	470-12000	100-5600	100-5600
*RDM42/CM08-13	3300-100000	3300-69000	3300-51000	3000-32000	1000-20000	NA

* For single coat, add "S" (SRDM). For crimped leads, add "1" (1RDM, 1SRDM).

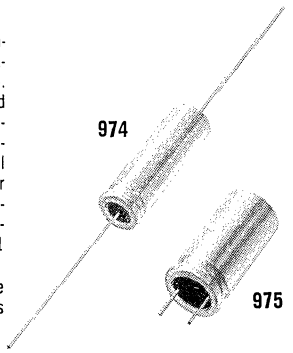
GENERAL INSTRUMENT

ALUMINUM ELECTROLYTIC CAPACITORS

Sub-miniature tubular +85°C

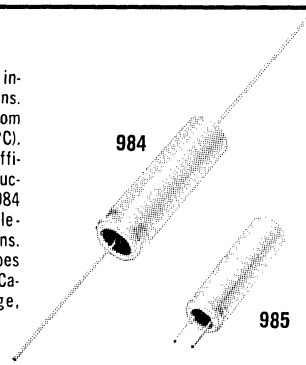
Type 974 and 975 capacitors are industrial quality units rated for continuous operation from −30°C to +85°C. They feature exceptionally low DCL and ESR. All-welded construction is combined with high purity foils in an insulated metal case. The 974 has axial leads. The 975 is single-ended for printed circuit applications. Capacitance range, 1-1800 μF, working voltage, 3-150 VDC. See bulletins EL-101 (974) and EL-105 (975).

Type 974 and 975 capacitors are available from Authorized Miconics Distributors.



Sub-miniature tubular +65°C

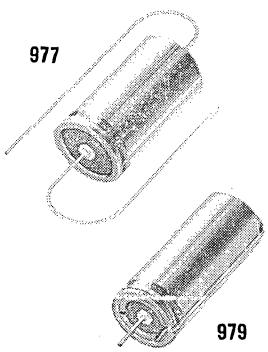
Type 984 and 985 capacitors are intended for entertainment applications. They are rated for continuous duty from −20° C to +65°C (500 hours at +85°C). Both types have high volumetric efficiency and feature all-welded construction in insulated metal cases. The 984 has axial leads while the 985 is single-ended for printed circuit applications. DCL and ESR are very low and all types have extended surge voltage ability. Capacitance range, 1-2500 μF, voltage, 3-150 WVDC. See Bulletin EL-102.



Standard tubular +85°C

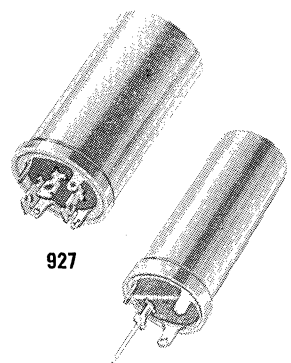
Type 977 capacitors are intended for industrial and entertainment applications and are rated for continuous operation from −20°C to +85°C. A wide range of values are available from 1 to 18,000 μF and 3-450 WVDC in 72 case sizes. Construction is all-welded with insulated (PVC) metal cases standard. Cardboard sleeves and/or mounting straps are available. For printed circuit applications, Type 979 is available with a special mounting wafer. See Bulletin EL-111.

Type 977 capacitors are available from Authorized Miconics Distributors.



Metal case, Twist-mount +85°C

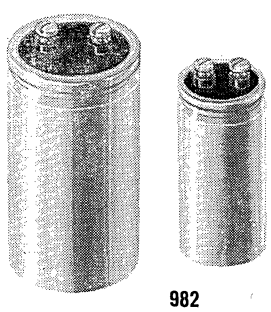
A broad range of metal case electrolytics in twist-mount, printed circuit or special mounting is available in the Type 927 series. Capacitances range from 1 to 30,000 μF and voltages from 3 to 475 WVDC. Operating temperature is −30°C to +85°C. These capacitors conform to EIA Standard RS-154B. Units are supplied in single, dual, triple or quad configuration. For details, see Bulletin EL-109.



High-capacitance (Computer Grade) +85°C

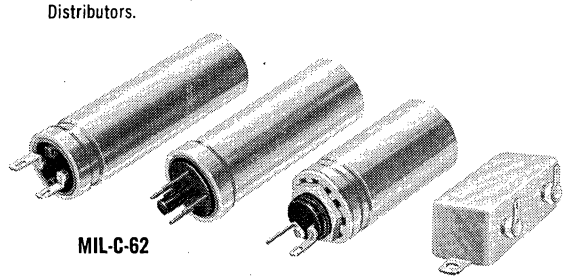
Type 982 capacitors feature very great (up to 570,000 μF) capacitances in compact insulated metal cans. Standard configuration is screw terminals with PVC sleeves. Mylar and acetate sleeves are also available. The standard line of eight cases covers most popular applications. Other cases are available. Capacitance ranges from 2300 μF at 450 WVDC, to 570,000μF at 3 WVDC. The 982 is intended for continuous operation in power supply filters at temperatures up to +85°C. See Bulletin EL-107.

Type 982 capacitors are available from Authorized Miconics Distributors.



Military Grade (MIL-C-62)

General Instrument supplies capacitors to MIL-C-62 in standard metal can and "bathtub" configurations. Extreme manufacturing care is exercised to ensure adherence to specifications. For details, see Bulletin EL-108. Rated for operation from −40°C to +85°C. MIL-C-62 capacitors are available from Authorized Miconics Distributors.



"CRYSTAL-CAP"® MYLAR* CAPACITORS (Patent applied for)

The Type 165 "Crystal-Cap" capacitor is a revolutionary new form of Mylar capacitor. The Mylar dielectric is fused into an integral unit with high purity aluminum foil to achieve unparalleled performance. Insulation resistance is extremely high with DF very low. Capacitance retrace characteristics are excellent. Terminal wires are imbedded into the sealed ends of the capacitors in a unique manner (Patent applied for) to provide a very strong bond.

The "Crystal-Cap" outperforms all typical Mylar "Wrap-and-fill" types in electrical or physical comparisons. Capacitance range, .001-.47μF, 50 to 600 WVDC. Operating temperature: −55°C to +125°C. See Bulletin FC-101.

Type 165 "Crystal-Cap" capacitors are available from Authorized Miconics Distributors.

*Mylar is an E.I. DuPont de Nemours trademark for polyester film.

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340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

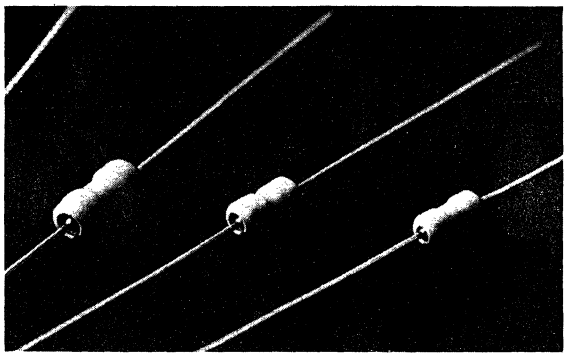
miniature tubular polycarbonate dielectric capacitors

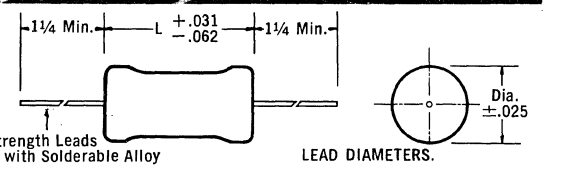
series 357 "PCG"

—55°C to +125°C Without Derating

Sealed in Non-Metallic Cases

100 VDC and 200 VDC





High Strength Leads Coated with Solderable Alloy

LEAD DIAMETERS.
.138 and .170 Diameters: 22 AWG
.204 Diameter and larger: 20 AWG

specifications

DISSIPATION FACTOR:
Less than .25% when measured at or referred to a frequency of 1,000 CPS at +25°C.

INSULATION RESISTANCE:
The minimum insulation resistance when measured with an applied potential of 100 to 200 volts, but not to exceed the rated voltage, shall be as follows:

TEMPERATURE	MEGOHMS MINIMUM
At + 25°C	150,000
At + 85°C	15,000
At +125°C	1,000

TEST VOLTAGE:
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25%, ±5°C.

ACCELERATED LIFE TEST:
Shall withstand an accelerated life test of 250 hours with 140% of the voltage rating, applied at the applicable high ambient temperature, per MIL-C-25C. Not more than one failure in 18 pieces tested shall be allowed.

VOLTAGE RATINGS:
These capacitors are designed to operate over the temperature range of −55°C to +85°C at full rated DC voltage and up to +125°C with working voltages as follows:

+85°C	+125°C
200 VDC	100 VDC
100 VDC	50 VDC

LEAD PULL TEST:
These capacitors shall withstand a five (5) pound pull applied axially for one minute.

LEAD BEND TEST:
Leads shall be bent without breakage about the point of egress from the capacitor. First 90 degrees in one direction then back to the original position, and the 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE:
The capacitance change shall not exceed the following values with reference to the +25°C capacitance value:

TEMPERATURE	% CAP. CHANGE
− 55°C	−2% Maximum
+ 85°C	±1.25% Maximum
+125°C	±2% Maximum

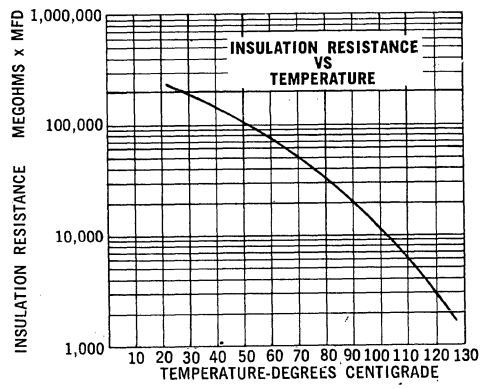
HUMIDITY TEST:
Series 357 capacitors are not intended to be operated where humidity is a problem. This series is intended for use in circuits which are encapsulated or hermetically sealed.

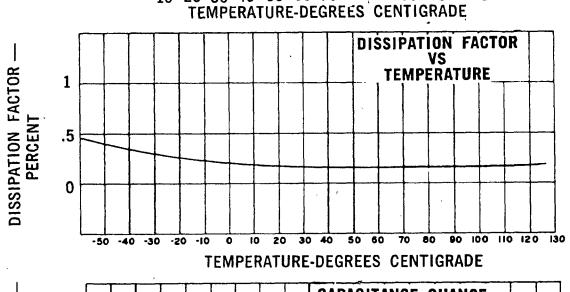
MARKING:
Small size of units limits marking information to the following: capacity, voltage, series prefix (357), Gudeman or trademark.

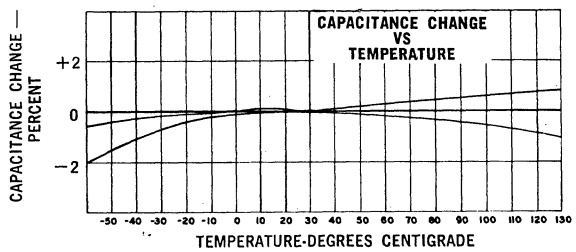
SPECIAL CAPACITORS:
Capacitance values, voltages and sizes not listed in this bulletin will be furnished upon request.

CAP. IN MFDS.	100 VDC PART NO.	100 VDC SIZE DIA. x L	200 VDC PART NO.	200 VDC SIZE DIA. x L
.001	357B102	.138 x 5/16	357C102	.138 x 5/16
.0015	357B152	.138 x 5/16	357C152	.170 x 5/16
.0022	357B222	.138 x 5/16	357C222	.170 x 5/16
.0033	357B332	.138 x 5/16	357C332	.170 x 7/16
.0039	357B392	.138 x 5/16	357C392	.170 x 7/16
.0047	357B472	.170 x 5/16	357C472	.204 x 1/2
.0068	357B682	.170 x 5/16	357C682	.204 x 1/2
.0082	357B822	.170 x 7/16	357C822	.225 x 1/2
.01	357B103	.170 x 7/16	357C103	.225 x 1/2
.012	357B123	.204 x 1/2	357C123	.225 x 9/16
.015	357B153	.204 x 1/2	357C153	.290 x 1/2
.018	357B183	.204 x 9/16	357C183	.290 x 1/2
.022	357B223	.204 x 9/16	357C223	.290 x 9/16
.027	357B273	.225 x 9/16	357C273	.290 x 9/16
.033	357B333	.225 x 9/16	357C333	.318 x 5/8
.039	357B393	.290 x 1/2	357C393	.318 x 5/8
.047	357B473	.290 x 1/2	357C473	.318 x 7/8
.056	357B563	.290 x 5/8	357C563	.318 x 7/8
.068	357B683	.290 x 5/8	357C683	.318 x 1
.082	357B823	.318 x 5/8	357C823	.318 x 1 3/16
.1	357B104	.318 x 5/8	357C104	.318 x 1 3/16
.12	357B124	.318 x 7/8		
.15	357B154	.318 x 7/8		
.18	357B184	.318 x 1 3/16		
.22	357B224	.318 x 1 3/16		

TYPICAL CURVES







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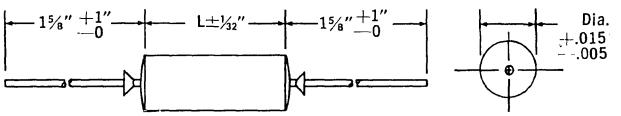
miniature polycarbonate-foil dielectric

series 401

HERMETICALLY SEALED (GLASS-TO-METAL)
TUBULAR METALLIC CASES
—55°C TO +125°C WITHOUT DERATING
100 VDC THRU 600 VDC

outline drawing

Standard leads consist of solid, bare, tinned wire. Special nickel leads are available for applications requiring a high degree of weldability.



LEADS: 24 gauge: .175 and .195 Dia.; 22 gauge: .235 and .312 Dia.; 20 gauge: .400 Dia. and larger case sizes.
For sleeving add .020 max. to Dia. and 1/16 to nominal case length.

specifications

CAPACITANCE AND TOLERANCE

The capacitance limits at +25°C are determined by the specified tolerance. Capacitors are measured at or referred to a frequency of 1000 cps.

DISSIPATION FACTOR

Less than .15% at 1000 cps. at +25°C.

INSULATION RESISTANCE

The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes. Listed below are minimum values:

Temperature	Nominal Capacitance Mfd.	R X C Megohms X mfd.	R Megohms
+25°C	Greater than .5	50,000	
	Smaller than .5		100,000
+85°C	Greater than .5	5,000	
	Smaller than .5		10,000
+125°C	Greater than .5	500	
	Smaller than .5		1,000

TEST VOLTAGE

Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C, ±5°C.

ACCELERATED LIFE TEST

Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 12 capacitors tested shall be allowed. A failure is defined as the following:

A) If the capacitor has a short or open circuit.
B) If the capacitance has changed more than 5% from its original value.
C) If the insulation resistance is less than 50% of the specified value above.
D) If the DF is greater than 20% of its initial specified value.

TEMPERATURE AND IMMERSION CYCLING

Shall meet all requirements of the applicable paragraph of the latest issue of MIL-C-19978.

MOISTURE RESISTANCE

Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-19978.

VIBRATION

Designed to withstand the Grade 3 vibration tests of the applicable paragraph of the latest issue of MIL-C19978.

A-C VOLTAGE RATING:

(—55°C to +85°C Ambient)

D-C Voltage Rating	400 cps
100	65
200	120
300	200
400	240
600	250

LEAD PULL TEST

Shall withstand a steady pull force of 5 lbs. applied axially to a capacitor lead for one minute.

LEAD BENDING TEST

The leads shall withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE

The change of capacitance with reference to the actual value at +25°C does not exceed the following limits.

TEMPERATURE	CHANGE OF CAPACITANCE
—55°C to +125°C	2%

100 V.D.C.

Part No.	Capacitance Mfd.	Diameter Inches	Length Inches
F401B102	.001	.195	¾
F401B122	.0012	.195	¾
F401B152	.0015	.195	¾
F401B182	.0018	.195	¾
F401B222	.0022	.195	¾
F401B272	.0027	.195	¾
F401B332	.0033	.195	¾
F401B392	.0039	.195	¾
F401B472	.0047	.195	¾
F401B562	.0056	.235	¾
F401B682	.0068	.235	¾
F401B822	.0082	.312	⅞
F401B103	.01	.312	⅞
F401B123	.012	.312	⅞
F401B153	.015	.312	⅞
F401B183	.018	.312	⅞
F401B223	.022	.312	⅞
F401B273	.027	.312	⅞
F401B333	.033	.312	⅞
F401B393	.039	.400	⅞
F401B473	.047	.400	⅞
F401B563	.056	.400	⅞
F401B683	.068	.400	⅞
F401B823	.082	.400	⅞
F401B104	0.1	.400	⅞
F401B124	.12	.400	1.0
F401B154	.15	.400	1.0
F401B185	.18	.400	1¼
F401B224	.22	.400	1¼
F401B274	.27	.500	1⅛
F401B334	.33	.500	1⅛
F401B394	.39	.562	1¼
F401B474	.47	.562	1¼
F401B564	.56	.562	1⅜
F401B684	.68	.562	1⅜
F401B824	.82	.670	1⅝
F401B105	1.00	.670	1⅝

200 V.D.C.

Part No.	Capacitance Mfd.	Diameter Inches	Length Inches
F401C102	.001	.195	¾
F401C122	.0012	.195	¾
F401C152	.0015	.195	¾
F401C182	.0018	.195	¾
F401C222	.0022	.195	¾
F401C272	.0027	.235	¾
F401C332	.0033	.235	¾
F401C392	.0039	.312	⅞
F401C472	.0047	.312	⅞
F401C562	.0056	.312	⅞
F401C682	.0068	.312	⅞
F401C822	.0082	.312	⅞
F401C103	.01	.312	⅞
F401C123	.012	.312	⅞
F401C153	.015	.312	⅞
F401C183	.018	.400	⅞
F401C223	.022	.400	⅞
F401C273	.027	.400	⅞
F401C333	.033	.400	⅞
F401C393	.039	.400	⅞
F401C473	.047	.400	⅞
F401C563	.056	.400	1.0
F401C683	.068	.400	1.0
F401C823	.082	.400	1¼
F401C104	.01	.400	1¼
F401C124	.12	.500	1⅛
F401C154	.15	.500	1⅛
F401C184	.18	.562	1¼
F401C224	.22	.562	1¼
F401C274	.27	.562	1⅝
F401C334	.33	.562	1⅝
F401C394	.39	.670	1⅝
F401C474	.47	.670	1⅝
F401C564	.56	.750	1¾
F401C684	.68	.750	1¾
F401C824	.82	.750	2¼
F401C105	1.0	.750	2¼

400 V.D.C.

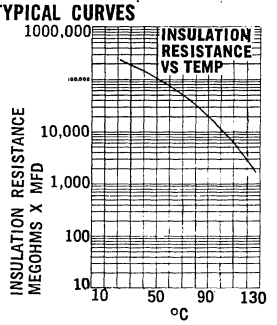
Part No.	Capacitance Mfd.	Diameter Inches	±.032 Length Inches
F401E102	.001	.235	¾
F401E122	.0012	.235	¾
F401E152	.0015	.235	¾
F401E182	.0018	.235	¾
F401E222	.0022	.235	¾
F401E272	.0027	.312	⅞
F401E332	.0033	.312	⅞
F401E392	.0039	.312	⅞
F401E472	.0047	.312	⅞
F401E562	.0056	.312	⅞
F401E682	.0068	.312	⅞
F401E822	.0082	.312	⅞
F401E103	.01	.312	⅞
F401E123	.012	.400	⅞
F401E153	.015	.400	⅞
F401E183	.018	.400	1.0
F401E223	.022	.400	1.0
F401E273	.027	.400	1¼
F401E333	.033	.400	1¼
F401E393	.039	.400	1⅜
F401E473	.047	.400	1⅜
F401E563	.056	.562	1⅛
F401E683	.068	.562	1⅛
F401E823	.082	.562	1⅜
F401E104	0.1	.562	1⅜
F401E124	.12	.562	1¾
F401E154	.15	.562	1¾
F401E184	.18	.670	1⅞
F401E224	.22	.670	1⅞
F401E274	.27	.750	1⅞
F401E334	.33	.750	1⅞
F401E394	.39	.750	2⅜
F401E474	.47	.750	2⅜
F401E564	.56	1.00	2⅛
F401E684	.68	1.00	2⅛

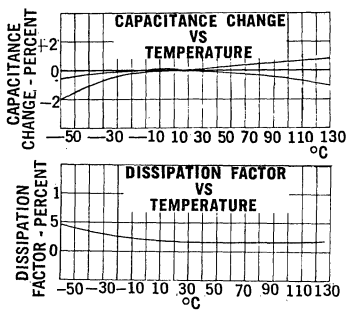
600 V.D.C.

Part No.	Capacitance Mfd.	Diameter Inches	±.032 Length Inches
F401F102	.001	.312	⅞
F401F122	.0012	.312	⅞
F401F152	.0015	.312	⅞
F401F182	.0018	.312	⅞
F401F222	.0022	.312	⅞
F401F272	.0027	.400	⅞
F401F332	.0033	.400	⅞
F401F392	.0039	.400	⅞
F401F472	.0047	.400	⅞
F401F562	.0056	.400	⅞
F401F682	.0068	.400	⅞
F401F822	.0082	.400	⅞
F401F103	.01	.400	⅞
F401F123	.012	.400	1.0
F401F153	.015	.400	1.0
F401F183	.018	.400	1⅛
F401F223	.022	.400	1⅛
F401F273	.027	.400	1⅜
F401F333	.033	.400	1⅜
F401F393	.039	.562	1⅛
F401F473	.047	.562	1⅛
F401F563	.056	.562	1⅜
F401F683	.068	.562	1⅜
F401F823	.082	.670	1⅝
F401F104	0.1	.670	1⅝
F401F124	.12	.670	1⅞
F401F154	.15	.670	1⅞
F401F184	.18	.750	1⅞
F401F224	.22	.750	1⅞
F401F274	.27	1.00	1⅝
F401F334	.33	1.00	1⅝
F401F394	.39	1.00	2⅛
F401F474	.47	1.00	2⅛
F401F564	.56	1.00	2½
F401F684	.68	1.00	2½

"F" indicates "Floating." Substitute "G" for "Grounded." Add following to Part No. for Tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%.

TYPICAL CURVES





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340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

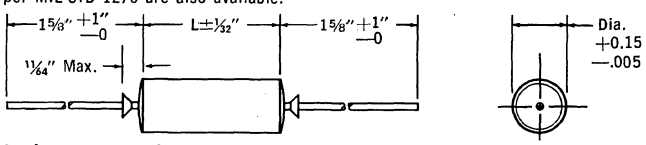
balanced polycarbonate film-foil dielectric

series 466

HERMETICALLY SEALED (GLASS-TO-METAL) MINIATURE METAL CASE —55°C TO +125°C WITHOUT DERATING 100 VDC THRU 600 VDC

outline drawing

Standard leads consist of solid, bare, tinned wire. Nickel or gold plated leads per MIL-STD 1276 are also available.



Leads: 22 gauge: .235 and .312 Dia.; 20 gauge: .400 and larger
For sleeving add .032 to dia. and 1/16 to the nominal case length.

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at +25°C are determined by the specified tolerance. Capacitors are measured or referred to a frequency of 1000 CPS.

DISSIPATION FACTOR
Less than .3% from +25°C to +125°C at 1000 CPS.

INSULATION RESISTANCE
The charging potential is equal to the specified operating voltage for a given temperature. The electrification time is two minutes. Minimum values are:

Temperature	Nominal Capacitance MFD	R X C Megohms X MFD	R Megohms
+25°C	Greater than .5	25,000	
	Smaller than .5		50,000
+125°C	Greater than .5	200	
	Smaller than .5		500

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 1000 hours with 140% of applied rated voltage at +125°C with one failure allowed in 18 capacitors tested. A failure is defined as:
A. If the capacitor has a short or open circuit
B. If the capacitance has changed more than 1.5% from its original measured value
C. If the insulation resistance is less than 50% of the specified value at +25°C
D. If the DF is greater than .5% at +25°C

TEMPERATURE AND IMMERSION CYCLING
Meets the requirements of the applicable paragraph of MIL-C-19978.

MOISTURE RESISTANCE
Meets the requirements of the applicable paragraph of MIL-C-19978.

VIBRATION
Shall withstand Grade 3 vibration tests of the applicable paragraph of MIL-C-19978.

AC VOLTAGE RATING (—55°C to +105°C Ambient)

DC VOLTAGE RATING	AC VOLTAGE RATING @400 CPS
100	70
200	140
400	240
600	330

LEAD PULL TEST
Shall withstand a steady pull force of 5 lbs. applied axially for one minute.

LEAD BENDING TEST
The leads shall withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE
Values below are guaranteed performance. Typical values are lower than those stated.

Rated Voltage	Temperature	Maximum Capacitance Change*
100VDC - 200VDC	+25°C to +125°C	+ .5 % — .75%
100VDC - 200VDC	+25°C to —55°C	— .25% —1.5 %
400VDC - 600VDC	+25°C to +125°C	+1.5 % — .75%
400VDC - 600VDC	+25°C to — 55°C	—1.0 % —1.5 %

*For capacitance values greater than .01 mfd. Values of .01 mfd. and less exhibit same change as 400-600 VDC units.

100 VOLTS D.C.

Capacitance Mfd.	Part No.	Diameter Inches	Length Inches
.001	F466B102	.235	¾
.0012	F466B122	.235	¾
.0015	F466B152	.235	¾
.0018	F466B182	.235	¾
.0022	F466B222	.235	¾
.0027	F466B272	.235	¾
.0033	F466B332	.235	¾
.0039	F466B392	.235	¾
.0047	F466B472	.235	¾
.0056	F466B562	.235	¾
.0068	F466B682	.235	¾
.0082	F466B822	.312	⅞
.01	F466B103	.312	⅞
.012	F466B123	.312	⅞
.015	F466B153	.312	⅞
.018	F466B183	.312	⅞
.022	F466B223	.312	⅞
.027	F466B273	.312	⅞
.033	F466B333	.312	⅞
.039	F466B393	.312	⅞
.047	F466B473	.400	⅞
.056	F466B563	.400	⅞
.068	F466B683	.400	⅞
.082	F466B823	.400	1⅛
.10	F466B104	.400	1⅛
.12	F466B124	.400	1⅜
.15	F466B154	.400	1⅜
.18	F466B184	.562	1⅛
.22	F466B224	.562	1⅛
.27	F466B274	.562	1⅜
.33	F466B334	.562	1⅜
.39	F466B394	.562	1⅝
.47	F466B474	.562	1⅝
.56	F466B564	.670	1⅝
.68	F466B684	.670	1⅝
.82	F466B824	.750	1⅞
1.0	F466B105	.750	1⅞

200 VOLTS D.C.

Capacitance Mfd.	Part No.	Diameter Inches	Length Inches
.001	F466C102	.235	¾
.0012	F466C122	.235	¾
.0015	F466C152	.235	¾
.0018	F466C182	.235	¾
.0022	F466C222	.235	¾
.0027	F466C272	.235	¾
.0033	F466C332	.235	¾
.0039	F466C392	.235	¾
.0047	F466C472	.235	¾
.0056	F466C562	.312	⅞
.0068	F466C682	.312	⅞
.0082	F466C822	.312	⅞
.01	F466C103	.312	⅞
.012	F466C123	.312	⅞
.015	F466C153	.312	⅞
.018	F466C183	.312	⅞
.022	F466C223	.312	⅞
.027	F466C273	.400	⅞
.033	F466C333	.400	⅞
.039	F466C393	.400	⅞
.047	F466C473	.400	1⅛
.056	F466C563	.400	1⅛
.068	F466C683	.400	1⅛
.082	F466C823	.400	1⅜
.10	F466C104	.400	1⅜
.12	F466C124	.562	1⅛
.15	F466C154	.562	1⅛
.18	F466C184	.562	1⅜
.22	F466C224	.562	1⅜
.27	F466C274	.562	1⅞
.33	F466C334	.562	1⅞
.39	F466C394	.670	1¾
.47	F466C474	.670	1¾
.56	F466C564	.750	2⅛
.68	F466C684	.750	2⅛
.82	F466C824	1.0	2⅛
1.0	F466C105	1.0	2⅛

400 VOLTS D.C.

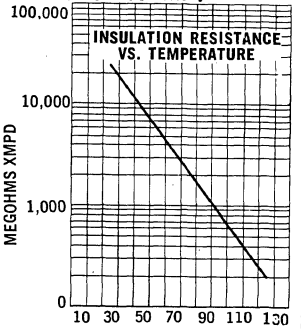
.001	F466E102	.235	¾
.0012	F466E122	.235	¾
.0015	F466E152	.235	¾
.0018	F466E182	.235	¾
.0022	F466E222	.235	¾
.0027	F466E272	.235	¾
.0033	F466E332	.235	¾
.0039	F466E392	.312	⅞
.0047	F466E472	.312	⅞
.0056	F466E562	.312	⅞
.0068	F466E682	.312	⅞
.0082	F466E822	.312	⅞
.01	F466E103	.400	⅞
.012	F466E123	.400	⅞
.015	F466E153	.400	⅞
.018	F466E183	.400	⅞
.022	F466E223	.400	1⅛
.027	F466E273	.400	1⅛
.033	F466E333	.400	1⅜
.039	F466E393	.400	1⅜
.047	F466E473	.400	1⅜
.056	F466E563	.562	1⅛
.068	F466E683	.562	1⅛
.082	F466E823	.562	1⅜
.10	F466E104	.562	1⅜
.12	F466E124	.670	1⅝
.15	F466E154	.670	1⅝
.18	F466E184	.670	1⅞
.22	F466E224	.670	1⅞
.27	F466E274	.750	2⅛
.33	F466E334	.750	2⅛
.39	F466E394	1.0	2⅛
.47	F466E474	1.0	2⅛
.56	F466E564	1.0	2⅛
.68	F466E684	1.0	2⅛
.82	F466E824	1.0	2⅝

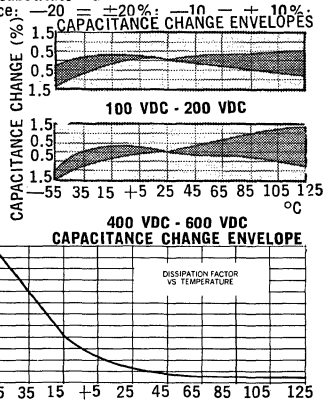
600 VOLTS D.C.

.001	F466F102	.312	¾
.0012	F466F122	.312	¾
.0015	F466F152	.312	¾
.0018	F466F182	.312	¾
.0022	F466F222	.312	⅞
.0027	F466F272	.312	⅞
.0033	F466F332	.312	⅞
.0039	F466F392	.400	⅞
.0047	F466F472	.400	⅞
.0056	F466F562	.400	⅞
.0068	F466F682	.400	⅞
.0082	F466F822	.400	⅞
.01	F466F103	.400	1
.012	F466F123	.400	1
.015	F466F153	.400	1
.018	F466F183	.400	1⅜
.022	F466F223	.400	1⅜
.027	F466F273	.500	1⅛
.033	F466F333	.500	1⅛
.039	F466F393	.562	1⅛
.047	F466F473	.562	1⅛
.056	F466F563	.562	1⅜
.068	F466F683	.562	1⅜
.082	F466F823	.670	1⅜
.10	F466F104	.670	1⅜
.12	F466F124	.670	1⅞
.15	F466F154	.670	1⅞
.18	F466F184	.750	1⅞
.22	F466F224	.750	1⅞
.27	F466F274	1	1⅞
.33	F466F334	1	1⅞
.39	F466F394	1	2⅛
.47	F466F474	1.0	2⅜
.56	F466F564	1.0	2⅝

"F" indicates "floating", for grounded substitute "G"
Add following to Part No. for tolerance: —20 = ±20%; —10 = ± 10%; —5 = ±5%

TYPICAL CURVES





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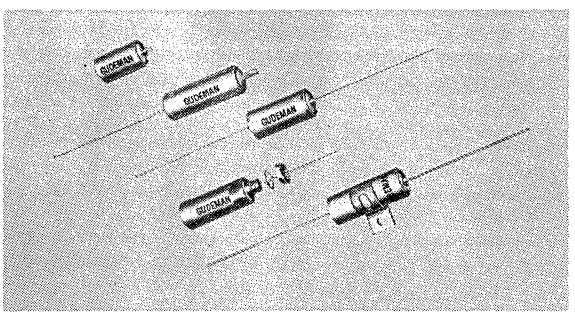
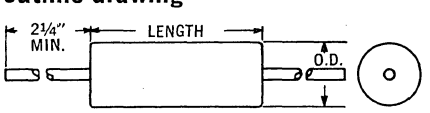
"XC" plastic film dielectric

series XC203 & XC204—

HERMETICALLY SEALED (GLASS-TO-METAL)
TUBULAR CASED
—65°C TO +165° WITHOUT DERATING
EXTENDED FOIL CONSTRUCTION
200 VDC THRU 600 VDC



outline drawing



Leads:
Ga.
24 .187 Dia.
22 .235 to .312
20 .400 and larger

Dimensions shown are for uninsulated types. When insulating sleeving is required the diameter shall be increased by a maximum of .04" and the length shall be increased by ⅛" ± 1/32".

Mtg. by means of lead wires is not recommended for units larger than .562 x 1 13/16" Lg.

Part No.	Voltage WVDC	CAP. Mfd.	Circuit 203 L.± 1/32	Circuit 203 D.±.015	Circuit 204 L.± 1/32	Circuit 204 D.±.015
XC204C102-	200	.001	11/16	.187	¾	.187
XC204C152-	200	.0015	11/16	.187	¾	.187
XC204C222-	200	.0022	13/16	.235	⅞	.235
XC204C332-	200	.0033	13/16	.235	⅞	.235
XC204C472-	200	.0047	13/16	.235	⅞	.235
XC204C682-	200	.0068	13/16	.312	⅞	.312
XC204C103-	200	.010	13/16	.312	⅞	.312
XC204C153-	200	.015	15/16	.312	1	.312
XC204C223-	200	.022	13/16	.400	⅞	.400
XC204C333-	200	.033	15/16	.400	1	.400
XC204C473-	200	.047	1 1/16	.400	1⅛	.400
XC204C683-	200	.068	1 5/16	.400	1⅜	.400
XC204C104-	200	.10	1 1/16	.562	1⅛	.562
XC204C154-	200	.15	1 5/16	.562	1⅜	.562
XC204C224-	200	.22	1 5/16	.562	1⅝	.562
XC204C334-	200	.33	1 11/16	.670	1¾	.670
XC204C474-	200	.47	1 13/16	.750	1⅞	.750
XC204E102-	400	.001	13/16	.235	⅞	.235
XC204E152-	400	.0015	13/16	.235	⅞	.235
XC204E222-	400	.0022	13/16	.235	⅞	.235
XC204E332-	400	.0033	13/16	.312	⅞	.312
XC204E472-	400	.0047	13/16	.312	⅞	.312
XC204E682-	400	.0068	15/16	.312	1	.312
XC204E103-	400	.010	13/16	.400	⅞	.400
XC204E153-	400	.015	13/16	.400	⅞	.400
XC204E223-	400	.022	1 1/16	.400	1⅛	.400
XC204E333-	400	.033	1 5/16	.400	1⅜	.400
XC204E473-	400	.047	1 1/16	.562	1⅛	.562
XC204E683-	400	.068	1 3/16	.562	1¼	.562
XC204E104-	400	.10	1 5/16	.562	1⅝	.562
XC204E154-	400	.15	1 5/16	.670	1⅝	.670
XC204E224-	400	.22	1 11/16	.750	1¾	.750
XC204E334-	400	.33	2 3/16	.750	2¼	.750
XC204F102-	600	.001	13/16	.235	⅞	.235
XC204F152-	600	.0015	15/16	.235	1	.235
XC204F222-	600	.0022	13/16	.312	⅞	.312
XC204F332-	600	.0033	13/16	.312	⅞	.312
XC204F472-	600	.0047	15/16	.312	1	.312
XC204F682-	600	.0068	13/16	.400	⅞	.400
XC204F103-	600	.010	15/16	.400	1	.400
XC204F153-	600	.015	1 1/16	.400	1⅛	.400
XC204F223-	600	.022	1 1/16	.400	1½	.400
XC204F333-	600	.033	1 3/16	.562	1¼	.562
XC204F473-	600	.047	1 5/16	.562	1⅜	.562
XC204F683-	600	.068	1 7/16	.670	1½	.670
XC204F104-	600	.10	1 13/16	.670	1⅞	.670
XC204F154-	600	.15	1 13/16	.750	1⅞	.750

"204" indicates "floating." Substitute "203" for "Grounded."
Add following to Part No. for tolerance: —20 = ±20% (Std.); —10 = ±10%; —5 = ±5%.

specifications

INSULATION RESISTANCE

The minimum insulation resistance when measured with an applied potential of 100 volts and an electrification time of two minutes shall be as follows:

At 25°C—75,000 megohm-mfds. minimum, but need not exceed 200,000 megohms
At 85°C—4000 megohm-mfds. minimum, but need not exceed 8000 megohms.
At 125°C—250 megohm-mfds. minimum, but need not exceed 500 megohms.
At 165°C—50 megohm-mfds. minimum, but need not exceed 100 megohms.

NOTE—The above IR characteristics are very conservative and it can be generally expected that they will be much higher than specified. The Gudeman engineering dept. believes that in introducing a new line of capacitors a conservative view point be maintained, thereby proffering a component which will offer the greatest degree of reliability.

POWER FACTOR

The power factor of these capacitors shall be no greater than .5 percent when measured at 1000 cps at 25°C.

ACCELERATED LIFE TEST

These capacitors shall withstand an accelerated life test of 250 hours at 165°C with an applied voltage of 140 percent of rated voltage on units not exceeding .05 watt seconds.

One failure in 12 samples permitted.

TEST VOLTAGE

These capacitors shall withstand a DC voltage equal to 200 percent of the rated voltage for one minute at a temperature of 25°C.

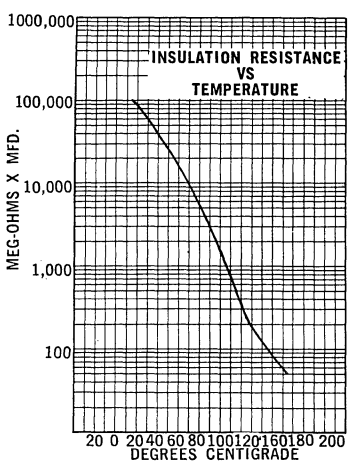
MOISTURE RESISTANCE AND VIBRATION

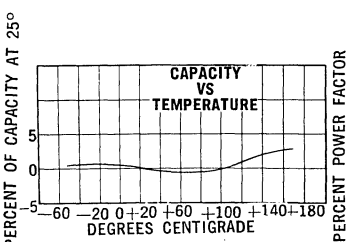
These capacitors shall meet the requirements for Moisture Resistance and Vibration of Specification MIL-C-25A.

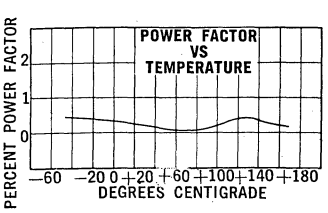
CAPACITANCE CHANGE

The capacitance change shall not be greater than —2 percent to +6 percent from —65°C to +165°C when compared to the nominal value measured at +25°C.

TYPICAL CURVES







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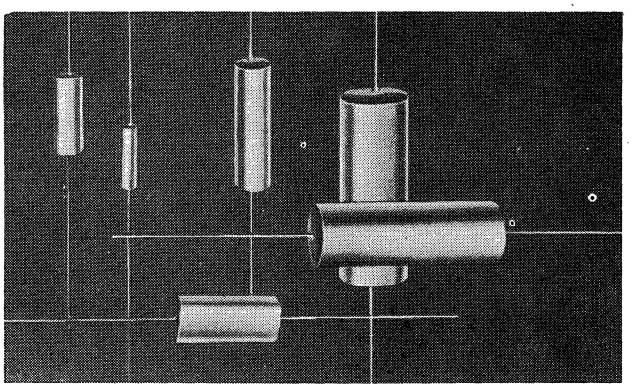
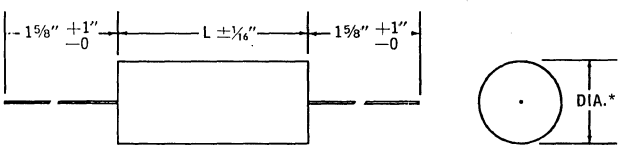
miniature "mylar"* dielectric

series 338 & 355

SEALED IN NON-METALLIC CASES with PLASTIC RESIN END SEALS
—55°C TO +125°C WITHOUT DERATING
50 VDC TO 600 VDC
FLAT (series 338) AND TUBULAR (series 355)

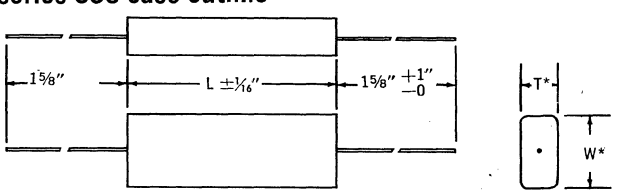


series 355 case outline



* UNDER .250" DIA. ±.031"
.250" THRU .499" DIA. ±.046"
.500" DIA. & OVER ±.062"

series 338 case outline



* UNDER .250" ±.031"
.250" THRU .499" ±.046"
.500" & OVER ±.062"

specifications

DISSIPATION FACTOR

Less than 1.0% when measured at or referred to a frequency of 1000 CPS at +25°C, per MIL-C-25C.

INSULATION RESISTANCE

The minimum insulation resistance when measured with an applied potential of 50 to 500 volts, but not to exceed the rated voltage, shall be as follows:

At + 25°C 50,000 megohm-mfds minimum but need not exceed 150,000 megohms.
At + 85°C 1000 megohm-mfds minimum but need not exceed 6000 ohms.
At + 125°C 50 megohm-mfds minimum but need not exceed 300 megohms.

TEST VOLTAGE

Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C, ±5°C.

ACCELERATED LIFE TEST

Shall withstand an accelerated life test of 250 hours with 140% of the voltage rating, applied at the applicable high ambient temperature, per MIL-C-25C.

The 355, and 338 series capacitors are furnished with high strength leads coated with a solderable alloy in the sizes shown below:

355 SERIES	GAUGE	338 SERIES
Up to .156 Dia.	#24 AWG	"T" Dim. up to .156
.156 Dia. to .375 Dia.	#22 AWG	"T" Dim. .156 to .375
.375 to .750 Dia.	#20 AWG	"T" Dim. .375 to .750
Greater than .750 Dia.	#18 AWG	"T" Dim. Over .750

MOISTURE RESISTANCE

Shall withstand the moisture resistance requirements as specified in military specification MIL-C-25C.

VIBRATION-ACCELERATION

Shall withstand the Grade 3 vibration-acceleration requirements of MIL-C-25C.

VOLTAGE RATINGS

Designed to operate over the temperature range of —55°C to +85°C at full rated DC voltage and up to +125°C with working voltages as follows:

+85°C	+125°C
600 VDC	300 VDC
400 VDC	200 VDC
200 VDC	150 VDC
150 VDC	100 VDC
50 VDC	50 VDC

LEAD PULL TEST

Shall withstand a five (5) pound pull applied axially for one minute, per MIL-C-25C.

LEAD BEND TEST

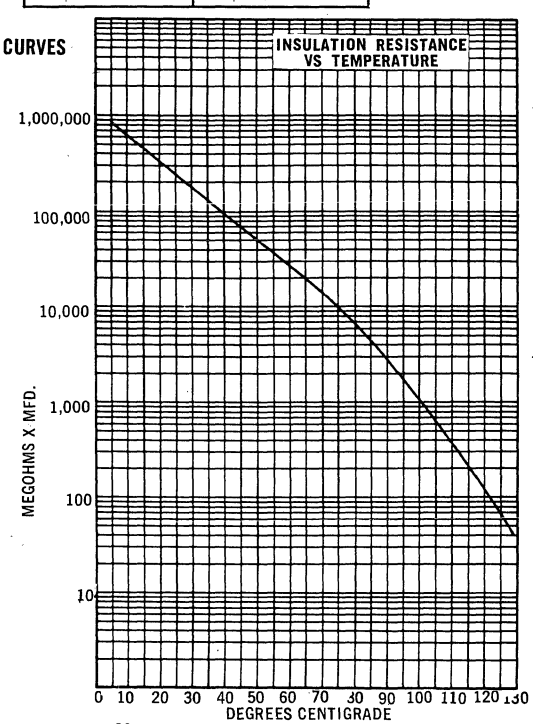
Shall be bent without breakage about the point of egress from the capacitor. First 90 degrees in one direction then back to the original position, and then 90 degrees in the opposite direction, per MIL-C-25C.

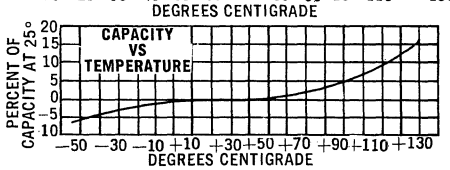
CAPACITANCE CHANGE WITH TEMPERATURE

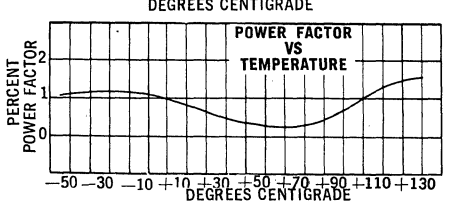
The capacitance change shall not exceed the following values with reference to the +25°C capacitance value:

TEMPERATURE	% CAP. CHANGE
— 55°C	—10% Maximum
+ 85°C	+ 5% Maximum
+125°C	+16% Maximum

TYPICAL CURVES







GUDEMAN
a division of
Gulton Industries, Inc.
340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

series 355

CAP. IN MFDS.	50 VDC. Part No.	Dia.	L.	150 VDC. Part No.	Dia.	L.	200 VDC. Part No.	Dia.	L.	400 VDC. Part No.	Dia.	L.	600 VDC. Part No.	Dia.	L.
.001				355Y102	.156″	½″	355C102	.156″	½″	355E102	.156″	5/8″	355F102	.156″	1 1/16″
.0015				355Y152	.156″	½″	355C152	.156″	½″	355E152	.156″	5/8″	355F152	.171″	1 1/16″
.0022				355Y222	.156″	½″	355C222	.156″	½″	355E222	.156″	5/8″	355F222	.187″	1 1/16″
.0033				355Y332	.156″	½″	355C332	.156″	½″	355E332	.156″	5/8″	355F332	.218″	1 1/16″
.0047				355Y472	.156″	½″	355C472	.156″	½″	355E472	.156″	1 1/16″	355F472	.218″	¾″
.0068				355Y682	.156″	½″	355C682	.156″	½″	355E682	.171″	1 1/16″	355F682	.250″	¾″
.0082				355Y822	.156″	½″	355C822	.156″	½″	355E822	.187″	1 1/16″	355F822	.265″	¾″
.01				355Y103	.156″	½″	355C103	.171″	½″	355E103	.203″	1 1/16″	355F103	.281″	¾″
.012				355Y123	.171″	½″	355C123	.187″	½″	355E123	.218″	1 1/16″	355F123	.281″	1 3/16″
.015				355Y153	.187″	½″	355C153	.203″	½″	355E153	.234″	1 1/16″	355F153	.312″	1 3/16″
.018				355Y183	.187″	9/16″	355C183	.203″	1 1/16″	355E183	.250″	1 1/16″	355F183	.328″	1 3/16″
.022				355Y223	.203″	9/16″	355C223	.218″	1 1/16″	355E223	.265″	1 1/16″	355F223	.359″	1 3/16″
.027				355Y273	.203″	1 1/16″	355C273	.218″	1 1/16″	355E273	.250″	1 3/16″	355F273	.328″	1 1/16″
.033				355Y333	.203″	1 1/16″	355C333	.250″	1 1/16″	355E333	.281″	1 3/16″	355F333	.375″	1 1/16″
.039				355Y393	.234″	1 1/16″	355C393	.281″	1 1/16″	355E393	.296″	1 3/16″	355F393	.390″	1 1/16″
.047				355Y473	.234″	1 1/16″	355C473	.250″	1 3/16″	355E473	.328″	1 3/16″	355F473	.421″	1 1/16″
.056				355Y563	.234″	1 3/16″	355C563	.281″	1 3/16″	355E563	.296″	1 1/16″	355F563	.453″	1 1/16″
.068				355Y683	.250″	1 3/16″	355C683	.312″	1 1/16″	355E683	.328″	1 1/16″	355F683	.453″	1 3/16″
.082				355Y823	.265″	1 3/16″	355C823	.328″	1 3/16″	355E823	.343″	1 1/16″	355F823	.484″	1 3/16″
.1	355A104	.250″	1 3/16″	355Y104	.296″	1 3/16″	355C104	.359″	1 3/16″	355E104	.375″	1 1/16″	355F104	.453″	1 1/16″
.12	355A124	.265″	1 3/16″	355Y124	.328″	1 3/16″	355C124	.390″	1 3/16″	355E124	.359″	1 5/16″	355F124	.453″	1 5/16″
.15	355A154	.281″	1 3/16″	355Y154	.359″	1 3/16″	355C154	.421″	1 3/16″	355E154	.390″	1 5/16″	355F154	.500″	1 1/16″
.18	355A184	.312″	1 3/16″	355Y184	.343″	1 1/16″	355C184	.406″	1 1/16″	355E184	.375″	1 1/16″	355F184	.562″	1 1/16″
.22	355A224	.328″	1 3/16″	355Y224	.359″	1 1/16″	355C224	.437″	1 1/16″	355E224	.421″	1 5/16″	355F224	.609″	1 1/16″
.27	355A274	.359″	1 3/16″	355Y274	.359″	1 3/16″	355C274	.437″	1 3/16″	355E274	.468″	1 5/16″	355F274	.609″	2 1/16″
.33	355A334	.406″	1 3/16″	355Y334	.390″	1 3/16″	355C334	.484″	1 3/16″	355E334	.500″	1 5/16″	355F334	.640″	2 1/16″
.39	355A394	.359″	1 1/16″	355Y394	.406″	1 3/16″	355C394	.531″	1 3/16″	355E394	.546″	1 5/16″	355F394	.687″	2 1/16″
.47	355A474	.375″	1 1/16″	355Y474	.453″	1 3/16″	355C474	.546″	1 5/16″	355E474	.593″	1 5/16″	355F474	.765″	2 1/16″
.56	355A564	.406″	1 1/16″	355Y564	.421″	1 5/16″	355C564	.531″	1 5/16″	355E564	.593″	1 15/16″	355F564	.750″	2 1/4″
.68	355A684	.437″	1 1/16″	355Y684	.453″	1 5/16″	355C684	.578″	1 5/16″	355E684	.640″	1 15/16″	355F684	.828″	2 1/4″
.82	355A824	.484″	1 1/16″	355Y824	.500″	1 5/16″	355C824	.531″	1 13/16″	355E824	.687″	2 3/16″	355F824	.921″	2 1/4″
1.0	355A105	.468″	1 5/16″	355Y105	.531″	1 5/16″	355C105	.609″	1 13/16″	355E105	.750″	2 3/16″	355F105	.906″	2 7/8″
1.5	355A155	.578″	1 5/16″	355Y155	.718″	1 13/16″	355C155	.750″	1 15/16″	355E155	.828″	2 1/16″	355F155	1.109″	2 7/8″
2.0	355A205	.609″	1 5/8″	355Y205	.812″	1 13/16″	355C205	.906″	2 1/16″	355E205	.953″	2 1/16″	355F205	1.265″	2 7/8″
3.0	355A305	.734″	1 5/8″												
4.0	355A405	.765″	1 7/8″												
5.0	355A505	.859″	1 7/8″												

series 338

CAP. IN MFDS.	50 VDC. Part No.	T.	W.	L.	150 VDC. Part No.	T.	W.	L.	200 VDC. Part No.	T.	W.	L.	400 VDC. Part No.	T.	W.	L.	600 VDC. Part No.	T.	W.	L.
.001					338Y102	.125″	.234″	½″	338C102	.125″	.250″	½″	338E102	.125″	.250″	5/8″	338F102	.125″	.250″	1 1/16″
.0015					338Y154	.125″	.234″	½″	338C154	.125″	.250″	½″	338E154	.125″	.250″	5/8″	338F154	.125″	.250″	1 1/16″
.0022					338Y222	.125″	.234″	½″	338C222	.125″	.250″	½″	338E222	.125″	.250″	5/8″	338F222	.125″	.250″	1 1/16″
.0033					338Y332	.125″	.234″	½″	338C332	.125″	.250″	½″	338E332	.125″	.250″	5/8″	338F332	.140″	.250″	1 1/16″
.0047					338Y472	.125″	.234″	½″	338C472	.125″	.250″	½″	338E472	.125″	.250″	1 1/16″	338F472	.140″	.250″	¾″
.0068					338Y682	.125″	.234″	½″	338C682	.125″	.250″	½″	338E682	.125″	.250″	1 1/16″	338F682	.171″	.281″	¾″
.0082					338Y822	.125″	.234″	½″	338C822	.125″	.250″	½″	338E822	.125″	.250″	1 1/16″	338F822	.187″	.312″	¾″
.01					338Y103	.125″	.234″	½″	338C103	.125″	.250″	½″	338E103	.125″	.250″	1 1/16″	338F103	.203″	.328″	¾″
.012					338Y123	.125″	.234″	½″	338C123	.125″	.250″	½″	338E123	.140″	.250″	1 1/16″	338F123	.203″	.328″	1 3/16″
.015					338Y153	.125″	.234″	½″	338C153	.125″	.250″	½″	338E153	.156″	.265″	1 1/16″	338F153	.234″	.343″	1 3/16″
.018					338Y183	.125″	.234″	9/16″	338C183	.125″	.250″	1 1/16″	338E183	.171″	.281″	1 1/16″	338F183	.265″	.375″	1 3/16″
.022					338Y223	.125″	.234″	9/16″	338C223	.140″	.250″	1 1/16″	338E223	.187″	.312″	1 1/16″	338F223	.281″	.406″	1 3/16″
.027					338Y273	.125″	.234″	1 1/16″	338C273	.140″	.250″	1 1/16″	338E273	.171″	.281″	1 3/16″	338F273	.218″	.375″	1 1/16″
.033					338Y333	.125″	.234″	1 1/16″	338C333	.171″	.281″	1 1/16″	338E333	.171″	.328″	1 3/16″	338F333	.250″	.453″	1 1/16″
.039					338Y393	.156″	.265″	1 1/16″	338C393	.203″	.328″	1 1/16″	338E393	.218″	.343″	1 3/16″	338F393	.281″	.437″	1 1/16″
.047					338Y473	.156″	.265″	1 1/16″	338C473	.171″	.281″	1 3/16″	338E473	.218″	.390″	1 3/16″	338F473	.281″	.500″	1 1/16″
.056					338Y563	.156″	.265″	1 3/16″	338C563	.187″	.312″	1 3/16″	338E563	.187″	.343″	1 1/16″	338F563	.312″	.546″	1 1/16″
.068					338Y683	.171″	.281″	1 3/16″	338C683	.234″	.343″	1 3/16″	338E683	.234″	.375″	1 1/16″	338F683	.296″	.531″	1 3/16″
.082					338Y823	.187″	.312″	1 3/16″	338C823	.250″	.375″	1 3/16″	338E823	.250″	.406″	1 1/16″	338F823	.343″	.562″	1 3/16″
.1	338A104	.171″	.296″	1 3/16″	338Y104	.203″	.375″	1 3/16″	338C104	.281″	.406″	1 3/16″	338E104	.281″	.437″	1 1/16″	338F104	.312″	.531″	1 1/16″
.12	338A124	.187″	.312″	1 3/16″	338Y124	.218″	.390″	1 3/16″	338C124	.312″	.437″	1 3/16″	338E124	.250″	.406″	1 5/16″	338F124	.312″	.531″	1 5/16″
.15	338A154	.203″	.329″	1 3/16″	338Y154	.218″	.421″	1 3/16″	338C154	.343″	.500″	1 3/16″	338E154	.281″	.437″	1 1/16″	338F154	.328″	.546″	1 1/16″
.18	338A184	.234″	.359″	1 3/16″	338Y184	.218″	.390″	1 1/16″	338C184	.281″	.437″	1 1/16″	338E184	.281″	.437″	1 5/16″	338F184	.375″	.687″	1 1/16″
.22	338A224	.250″	.375″	1 3/16″	338Y224	.218″	.468″	1 1/16″	338C224	.343″	.500″	1 1/16″	338E224	.312″	.468″	1 5/16″	338F224	.421″	.718″	1 1/16″
.27	338A274	.281″	.406″	1 3/16″	338Y274	.250″	.406″	1 3/16″	338C274	.328″	.500″	1 3/16″	338E274	.359″	.515″	1 5/16″	338F274	.421″	.718″	2 1/16″
.33	338A334	.328″	.453″	1 3/16″	338Y334	.281″	.437″	1 3/16″	338C334	.359″	.531″	1 3/16″	338E334	.406″	.562″	1 5/16″	338F334	.421″	.843″	2 1/16″
.39	338A394	.265″	.406″	1 1/16″	338Y394	.312″	.468″	1 3/16″	338C394	.421″	.593″	1 3/16″	338E394	.437″	.593″	1 5/16″	338F394	.468″	.875″	2 1/16″
.47	338A474	.281″	.421″	1 1/16″	338Y474	.359″	.515″	1 3/16″	338C474	.437″	.609″	1 5/16″	338E474	.437″	.671″	1 5/16″	338F474	.578″	.984″	2 1/16″
.56	338A564	.312″	.453″	1 1/16″	338Y564	.312″	.468″	1 5/16″	338C564	.421″	.593″	1 5/16″	338E564	.437″	.671″	1 15/16″	338F564	.531″	.906″	2 1/16″
.68	338A684	.343″	.484″	1 1/16″	338Y684	.343″	.515″	1 5/16″	338C684	.468″	.625″	1 5/16″	338E684	.484″	.718″	1 15/16″	338F684	.625″	1.015″	2 1/4″
.82	338A824	.390″	.531″	1 1/16″	338Y824	.406″	.562″	1 5/16″	338C824	.421″	.593″	1 13/16″	338E824	.468″	.859″	2 3/16″	338F824	.718″	1.437″	2 1/4″
1.0	338A105	.343″	.531″	1 5/16″	338Y105	.375″	.687″	1 1/16″	338C105	.468″	.625″	1 13/16″	338E105	.531″	.921″	2 3/16″	338F105	.656″	1.093″	2 7/16″
1.5	338A155	.453″	.640″	1 5/16″	338Y155	.562″	.796″	1 13/16″	338C155	.671″	.906″	1 15/16″	338E155	.671″	.906″	2 1/16″	338F155	.843″	1.265″	2 7/8″
2.0	338A205	.484″	.671″	1 5/8″	338Y205	.656″	.890″	1 13/16″	338C205	.625″	.953″	2 3/16″	338E205	.765″	1.046″	2 1/16″	338F205	1.000″	1.437″	2 7/8″
3.0	338A305	.609″	.796″	1 5/8″																
4.0	338A405	.609″	.843″	1 7/8″																
5.0	338A505	.703″	.937″	1 7/8″																

DIM. TOLERANCES:
Add following to Part No. for tolerance: —M = ±20%; —K = ±10%; —J = ±5%; —B = ±2%.
Add prefix "F" to specify outer fibreglas wrap in lieu of Mylar.

GUDEMAN

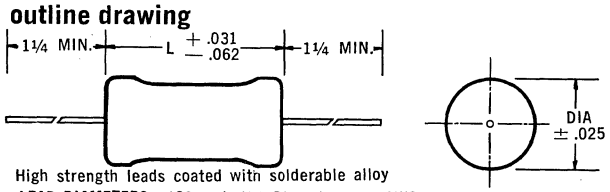
a division of
Gulton Industries, Inc.
340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

miniature "mylar"* dielectric

series 356

"BLUE-R"® TUBULAR
SEALED IN NON-METALLIC CASES
—55°C TO +125°C
80 VDC TO 600 VDC

outline drawing



High strength leads coated with solderable alloy
LEAD DIAMETERS: .138 and .170 Diameters: 22 AWG
.204 Diameter and larger: 20 AWG

specifications

DISSIPATION FACTOR
The dissipation factor shall not exceed 1.0% when measured at or referred to a frequency of 1,000 CPS at +25°C.

INSULATION RESISTANCE
The minimum insulation resistance when measured with an applied potential of 80 to 500 volts, but not to exceed the rated voltage, shall be as follows:

At + 25°C 50,000 megohm-mfds minimum but need not exceed 150,000 megohms.
At + 85°C 5,000 megohms-mfds minimum but need not exceed 15,000 ohms.
At + 125°C 50 megohms-mfds minimum but need not exceed 300 megohms.

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25%, ±5°C.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 250 hours with 140% of the voltage rating, applied at the applicable high ambient temperature, per MIL-C-25C. Not more than one failure in 18 pieces tested shall be allowed.

VOLTAGE RATINGS
These capacitors are designed to operate over the temperature range of —55°C to +85°C at full rated DC voltage and up to +125°C with working voltages as follows:

+85°C	+125°C
600 VDC	300 VDC
400 VDC	200 VDC
200 VDC	150 VDC
80 VDC	50 VDC

MOISTURE ASSISTANCE
Capacitors shall withstand 500 hours of 95% relative humidity at 40°C. Voltage will not be applied. Upon completion of test, units will be dried for four hours. Minimum insulation resistance at 25°C. will be 25,000 megohm-mfds but need not exceed 75,000 megohms. Not more than one failure in 12 shall be permitted.

MARKING
Small size of units limits marking information to the following: capacity, voltage, series prefix (356), Gudeman or trademark.

LEAD PULL TEST
Shall withstand a five (5) pound pull applied axially for one minute.

LEAD BENDING TEST
Leads shall be bent without breakage about the point of egress from the capacitor. First 90 degrees in one direction then back to the original position, and then 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE
The capacitance change shall not exceed the following values with reference to the +25°C capacitance value:

TEMPERATURE	% CAP. CHANGE
— 55°C	—10% Maximum
+ 85°C	+ 5% Maximum
+125°C	+16% Maximum

80 VDC

CAP. IN MFDS.	Part No.	Dia.	L.
.001			
.0015			
.0022	356AZ222	.138″	5/16″
.0033	356AZ332	.138″	5/16″
.0047	356AZ472	.138″	5/16″
.0068	356AZ682	.170″	3/8″
.0082	356AZ822	.170″	3/8″
.01	356AZ103	.170″	3/8″
.012	356AZ123	.170″	7/16″
.015	356AZ153	.170″	7/16″
.018	356AZ183	.170″	1/2″
.022	356AZ223	.170″	1/2″
.027	356AZ273	.204″	7/16″
.033	356AZ333	.204″	7/16″
.039	356AZ393	.204″	9/16″
.047	356AZ473	.204″	9/16″
.056	356AZ563	.225″	9/16″
.068	356AZ683	.225″	9/16″
.082	356AZ823	.290″	1/2″
.1	356AZ104	.290″	1/2″
.12	356AZ124	.290″	5/8″
.15	356AZ154	.290″	5/8″
.18	356AZ184	.318″	5/8″
.22	356AZ224	.318″	5/8″
.27	356AZ274	.318″	7/8″
.33	356AZ334	.318″	7/8″
.39	356AZ394	.318″	1 3/16″
.47	356AZ474	.318″	1 3/16″

200 VDC

CAP. IN MFDS.	Part No.	Dia.	L.
.001	356C102	.138″	5/16″
.0015	356C152	.138″	5/16″
.0022	356C222	.170″	5/16″
.0033	356C332	.170″	5/16″
.0047	356C472	.170″	7/16″
.0068	356C682	.170″	7/16″
.0082	356C822	.170″	1/2″
.01	356C103	.170″	1/2″
.012	356C123	.204″	7/16″
.015	356C153	.204″	7/16″
.018	356C183	.204″	9/16″
.022	356C223	.204″	9/16″
.027	356C273	.225″	9/16″
.033	356C333	.225″	9/16″
.039	356C393	.290″	1/2″
.047	356C473	.290″	1/2″
.056	356C563	.290″	5/8″
.068	356C683	.290″	5/8″
.082	356C823	.318″	5/8″
.1	356C104	.318″	5/8″
.12	356C124	.318″	7/8″
.15	356C154	.318″	7/8″
.18	356C184	.318″	1 3/16″
.22	356C224	.318″	1 3/16″

400 VDC

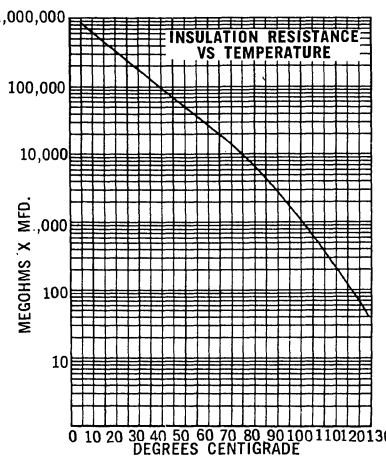
CAP. IN MFDS.	Part No.	Dia.	L.
.001	356E102	.170″	3/8″
.0015	356E152	.170″	3/8″
.0022	356E222	.170″	7/16″
.0033	356E332	.204″	7/16″
.0047	356E472	.204″	7/16″
.0068	356E682	.225″	9/16″
.0082	356E822	.225″	9/16″
.01	356E103	.225″	9/16″
.012	356E123	.290″	1/2″
.015	356E153	.290″	1/2″
.018	356E183	.290″	5/8″
.022	356E223	.290″	5/8″
.027	356E273	.318″	5/8″
.033	356E333	.318″	5/8″
.039	356E393	.318″	7/8″
.047	356E473	.318″	7/8″
.056	356E563	.318″	1 3/16″
.068	356E683	.318″	1 3/16″

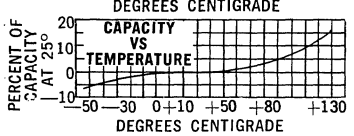
600 VDC

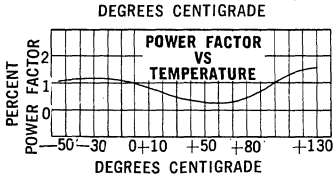
CAP. IN MFDS.	Part No.	Dia.	L.
.001	356F102	.170″	1/2″
.0015	356F152	.204″	7/16″
.0022	356F222	.204″	9/16″
.0033	356F332	.225″	9/16″
.0047	356F472	.290″	5/8″
.0068	356F682	.290″	5/8″
.0082	356F822	.318″	5/8″
.01	356F103	.318″	5/8″
.012	356F123	.318″	7/8″
.015	356F153	.318″	7/8″
.018	356F183	.318″	7/8″
.022	356F223	.318″	7/8″

add following to part no. for tolerance:
—M = ±20%; —K = ±10%;
—J = ±5%

TYPICAL CURVES







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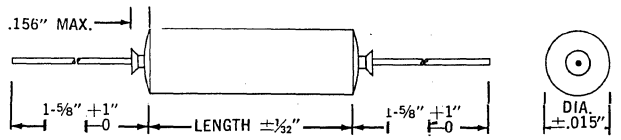
miniature "mylar*"—foil (extended foil) dielectric

series 383

HERMETICALLY SEALED (GLASS-TO-METAL)
TUBULAR METALLIC CASES
—55°C TO +85°C WITHOUT DERATING
30 VDC THRU 600 VDC

outline drawing



Grounded circuits are available in all sizes: for grounded length subtract 1/16 inch from catalog length.

Case Diameter (Inches)	Lead Gauge (AWG)
.175 and .195	24
.235 and .312	22
.400 and up	20

Standard leads consist of solid, bare, tinned wire. Special nickel leads are available for applications requiring a higher degree of weldability.

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at ±25°C are determined by the specified tolerance. Capacitors which have a nominal value of 1 MFD or less are measured or referred to a frequency of 1000 cps. Nominal capacitances above 1 MFD are measured at or referred to a frequency of 60 cps.

DISSIPATION FACTOR
Less than 0.6% at +25°C.

INSULATION RESISTANCE
The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes. Listed below are minimum values:

Temperature	Nominal Capacitance Mfd	R X C Megohms X Mfd	R Megohms
25°C	Greater than .5	50,000	
	Smaller than .5		100,000
85°C	Greater than .1	5,000	
	Smaller than .1		50,000
125°C	Greater than .02	100	
	Smaller than .02		5,000
150°C	Greater than .01	10	
	Smaller than .01		1,000

TEST VOLTAGE
Designed to withstand a test potential equal to 200% of the rated voltage for two minutes at 25°C.
The test voltage must be applied and discharged through a current limiting resistance of approximately 1000 ohms.

VOLTAGE RATING ABOVE 85°C
Derate above +85°C at a rate of 1.2% of rated voltage per degree C.

ACCELERATED LIFE TEST
Capacitors are designed to withstand a test potential equal to 140% of the rated voltage at the test temperature used for a period of 250 hours. One failure in 25 samples tested is permitted. The life test voltage must be applied and discharged through a current limiting resistance of approximately 1,000 ohms.

TEMPERATURE AND IMMERSION CYCLING
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

MOISTURE RESISTANCE
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

VIBRATION
Designed to withstand the Grade 3 vibration tests of the applicable paragraph of the latest issue of MIL-C-25.

AC VOLTAGE RATING
Designed to operate safely up to the following AV voltages at 85°C.

NOMINAL VOLTAGE VDC	AC — VOLTAGES AT 85°C (rms)	
	Up to 120 cps	Up to 400 cps
100	70	56
200	140	70
400	280	110
600	420	160

For 105°C operation the listed AC voltages should be derated to 60% of the 85°C values.
If both AC and DC voltages are present the sum of the DC voltage and the amplitude of the AC voltage must not exceed the specified DC-rating at a given temperature.

LEAD PULL TEST
Designed to withstand a steady pull force of 5 lbs. applied axially to a capacitor lead for one minute.

LEAD BENDING TEST
The leads withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

30 VOLTS

Part No.	Cap MFD	Dia. In.	Length In.
F383Z155	1.5	.562	1 5/8
F383Z225	2.2	.670	1 7/8
F383Z335	3.3	.750	1 7/8
F383Z475	4.7	.750	2 5/8

50 VOLTS

Part No.	Cap MFD	Dia. In.	Length In.
F383A562	.0056	.175	3/4
F383A682	.0068	.175	3/4
F383A822	.0082	.175	3/4
F383A103	.01	.175	3/4
F383A123	.012	.175	3/4
F383A153	.015	.175	3/4
F383A183	.018	.195	3/4
F383A223	.022	.195	3/4
F383A273	.027	.195	3/4
F383A333	.033	.195	3/4
F383A393	.039	.235	3/4
F383A473	.047	.235	3/4
F383A563	.056	.312	7/8
F383A683	.068	.312	7/8
F383A823	.082	.312	7/8
F383A104	.1	.312	7/8
F383A124	.12	.312	7/8
F383A154	.15	.312	7/8
F383A184	.18	.400	7/8
F383A224	.22	.400	7/8
F383A274	.27	.400	7/8
F383A334	.33	.400	7/8
F383A394	.39	.400	1 1/8
F383A474	.47	.400	1 1/8
F383A564	.56	.400	1 3/8
F383A684	.68	.400	1 3/8
F383A824	.82	.562	1 1/8
F383A105	1.0	.562	1 1/8

100 VOLTS

Part No.	Cap MFD	Dia. In.	Length In.
F383B102	.001	.175	3/4
F383B122	.0012	.175	3/4
F383B152	.0015	.175	3/4
F383B182	.0018	.175	3/4
F383B222	.0022	.175	3/4
F383B272	.0027	.175	3/4
F383B332	.0033	.175	3/4
F383B392	.0039	.175	3/4
F383B472	.0047	.175	3/4
F383B562	.0056	.195	3/4
F383B682	.0068	.195	3/4
F383B822	.0082	.235	3/4
F383B103	.01	.235	3/4
F383B123	.012	.235	3/4
F383B153	.015	.235	3/4
F383B183	.018	.235	3/4
F383B223	.022	.235	3/4
F383B273	.027	.312	7/8
F383B333	.033	.312	7/8
F383B393	.039	.312	7/8
F383B473	.047	.312	7/8
F383B563	.056	.312	7/8
F383B683	.068	.312	7/8
F383B823	.082	.400	7/8
F383B104	.1	.400	7/8
F383B124	.12	.400	7/8
F383B154	.15	.400	7/8
F383B184	.18	.400	1 1/8
F383B224	.22	.400	1 1/8
F383B274	.27	.400	1 3/8
F383B334	.33	.400	1 3/8
F383B394	.39	.562	1 1/8
F383B474	.47	.562	1 1/8
F383B564	.56	.562	1 3/8
F383B684	.68	.562	1 3/8
F383B824	.82	.562	1 7/8
F383B105	1.0	.562	1 7/8
F383B155	1.5	.670	1 7/8
F383B205	2.0	.750	1 7/8

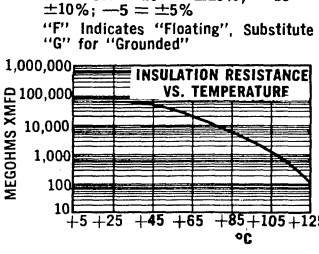
200 VOLTS

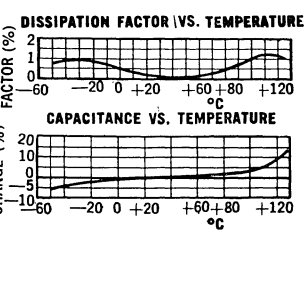
Part No.	Cap MFD	Dia. In.	Length In.
F383C562	.0056	.235	3/4
F383C682	.0068	.235	3/4
F383C822	.0082	.235	3/4
F383C103	.01	.235	3/4
F383C123	.012	.235	3/4
F383C153	.015	.235	3/4
F383C183	.018	.235	3/4
F383C223	.022	.235	3/4
F383C273	.027	.312	7/8
F383C333	.033	.312	7/8
F383C393	.039	.312	7/8
F383C473	.047	.312	7/8
F383C563	.056	.312	7/8
F383C683	.068	.312	7/8
F383C823	.082	.400	7/8
F383C104	.1	.400	7/8
F383C124	.12	.400	7/8
F383C154	.15	.400	7/8
F383C184	.18	.400	1 1/8
F383C224	.22	.400	1 1/8
F383C274	.27	.400	1 3/8
F383C334	.33	.400	1 3/8
F383C394	.39	.562	1 1/8
F383C474	.47	.562	1 1/8
F383C564	.56	.562	1 3/8
F383C684	.68	.562	1 3/8
F383C824	.82	.562	1 7/8
F383C105	1.0	.562	1 7/8

400 VOLTS

Part No.	Cap MFD	Dia. In.	Length In.
F388E272	.0027	.235	3/4
F383E332	.0033	.235	3/4
F383E392	.0039	.235	3/4
F383E472	.0047	.235	3/4
F383E822	.0082	.312	7/8
F383E103	.01	.312	7/8
F383E123	.012	.312	7/8
F383E153	.015	.312	7/8
F383E183	.018	.312	1
F383E223	.022	.312	1
F383E273	.027	.400	7/8
F383E333	.033	.400	7/8
F383E393	.039	.400	1
F383E473	.047	.400	1
F383E563	.056	.400	1 1/4
F383E683	.068	.400	1 1/4
F383E823	.082	.400	1 1/2
F383E104	.1	.400	1 1/2
F383E124	.12	.562	1 1/8
F383E154	.15	.562	1 1/8
F383E184	.18	.562	1 1/2
F383E224	.22	.562	1 1/2
F383E274	.27	.562	1 7/8
F383E334	.33	.562	1 7/8
F383E394	.39	.670	1 7/8
E383E474	.47	.670	1 7/8
F383E564	.56	.750	2 1/8
F383E684	.68	.750	2 1/8
F383E824	.82	.750	2 5/8
F383E105	1.0	.750	2 5/8

Add following to part no. to indicate tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%
"F" Indicates "Floating", Substitute "G" for "Grounded"





*DuPont Trademark

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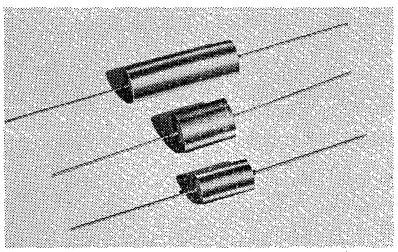
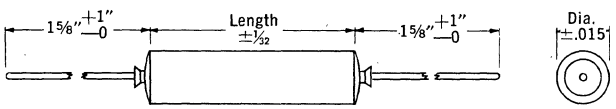
extended foil teflon dielectric

series 371

HERMETICALLY SEALED (GLASS TO METAL)
TUBULAR METAL CASE
—55°C TO +200°C WITHOUT DERATING
200 VDC THRU 600 VDC



outline drawing



LEAD SPECIFICATIONS: Solid tinned leads 1⅝" long +1" —0 tolerance. No. 22 AWG for .235" and .312" Dia. cans. No. 20 AWG for larger case diameters. For Series F371 (Both Terminals Insulated From Case) add 1/16" to above case length for diameters larger than .400". For diameters .400 and smaller add 3/32" to above case length.

specifications

DISSIPATION FACTOR
Maximum dissipation factor shall be 0.1% at +25°C when measured at a frequency of 1000 CPS. Maximum dissipation factor shall be 0.2% at +200°C.

INSULATION RESISTANCE
The minimum insulation resistance when measured with an applied potential of between 200 and 500 volts and an electrification time of 2 minutes, but never greater than rated voltage shall be as follows:

At + 25°C 125,000 megohm-mfds capacitance values .5 MFD and greater.
250,000 megohms for cap. values below .5 MFDS.
+ 85°C 40,000 meg-mfds for cap. values 1. MFD and greater.
40,000 megohms for cap. values below 1. MFD.
+ 125°C 5,000 meg x mfds for cap. values .25 MFD and greater.

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for 2 minutes. Test voltage will be applied and discharged through a current limiting resistor of one Ohm per volt.

LIFE TEST VOLTAGE
Shall withstand an accelerated life test of 250 hours at +200°C and 140% of rated voltage. One failure in 12 samples permitted.

CAPACITANCE DRIFT
Capacitance will drift less than 2% from its initial value at 25°C after being temperature cycled from —55°C to 200°C.

CAPACITANCE "Q"
The "Q" of Gudeman Series 371 will average 5000 up to +125°C and will exceed 500 at +200°C.

DIELECTRIC ABSORPTION
At +25°C less than .05% of the initial 100 volts charging voltage shall reappear after charging for ½ hour and immediately discharging for 10 seconds through a one ohm resistor. Absorption voltage should be read 5 minutes, but not later than 10 minutes, after removing shorting bar. Percent dielectric absorption = V absorption / V charge x 100.

MOISTURE RESISTANCE AND VIBRATION
Shall meet the requirements for moisture resistance and vibration of Specification MIL-C-25A.

CAPACITANCE CHANGE WITH TEMPERATURE
Capacitance change shall not be greater than —4% at 200°C or +2.5% at —55°C relative to the nominal value at +25°C.

200 VDC

Part No.	Capacity	Dia. ±.015"	Length ±1/32"
G371C152	.0015	.235	23/32"
G371C392	.0039	.312	27/32"
G371C472	.0047	.312	27/32"
G371C822	.0082	.400	27/32"
G371C103	.01	.400	27/32"
G371C123	.012	.400	1 3/32"
G371C153	.015	.400	1 3/32"
G371C183	.018	.400	1 7/32"
G371C223	.022	.400	1 7/32"
G371C273	.027	.562	1 11/16"
G371C333	.033	.562	1 11/16"
G371C393	.039	.562	1 13/16"
G371F473	.047	.562	1 13/16"
G371F563	.056	.562	1 15/16"
G371F683	.068	.562	1 15/16"
G371F823	.082	.562	1 15/16"
G371F104	.1	.562	1 15/16"
G371F124	.12	.562	1 15/16"
G371F154	.15	.562	1 15/16"
G371F184	.18	.750	1 13/16"
G371F224	.22	.750	1 15/16"
G371F274	.27	1.00	1 1/16"
G371F394	.39	1.00	1 13/16"
G371F474	.47	1.00	2 1/16"

400 VDC

Part No.	Capacity	Dia. ±.015"	Length ±1/32"
G371E822	.0082	.400	2 9/32"
G371E103	.01	.400	1 1/32"
G371E153	.015	.400	1 5/32"
G371E183	.018	.562	1 3/16"
G371E223	.022	.562	1 1/16"
G371E273	.027	.562	1 1/16"
G371E333	.033	.562	1 3/16"
G371E393	.039	.562	1 5/16"
G371E473	.047	.562	1 7/16"
G371E563	.056	.562	1 9/16"
G371E683	.068	.562	1 13/16"
G371E823	.082	.670	1 9/16"
G371E104	.1	.670	1 13/16"
G471E124	.12	.750	2 1/16"
G371E154	.15	.750	2 1/16"
G371E184	.18	1.000	1 13/16"
G371E224	.22	1.000	1 13/16"
G371E274	.27	1.000	2 5/16"
G371E334	.33	1.000	2 5/16"

600 VDC

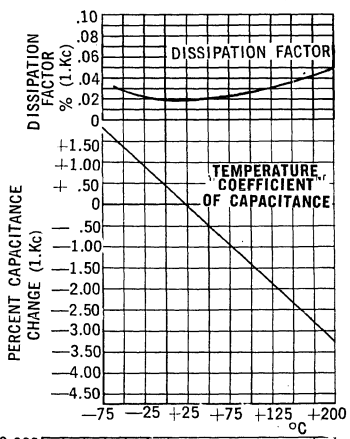
Part No.	Capacity	Dia. ±.015"	Length ±1/32"
G371F102	.001	.235	23/32"
G371F122	.0012	.312	27/32"
G371F152	.0015	.312	27/32"
G371F182	.0018	.312	27/32"
G371F222	.0022	.312	27/32"
G371F272	.0027	.312	27/32"
G371F332	.0033	.312	27/32"
G371F392	.0039	.400	27/32"
G371F472	.0047	.400	27/32"
G371F562	.0056	.400	27/32"
G371F682	.0068	.400	27/32"

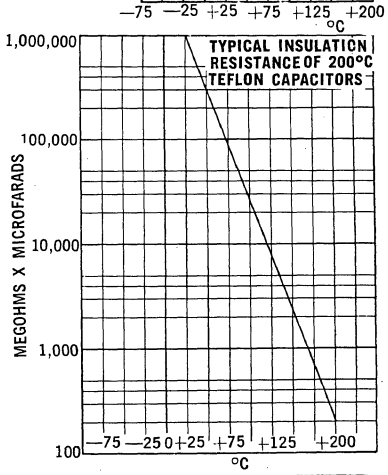
600 VDC continued

Part No.	Capacity	Dia. ±.015"	Length ±1/32"
G371F822	.0082	.400	1 3/32"
G371F103	.01	.400	1 3/32"
G371F123	.012	.400	1 3/32"
G371F153	.015	.400	1 3/32"
G371F183	.018	.562	1 1/16"
G371F223	.022	.562	1 1/16"
G371F273	.027	.562	1 3/16"
G371F333	.033	.562	1 3/16"
G371F393	.039	.562	1 3/16"
G371F473	.047	.562	1 1/16"
G371F563	.056	.562	1 13/16"
G371F683	.068	.562	1 13/16"
G371F823	.082	1.000	1 13/16"
G371F104	.1	1.000	1 13/16"
G371F124	.12	1.000	2 5/16"
G371F154	.15	1.000	2 5/16"

"G" indicates "Grounded". Substitute "F" for "Floating"
Add following to part no. for tolerance: —20 = ±20%; —10= ±10%; —5 = ±5%; —2 = ±2%; —1 = ±1%

TYPICAL CURVES





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metallized polycarbonate dielectric series 409 & 410

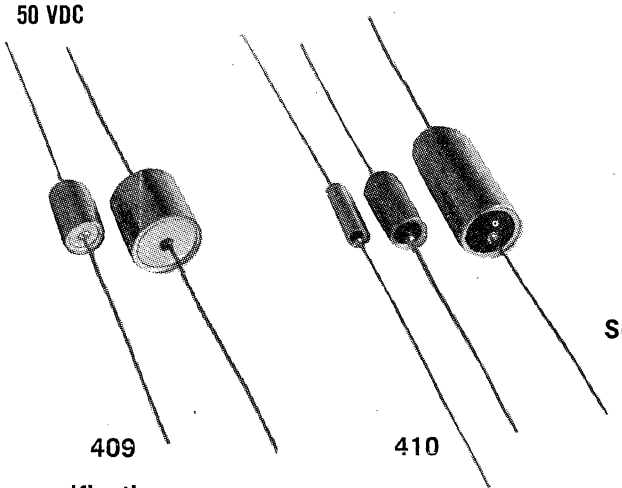
409 SERIES — HERMETICALLY SEALED (Ceramic End Seals)

410 SERIES — MINIATURE TUBULAR TYPES (Metal Case — Glass to Metal Seals)

.00008" THICK FILM

—55°C TO +125°C WITHOUT DERATING

50 VDC



409 410

specifications

CAPACITANCE AND TOLERANCE

The capacitance limits at +25°C are determined by the specified tolerance.

Capacitance is measured at or referred to a frequency of 1000 Hz.

DISSIPATION FACTOR

The dissipation factor at +25°C is less than 0.3% at 1000 Hz.

INSULATION RESISTANCE

The charging potential is equal to the specified operating voltage for a given temperature. The electrification time is two minutes. Listed below are minimum values:

TEMPERATURE	CAPACITANCE (mfd.)	RXC (megohms x mfd.)	R (megohms)
25°C	>.5	100,000	
	<.5		200,000
125°C	>.5	1000	
	<.5		2000

ACCELERATED LIFE TEST

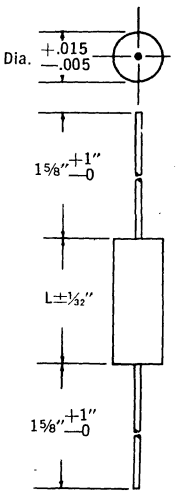
Capacitors shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 18 capacitors tested shall be allowed. A failure is defined as the following:

A) If the capacitor has "opened."

B) If the capacitance has changed more than 5% from its original value.

C) If the insulation resistance is less than 50% of its original value.

Series 409



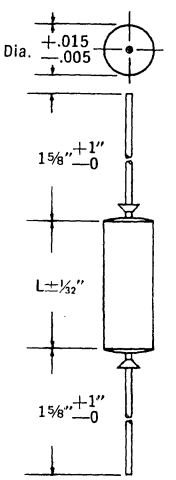
Dim. Include Solder Eyelet

LEADS: 24 gauge: .175 and .195 Dia.; 22 gauge: .235 and .312 Dia.; 20 gauge: .400 Dia. and larger case sizes.

Part No.	Cap in MFDS.	Dia.	L
F409A103	.01	.175	15/32
F409A123	.012	.175	15/32
F409A153	.015	.175	15/32
F409A183	.018	.175	15/32
F409A223	.022	.175	15/32
F409A273	.027	.175	15/32
F409A333	.033	.175	15/32
F409A473	.047	.175	15/32
F409A563	.056	.175	15/32
F409A683	.068	.195	15/32
F409A823	.082	.195	15/32
F409A104	.1	.195	15/32
F409A124	.12	.235	15/32
F409A154	.15	.235	15/32
F409A184	.18	.312	15/32
F409A224	.22	.312	15/32
F409A274	.27	.312	15/32
F409A334	.33	.312	15/32
F409A474	.47	.400	15/32
*F409-001	.56	.400	15/32
F409A564	.56	.312	19/32
*F409-002	.68	.500	15/32
F409A684	.68	.400	19/32
*F409-003	.82	.500	15/32
F409A824	.82	.400	19/32
*F409-004	1.0	.562	15/32
F409A105	1.0	.400	19/32
*F409-005	1.2	.562	15/32
F409A125	1.2	.500	19/32
F409A155	1.5	.500	19/32
F409A205	2.0	.562	19/32
F409A305	3.0	.670	19/32

*Special No. assigned to alternate sizes for same cap. valves.

Series 410



LEADS: 24 gauge: .175 and .195 Dia.; 22 gauge: .235 and .312 Dia.; 20 gauge: .400 Dia. and larger case sizes.

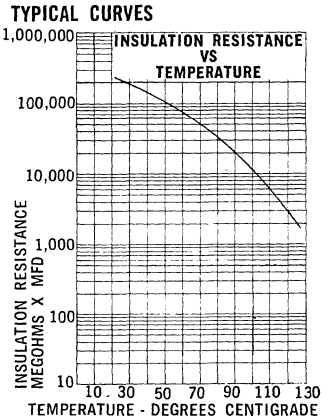
For Sleeving Add .020 max to Dia. and 1/32 ± 1/32 to length

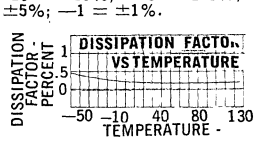
Part No.	Cap in MFDS.	Dia.	L
F410A103	.01	.175	17/32
F410A123	.012	.175	17/32
F410A153	.015	.175	17/32
F410A183	.018	.175	17/32
F410A223	.022	.175	17/32
F410A273	.027	.175	17/32
F410A333	.033	.175	17/32
F410A473	.047	.175	17/32
F410A563	.056	.175	17/32
F410A683	.068	.175	5/8
F410A823	.082	.175	5/8
F410A104	.1	.175	5/8
F410A124	.12	.175	5/8
F410A154	.15	.195	5/8
F410A184	.18	.195	5/8
F410A224	.22	.235	5/8
F410A274	.27	.235	5/8
F410A334	.33	.312	5/8
F410A474	.47	.312	5/8
F410A564	.56	.312	5/8
F410A684	.68	.312	27/32
F410A824	.82	.312	27/32
F410A105	1.0	.312	27/32
F410A125	1.2	.400	27/32
F410A155	1.5	.400	27/32
F410A185	1.8	.400	27/32
F410A205	2.0	.400	27/32
F410A225	2.2	.400	1 1/8
F410A275	2.7	.400	1 1/8
F410A305	3.0	.400	1 1/8
F410A335	3.3	.400	1 1/8
F410A395	3.9	.500	1 1/8
F410A475	4.7	.500	1 1/8
F410A505	5.0	.500	1 1/8
F410A565	5.6	.500	1 1/8
F410A685	6.8	.562	1 5/16
F410A825	8.2	.562	1 5/16
F410A106	10.0	.670	1 5/16
F410A156	15.0	.750	1 3/8

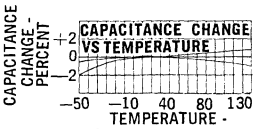
"F" indicates "Floating". Substitute "G" for "Grounded"

Add following to part no. for tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%; —1 = ±1%.

TYPICAL CURVES







GUDEMAN a division of **Gulton Industries, Inc.**

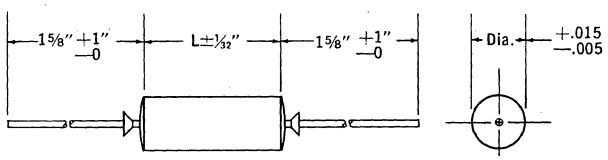
340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

miniature metallized polycarbonate dielectric

series 410

HERMETICALLY SEALED (GLASS-TO-METAL) TUBULAR METALLIC CASES
—55°C TO +125°C WITHOUT DERATING
100 TO 400 VDC

outline drawing



Standard leads consist of solid, bare, tinned wire. Special nickel leads are available for applications requiring a higher degree of weldability.

LEADS: 24 gauge: .175 and .195 Dia.; 22 gauge: .235 and .312 Dia.; 20 gauge: .400 Dia. and larger case sizes.

For sleeving add .020 max. to Dia. and .032 +.032 −.015 extension to each end of capacitor.

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at +25°C are determined by the specified tolerance. Capacitors are measured or referred to a frequency of 1000 cps.

DISSIPATION FACTOR
The dissipation factor at +25°C is less than 0.3% at 1000 cps.

INSULATION RESISTANCE
The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes. Listed below are minimum values:

Temperature	Nominal Capacitance Mfd	R X C Megohms X mfd	R Megohms
25°C	Greater than .5	100,000	
	Smaller than .5		200,000
125°C	Greater than .5	1,000	
	Smaller than .5		2,000

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C, ±5°C. Test will be applied through resistor of 1 ohm per volt.

TEMPERATURE AND IMMERSION CYCLING
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-18312.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 18 capacitors tested shall be allowed. A failure is defined as the following.
A) If the capacitor has "opened."
B) If the capacitance has changed more than 5% from its original value.
C) If the insulation resistance is less than 50% of its original value.
(D) If the DF is greater than 1%.

MOISTURE RESISTANCE
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-18312.

VIBRATION
Designed to withstand the Grade 3 vibration tests of the applicable paragraph of the latest issue of MIL-C-18312.

A-C VOLTAGE RATING:
(—55C to +85C Ambient)

D-C Voltage Rating	400 cps
100	65
200	120
300	200
400	240

LEAD PULL TEST
Designed to withstand a steady pull force of 5 lbs. applied axially to a capacitor lead for one minute.

LEAD BENDING TEST
The leads shall withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE
The change of capacitance with reference to the actual value at +25°C does not exceed the following limits:

TEMPERATURE	CHANGE OF CAPACITANCE
—55°C	2%
+125°C	1%

100 VDC

Cap In MFDS.	Part No.	Dia.*	L.*
.01	F410B103	.175	9/16"
.012	F410B123	.175	9/16"
.015	F410B153	.175	9/16"
.018	F410B183	.195	9/16"
.022	F410B223	.195	9/16"
.027	F410B273	.195	9/16"
.033	F410B333	.195	9/16"
.039	F410B393	.195	9/16"
.047	F410B473	.195	5/8"
.056	F410B563	.195	5/8"
.068	F410B683	.235	5/8"
.082	F410B823	.235	5/8"
.1	F410B104	.235	11/16"
.12	F410B124	.235	11/16"
.15	F410B154	.312	5/8"
.18	F410B184	.312	5/8"
.22	F410B224	.312	11/16"
.27	F410B274	.312	11/16"
.33	F410B334	.312	13/16"
.39	F410B394	.312	13/16"
.47	F410B474	.400	11/16"
.56	F410B564	.400	13/16"
.68	F410B684	.400	13/16"
.82	F410B824	.400	13/16"
1.0	F410B105	.400	1"
1.5	F410B155	.500	1 1/8"
2.0	F410B205	.500	1 5/16"
3.0	F410B305	.562	1 5/16"
4.0	F410B405	.670	1 5/16"
5.0	F410B505	.670	1 5/16"
7.0	F410B705	.750	1 7/8"
8.0	F410B805	.750	2 1/8"
10.0	F410B106	1.00	2 1/8"

200 VDC

Cap In MFDS.	Part No.	Dia.*	L.*
.01	F410C103	.175	11/16"
.012	F410C123	.195	11/16"
.015	F410C153	.195	11/16"
.018	F410C183	.235	11/16"
.022	F410C223	.235	13/16"
.027	F410C273	.235	11/16"
.033	F410C333	.235	13/16"
.039	F410C393	.235	13/16"
.047	F410C473	.235	13/16"
.056	F410C563	.235	13/16"
.068	F410C683	.312	13/16"
.082	F410C823	.312	13/16"
.1	F410C104	.312	13/16"
.12	F410C124	.312	15/16"
.15	F410C154	.312	13/16"
.18	F410C184	.400	13/16"
.22	F410C224	.400	13/16"
.27	F410C274	.400	1 1/16"
.33	F410C334	.400	1 1/16"
.39	F410C394	.400	1 5/16"
.47	F410C474	.400	1 5/16"
.56	F410C564	.562	1 1/16"
.68	F410C684	.562	1 1/16"
.82	F410C824	.562	1 5/16"
1.0	F410C105	.562	1 5/16"
1.5	F410C155	.670	1 5/16"
2.0	F410C205	.670	1 5/16"
3.0	F410C305	.750	1 7/8"
4.0	F410C405	.750	2 1/8"
5.0	F410C505	.750	2 3/8"
7.0	F410C705	1.00	1 7/8"
8.0	F410C805	1.00	2 1/8"
10.0	F410C106	1.00	2 5/8"

300 VDC

Cap In MFDS.	Part No.	Dia.*	L.*
.01	F410D103	.235	11/16"
.012	F410D123	.312	13/16"
.015	F410D153	.312	13/16"
.018	F410D183	.312	13/16"
.022	F410D223	.312	13/16"
.027	F410D273	.312	13/16"
.033	F410D333	.312	13/16"
.039	F410D393	.312	13/16"
.047	F410D473	.312	13/16"
.056	F410D563	.312	1 1/16"
.068	F410D683	.312	1 1/16"
.082	F410D823	.400	1 1/16"
.1	F410D104	.400	1 1/16"
.12	F410D124	.400	1 5/16"
.15	F410D154	.400	1 5/16"
.18	F410D184	.500	1 1/16"
.22	F410D224	.500	1 1/16"
.27	F410D274	.562	1 1/16"
.33	F410D334	.562	1 1/16"
.39	F410D394	.562	1 5/16"
.47	F410D474	.562	1 5/16"
.56	F410D564	.562	1 13/16"
.68	F410D684	.562	1 13/16"
.82	F410D824	.670	1 13/16"
1.0	F410D105	.670	1 13/16"
1.5	F410D155	.750	2 1/8"
2.0	F410D205	.750	2 3/8"
3.0	F410D305	1.00	1 7/8"
4.0	F410D405	1.00	2 3/8"

400 VDC

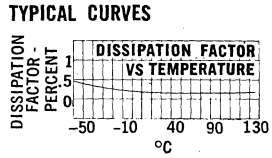
Cap In MFDS.	Part No.	Dia.*	L.*
.01	F410E103	.312	13/16"
.012	F410E123	.312	13/16"
.015	F410E153	.312	13/16"
.018	F410E183	.312	13/16"
.022	F410E223	.312	13/16"
.027	F410E273	.312	1 1/16"
.033	F410E333	.312	1 1/16"
.039	F410E393	.312	1 1/16"
.047	F410E473	.312	1 1/16"
.056	F410E563	.400	1 1/16"
.068	F410E683	.400	1 1/16"
.082	F410E823	.400	1 5/16"
.1	F410E104	.400	1 5/16"
.12	F410E124	.500	1 1/16"
.15	F410E154	.500	1 1/16"
.18	F410E184	.562	1 5/16"
.22	F410E224	.562	1 5/16"
.27	F410E274	.562	1 5/16"
.33	F410E334	.562	1 5/16"
.39	F410E394	.670	1 5/16"
.47	F410E474	.670	1 5/16"
.56	F410E564	.670	1 13/16"
.68	F410E684	.670	1 13/16"
.82	F410E824	.750	2 1/8"
1.0	F410E105	.750	2 1/8"
1.5	F410E155	1.00	2 1/8"
2.0	F410E205	1.00	2 1/8"

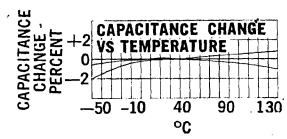
*Sizes shown are for floating circuit. Subtract 1/16" from length for grounded circuit.

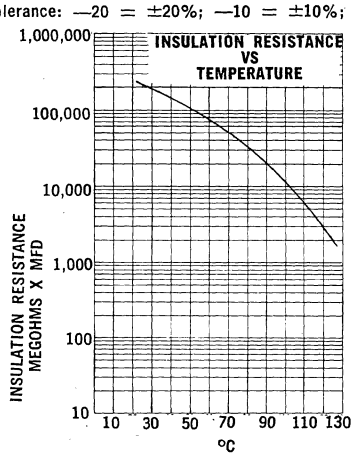
"F" indicates "Floating". Substitute "G" for Grounded.

Add following to part no. for tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%; —1 = ±1%.

TYPICAL CURVES







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"thinfilm" metallized polycarbonate dielectric

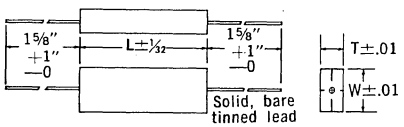
series 317 & 318

ULTRAMINIATURE
SEALED IN RECTANGULAR EPOXY CASES
—55°C TO +125°C WITHOUT DERATING
SERIES 317 AXIAL LEADS
SERIES 318 RADIAL LEADS

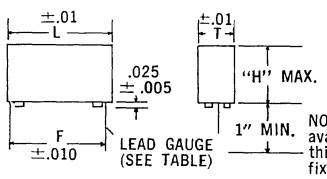
outline drawings

Series 317

See Part No. Table for Lead Gauge.
Dimensions noted in inches.



Series 318



NOTE: .42x.31x18 cases have one round standoff between leads.
.55 x .31 x 18 has two standoffs between leads.

NOTE: Nickel "A" weldable leads are available with capacitors specified in this bulletin, add letter "W" as a suffix on the part number.

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at +25°C are determined by the specified tolerance. Capacitance is measured at or referred to a frequency of 1000 cps.

DISSIPATION FACTOR
The dissipation factor at +25°C is less than 0.5% at 1000 cps.

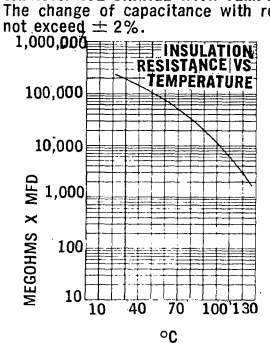
INSULATION RESISTANCE
The minimum insulation resistance when measured at rated voltage but not to exceed 500 VDC shall be as follows:
At + 25°C 100,000 megohm-mfds minimum but need not exceed 200,000 megohms.
At +125°C 100 megohm-mfds minimum but need not exceed 2000 megohms.

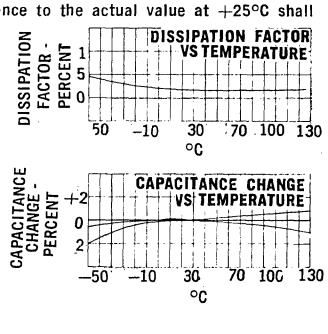
TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C, ± 5°C. Test will be applied through resistor of 1 ohm per volt.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 12 capacitors tested shall be allowed. A failure is defined as the following:
A) If the capacitor has "opened".
B) If the capacitance has changed more than 5% from its original value.
C) If the insulation resistance is less than 30% of its original specified value.
D) If the dissipation factor is greater than 1%.

HUMIDITY TEST
Capacitors shall withstand 250 hours of 95% relative humidity at 40°C. Voltage will not be applied. Upon completion of test, units will be dried for four hours.
Minimum product of insulation resistance @ 25°C shall be 33% of the original specified value.
The capacitance is not to change more than 5% of its original value.
The dissipation factor shall not exceed 1.5%.

CAPACITANCE CHANGE WITH TEMPERATURE
The change of capacitance with reference to the actual value at +25°C shall not exceed ± 2%.





317 SERIES

100 VDC

Part No.	Cap.	L	W	T	Lead Gauge
317B102	.001	.42	.29	.17	24
317B122	.0012	.42	.29	.17	24
317B152	.0015	.42	.28	.17	24
317B182	.0018	.42	.29	.17	24
317B222	.0022	.42	.29	.17	24
317B272	.0027	.42	.29	.17	24
317B332	.0033	.42	.29	.17	24
317B392	.0039	.42	.29	.17	24
317B472	.0047	.42	.29	.17	24
317B562	.0056	.42	.29	.17	24
317B682	.0068	.42	.29	.17	24
317B822	.0082	.42	.29	.17	24
317B103	.01	.42	.29	.17	24
317B123	.012	.42	.29	.17	24
317B153	.015	.42	.29	.17	24
317B183	.018	.42	.29	.17	24
317B223	.022	.42	.29	.17	24
317G273	.027	.42	.29	.17	24
317B333	.033	.42	.29	.17	24
317B393	.039	.42	.29	.17	24
317B473	.047	.57	.29	.17	24
317B563	.056	.57	.29	.17	24
317B683	.068	.57	.29	.17	24
317B823	.082	.55	.36	.23	24
317B104	.10	.55	.36	.23	24
317B124	.12	.55	.36	.23	24
317B154	.15	.55	.36	.23	24
317B184	.18	.57	.42	.29	24
317B224	.22	.57	.42	.29	24
317B254	.25	.67	.42	.29	24
317B274	.27	.67	.42	.29	24
317B334	.33	.67	.42	.29	24
317B394	.39	.67	.42	.29	24
317B474	.47	.82	.42	.29	22
317B504	.50	.82	.42	.29	22
317B564	.56	.82	.54	.39	22
317B684	.68	.82	.54	.39	22
317B754	.75	.82	.54	.39	22
317B824	.82	.82	.54	.39	22
317B105	1.0	1.04	.54	.39	22
317B155	1.5	1.19	.54	.39	20
317B205	2.0	1.24	.72	.56	20
317B305	3.0	1.24	.72	.56	20
317B505	5.0	1.75	.72	.56	20

200 VDC

Part No.	Cap.	L	W	T	Lead Gauge
317C102	.001	.42	.29	.17	24
317C122	.0012	.42	.29	.17	24
317C152	.0015	.42	.29	.17	24
317C182	.0018	.42	.29	.17	24
317C222	.0022	.42	.29	.17	24
317C272	.0027	.42	.29	.17	24
317C332	.0033	.42	.29	.17	24
317C392	.0039	.42	.29	.17	24
317C472	.0047	.42	.29	.17	24
317C562	.0056	.42	.29	.17	24
317C682	.0068	.42	.29	.17	24
317C822	.0082	.42	.29	.17	24
317C103	.01	.42	.29	.17	24
317C123	.012	.42	.29	.17	24
317C153	.015	.42	.29	.17	24
317C183	.018	.42	.29	.17	24
317C223	.022	.57	.29	.17	24
317C273	.027	.57	.29	.17	24
317C333	.033	.57	.29	.17	24
317C393	.039	.57	.29	.17	24
317C473	.047	.55	.36	.23	24
317C563	.056	.55	.36	.23	24
317C683	.068	.55	.36	.23	24
317C823	.082	.57	.42	.29	24
317C104	.10	.57	.42	.29	24
317C124	.12	.57	.42	.29	24
317C154	.15	.67	.42	.29	24
317C184	.18	.67	.42	.29	24
317C224	.22	.82	.42	.29	22
317C254	.25	.82	.42	.29	22
317C274	.27	.82	.42	.29	22
317C334	.33	.82	.54	.39	22
317C394	.39	.82	.54	.39	22
317C474	.47	.82	.54	.39	22
317C504	.50	.82	.54	.39	22
317C564	.56	1.04	.54	.39	22
317C684	.68	1.04	.54	.39	20
317C754	.75	1.19	.54	.39	20
317C824	.82	1.19	.54	.39	20
317C105	1.0	1.24	.72	.56	20
317C155	1.5	1.24	.72	.56	20
317C205	2.0	1.75	.72	.56	20
317C305	3.0	1.75	.72	.56	20

318 SERIES

100 VDC

Part No.	Cap.	L	H	T	F	Lead Ga.
318B102	.001	.42	.31	.18	.300	20
318B122	.0012	.42	.31	.18	.300	22
318B152	.0015	.42	.31	.18	.300	22
318B182	.0018	.42	.31	.18	.300	22
318B222	.0022	.42	.31	.18	.300	22
318B272	.0027	.42	.31	.18	.300	22
318B332	.0033	.42	.31	.18	.300	22
318B392	.0039	.42	.31	.18	.300	22
318B472	.0047	.42	.31	.18	.300	22
318B562	.0056	.42	.31	.18	.300	22
318B822	.0082	.42	.31	.18	.300	22
318B103	.01	.42	.31	.18	.300	22
318B123	.012	.42	.31	.18	.300	22
318B153	.015	.42	.31	.18	.300	22
318B183	.018	.42	.31	.18	.300	22
318B223	.022	.42	.31	.18	.300	22
318B273	.027	.42	.31	.18	.300	22
318B333	.033	.42	.31	.18	.300	22
318B393	.039	.42	.31	.18	.300	22
318B473	.047	.55	.31	.18	.400	22
318B563	.056	.55	.31	.18	.400	22
318B683	.068	.55	.31	.18	.400	22
318B823	.082	.55	.38	.24	.400	22
318B104	.10	.55	.38	.24	.400	22
318B124	.12	.55	.38	.24	.400	22
318B154	.15	.55	.38	.24	.400	22
318B184	.18	.55	.38	.24	.400	22
318B224	.22	.55	.44	.30	.400	22
318B274	.27	.67	.44	.30	.500	22
318B334	.33	.67	.44	.30	.500	22
318B394	.39	.67	.44	.30	.500	22
318B474	.47	.82	.44	.30	.600	22
318B564	.56	.82	.56	.40	.600	22
318B684	.68	.82	.56	.40	.600	22
318B824	.82	.82	.56	.40	.600	22
318B105	1.0	1.04	.56	.40	.800	22
318B125	1.2	1.24	.56	.40	1.100	20
318B155	1.5	1.24	.56	.40	1.100	22
318B185	1.8	1.24	.74	.57	1.100	20
318B205	2.0	1.24	.74	.57	1.100	20
318B225	2.2	1.24	.74	.57	1.100	20
318B275	2.7	1.24	.74	.57	1.100	20
318B305	3.0	1.24	.74	.57	1.100	20
318B335	3.3	1.75	.74	.57	1.600	20
318B395	3.9	1.75	.74	.57	1.600	20
318B475	4.7	1.75	.74	.57	1.600	20
318B505	5.0	1.75	.74	.57	1.600	20
318B565	5.6	1.75	.74	.57	1.600	20

200 VDC

Part No.	Cap.	L	H	T	F	Lead Ga.
318C102	.001	.42	.31	.18	.300	22
318C122	.0012	.42	.31	.18	.300	22
318C152	.0015	.42	.31	.18	.300	22
318C182	.0018	.42	.31	.18	.300	22
318C222	.0022	.42	.31	.18	.300	22
318C272	.0027	.42	.31	.18	.300	22
318C332	.0033	.42	.31	.18	.300	22
318C392	.0039	.42	.31	.18	.300	22
318C472	.0047	.42	.31	.18	.300	22
318C562	.0056	.42	.31	.18	.300	22
318C822	.0082	.42	.31	.18	.300	22
318C103	.01	.42	.31	.18	.300	22
318C123	.012	.42	.31	.18	.300	22
318C153	.015	.42	.31	.18	.300	22
318C183	.018	.42	.31	.18	.300	22
318C223	.022	.55	.31	.18	.400	22
318C273	.027	.55	.31	.18	.400	22
318C333	.033	.55	.31	.18	.400	22
318C393	.039	.55	.31	.18	.400	22
318C473	.047	.55	.38	.24	.400	22
318C563	.056	.55	.38	.24	.400	22
318C683	.068	.55	.38	.24	.400	22
318C823	.082	.55	.44	.30	.400	22
318C104	.10	.55	.44	.30	.400	22
318C124	.12	.55	.44	.30	.400	22
318C154	.15	.67	.44	.30	.500	22
318C184	.18	.67	.44	.30	.500	22
318C224	.22	.82	.44	.30	.600	22
318C274	.27	.82	.44	.30	.600	22
318C334	.33	.82	.56	.40	.600	22
318C394	.39	.82	.56	.40	.600	22
318C474	.47	.82	.56	.40	.600	22
318C564	.56	1.04	.56	.40	.800	22
318C684	.68	1.04	.56	.40	.800	22
318C824	.82	1.24	.56	.40	1.100	20
318C105	1.0	1.24	.74	.57	1.100	20
318C125	1.2	1.24	.74	.57	1.100	20
318C155	1.5	1.24	.74	.57	1.100	20
318C185	1.8	1.75	.74	.57	1.600	20
318C205	2.0	1.75	.74	.57	1.600	20
318C225	2.2	1.75	.74	.57	1.600	20
318C275	2.7	1.75	.74	.57	1.600	20
318C305	3.0	1.75	.74	.57	1.600	20

Add following to Part No. for tolerance: —M = ±20%; —K = ±10%; —J = ±5%; —B = ±2%.

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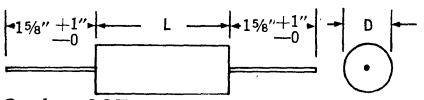
"thinfilm" metallized polycarbonate dielectric

series 396 & 397

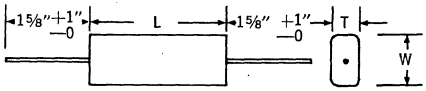
ULTRAMINIATURE TUBULAR (Series 396) AND FLAT CAPACITORS (Series 397)
SEALED IN NON-METALLIC CASES
WITH PLASTIC RESIN END SEALS
—55°C TO +125°C WITHOUT DERATING
100 VDC TO 200 VDC

outline drawings

Series 396



Series 397



Solid, Bare Tinned Lead
See Part No. Table for Lead Gauge
NOTE: Nickel "A" weldable leads are available!
Add suffix "W" to Part No. for nickel lead.

SERIES 396

50 VOLTS

Cap. In Mfds.	Part No.	Dia. Max.	L ±1/16	Ld. Ga.
.01	396A103	.171	½"	24
.012	396A123	.171	½"	24
.015	396A153	.171	½"	24
.018	396A183	.171	½"	24
.022	396A223	.171	½"	24
.027	396A273	.171	½"	24
.033	396A333	.171	½"	24
.047	396A473	.171	½"	24
.056	396A563	.171	½"	24
.068	396A683	.171	5/8"	24
.082	396A823	.171	5/8"	24
.1	396A104	.171	5/8"	24
.12	396A124	.171	5/8"	24
.15	396A154	.187	5/8"	24
.18	396A184	.187	5/8"	24
.22	396A224	.234	5/8"	22
.27	396A274	.234	5/8"	22
.33	396A334	.312	5/8"	22
.47	396A474	.312	5/8"	22
.56	396A564	.312	5/8"	22
.68	396A684	.312	13/16"	22
.82	396A824	.312	13/16"	22
1.0	396A105	.312	13/16"	22
1.2	396A125	.390	13/16"	20
1.5	396A155	.390	13/16"	20
1.8	396A185	.390	13/16"	20
2.0	396A205	.390	13/16"	20
2.2	396A225	.390	1 1/8"	20
2.7	396A275	.390	1 1/8"	20
3.0	396A305	.390	1 1/8"	20
3.3	396A335	.390	1 1/8"	20
3.9	396A395	.500	1 1/8"	20
4.7	396A475	.500	1 1/8"	20
5.0	396A505	.500	1 1/8"	20
5.6	396A565	.500	1 1/8"	20
6.8	396A685	.562	1 5/16"	20
8.2	396A825	.562	1 5/16"	20
10.0	396A106	.671	1 5/16"	20
15.0	396A156	.750	1 3/8"	20

100 VOLTS

Cap. In Mfds.	Part No.	Dia. Max.	L ±1/16	Ld. Ga.
.01	396B103	.203	11/16"	24
.012	396B123	.203	11/16"	24
.015	396B153	.203	11/16"	24
.018	396B183	.218	11/16"	24
.022	396B223	.218	11/16"	24
.027	396B273	.218	11/16"	24
.033	396B333	.218	11/16"	24
.039	396B393	.218	11/16"	24
.047	396B473	.218	5/8"	24
.056	396B563	.218	5/8"	24
.068	396B683	.250	5/8"	22
.075	396B753	.250	5/8"	22
.082	396B823	.250	5/8"	22
.1	396B104	.250	11/16"	22
.12	396B124	.250	11/16"	22
.15	396B154	.343	5/8"	22
.18	396B184	.343	5/8"	22
.22	396B224	.343	11/16"	22
.27	396B274	.343	11/16"	22
.33	396B334	.343	13/16"	22
.39	396B394	.343	13/16"	22
.47	396B474	.421	11/16"	20
.56	396B564	.421	13/16"	20
.68	396B684	.421	13/16"	20
.82	396B824	.421	13/16"	20
1.0	396B105	.421	1"	20
1.5	396B155	.531	1 1/8"	20
2.0	396B205	.531	1 5/16"	20
3.0	396B305	.593	1 5/16"	20
4.0	396B405	.703	1 5/16"	20
5.0	396B505	.703	1 5/16"	20
7.0	396B705	.781	1 7/8"	20
8.0	396B805	.781	1 7/8"	20
10.0	396B106	1.031	2 1/8"	20

200 VOLTS

Cap. In Mfds.	Part No.	Dia. Max.	L ±1/16	Ld. Ga.
.01	396C103	.203	11/16"	24
.012	396C123	.218	11/16"	24
.015	396C153	.218	11/16"	24
.018	396C183	.250	11/16"	22
.022	396C223	.250	11/16"	22
.027	396C273	.250	11/16"	22
.033	396C333	.250	13/16"	22
.039	396C393	.250	13/16"	22
.047	396C473	.250	13/16"	22
.056	396C563	.250	13/16"	22
.068	396C683	.343	13/16"	22
.082	396C823	.343	13/16"	22
.1	396C104	.343	13/16"	22
.12	396C124	.343	15/16"	22
.15	396C154	.343	15/16"	22
.18	396C184	.421	13/16"	20
.22	396C224	.421	13/16"	20
.27	396C274	.421	1 1/16"	20
.33	396C334	.421	1 1/16"	20
.39	396C394	.421	1 5/16"	20
.47	396C474	.421	1 5/16"	20
.56	396C564	.593	1 1/16"	20
.68	396C684	.593	1 1/16"	20
.82	396C824	.593	1 5/16"	20
1.0	396C105	.593	1 5/16"	20
1.5	396C155	.703	1 5/16"	20
2.0	396C205	.703	1 5/16"	20
3.0	396C305	.781	1 7/8"	20
4.0	396C405	.781	2 1/8"	20
5.0	396C505	.781	2 3/8"	20
7.0	396C705	1.031	1 7/8"	20
8.0	396C805	1.031	2 1/8"	20
10.0	396C106	1.031	2 5/8"	20

specifications

CAPACITANCE AND TOLERANCE

The capacitance limits at +25°C are determined by the specified tolerance.
Capacitors are measured or referred to a frequency of 1000 cps.

DISSIPATION FACTOR

The dissipation factor at +25°C shall be less than 0.5% at 1000 cps.

INSULATION RESISTANCE

The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes. Listed below are minimum values:

Temperature	Nominal Capacitance Mfd.	R X C Megohms X mfd.	R Megohms
25°C	Greater than .5	50,000	
	Smaller than .5		100,000
125°C	Greater than .5	500	
	Smaller than .5		1,000

TEST VOLTAGE

Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C, ±5°C. Test voltage will be applied through resistor of 1 ohm per volt.

ACCELERATED LIFE TEST

Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 12 capacitors tested shall be allowed. A failure is defined as the following:

A) If the capacitor has "opened."
B) If the capacitance has changed more than 5% from its original value.
C) If the insulation resistance is less than 50% of the original specified value.
D) If the DF is greater than 1%.

HUMIDITY

Not intended to be operated where humidity is a problem. This series is intended for use in circuits which are encapsulated or hermetically sealed.

LEAD PULL TEST

These capacitors shall withstand a five (5) pound pull applied axially for one minute, per MIL-C-25.

LEAD BEND TEST

Leads shall be bent without breakage about the point of egress from the capacitor. First 90 degrees in one direction then back to the original position and then 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMP.

The change of capacitance with reference to the actual value at 25°C will not exceed the following limits:

TEMPERATURE	CHANGE OF CAPACITANCE
— 55°C	—2%
+125°C	±1%

SERIES 397

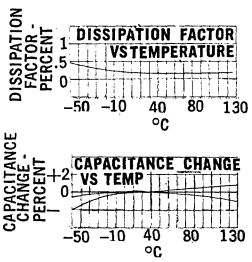
100 VOLTS

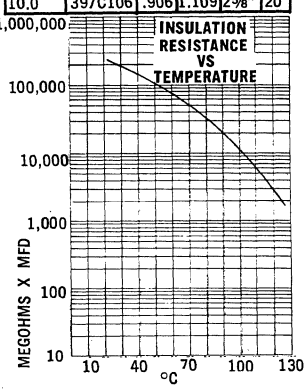
Cap. In Mfds.	Part No.	T Max.	W Max.	L ±1/16	Ld. Ga.
.01	397B103	.156	.250	5/16"	24
.012	397B123	.156	.250	5/16"	24
.015	397B153	.156	.250	5/16"	24
.018	397B183	.156	.250	5/16"	24
.022	397B223	.156	.250	5/16"	24
.027	397B273	.156	.250	5/16"	24
.033	397B333	.156	.250	5/16"	24
.039	397B393	.156	.250	5/16"	24
.047	397B473	.156	.250	5/8"	24
.056	397B563	.156	.250	5/8"	24
.068	397B683	.171	.296	5/8"	22
.075	397B753	.171	.296	5/8"	22
.082	397B823	.171	.296	5/8"	22
.1	397B104	.171	.296	11/16"	22
.12	397B124	.171	.296	11/16"	22
.15	397B154	.265	.390	5/8"	22
.18	397B184	.265	.390	5/8"	22
.22	397B224	.265	.390	11/16"	22
.27	397B274	.265	.390	11/16"	22
.33	397B334	.265	.390	13/16"	22
.39	397B394	.265	.390	13/16"	22
.47	397B474	.343	.453	11/16"	20
.56	397B564	.343	.453	13/16"	20
.68	397B684	.343	.453	13/16"	20
.82	397B824	.343	.453	15/16"	20
1.0	397B105	.343	.453	1"	20
1.5	397B155	.421	.578	1 1/8"	20
2.0	397B205	.421	.578	1 5/16"	20
3.0	397B305	.484	.640	1 3/4"	20
4.0	397B405	.578	.765	1 3/4"	20
5.0	397B505	.578	.765	1 5/16"	20
7.0	397B705	.656	.859	1 7/8"	20
8.0	397B805	.656	.859	1 7/8"	20
10.0	397B106	.906	1.109	2 1/8"	20

200 VOLTS

Cap. In Mfds.	Part No.	T Max.	W Max.	L ±1/16	Ld. Ga.
.01	397C103	.156	.250	11/16"	24
.012	397C123	.156	.250	11/16"	24
.015	397C153	.156	.250	11/16"	24
.018	397C183	.171	.211	11/16"	22
.022	397C223	.171	.211	11/16"	22
.027	397C273	.171	.211	11/16"	22
.033	397C333	.171	.211	13/16"	22
.039	397C393	.171	.211	13/16"	22
.047	397C473	.171	.211	13/16"	22
.056	397C563	.171	.211	13/16"	22
.068	397C683	.265	.390	13/16"	22
.082	397C823	.265	.390	13/16"	22
.1	397C104	.265	.390	13/16"	22
.12	397C124	.265	.390	15/16"	22
.15	397C154	.265	.390	15/16"	22
.18	397C184	.343	.453	13/16"	20
.22	397C224	.343	.453	13/16"	20
.27	397C274	.343	.453	1 1/16"	20
.33	397C334	.343	.453	1 1/16"	20
.39	397C394	.343	.453	1 3/16"	20
.47	397C474	.343	.453	1 3/16"	20
.56	397C564	.484	.640	1 1/16"	20
.68	397C684	.484	.640	1 1/16"	20
.82	397C824	.484	.640	1 3/16"	20
1.0	397C105	.484	.640	1 3/16"	20
1.5	397C155	.593	.750	1 3/16"	20
2.0	397C205	.593	.750	1 3/16"	20
3.0	397C305	.656	.859	1 7/8"	20
4.0	397C405	.656	.859	2 1/8"	20
5.0	397C505	.656	.859	2 3/8"	20
7.0	397C705	.906	1.109	1 7/8"	20
8.0	397C805	.906	1.109	2 1/8"	20
10.0	397C106	.906	1.109	2 5/8"	20

TYPICAL CURVES





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"thinfilm" metallized mylar* dielectric

series 322 & 323

ULTRA MINIATURE CAPACITORS
SEALED IN RECTANGULAR EPOXY CASES WITH RESIN END SEAL
100 VDC TO 200 VDC
SERIES 322 — RADIAL LEADS
SERIES 323 — AXIAL LEADS

specifications

DISSIPATION FACTOR
The dissipation factor shall not exceed 1.0% when measured at or referred to a frequency of 1,000 CPS at +25°C. Nominal capacitance values above 1.0 mfd. are measured at or referred to a frequency of 60 cps.

INSULATION RESISTANCE
The minimum insulation resistance when measured with an applied potential of 50 to 200 volts, but not to exceed the rated voltage, shall be as follows:
At +25°C 10,000 megohm-mfds. minimum but need not exceed 30,000 megohms.
At +85°C 500 megohm-mfds. minimum but need not exceed 3000 megohms.
At +125°C 10 megohm-mfds. minimum but need not exceed 150 megohms.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 12 capacitors tested shall be allowed.
A failure is defined as the following:
A) If the capacitor has "opened" or short circuited.
B) If the capacitance has changed more than 10% from its original value.
C) If the insulation resistance is less than 30% of its specified value.

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated voltage for one minute at a temperature of +25°C±5°C.

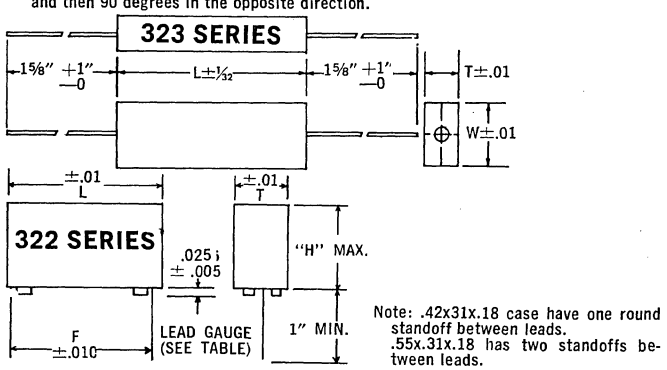
VOLTAGE RATINGS
Designed to operate over the temperature range of —55°C to +85°C at full rated DC voltage and up to +125°C with working voltages as follows:

+85°C	+125°C
200VDC	100VDC
100VDC	50VDC

HUMIDITY TEST
Capacitors shall withstand 250 hours of 95% relative humidity at 40°C. Voltage will not be applied. Upon completion of test, units will be dried for four hours. Minimum product of insulation resistance shall be 5000 megohm-mfd but need not exceed 15,000 megohms.
The capacitance will change not more than 10% of its original value. The dissipation factor shall not increase over 1.5%.

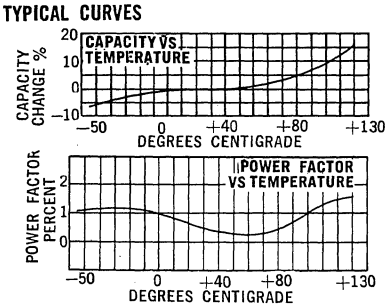
LEAD PULL TEST
Shall withstand a five (5) pound pull applied axially for one minute.

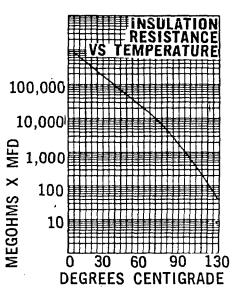
LEAD BEND TEST
Leads shall be bent without breakage about the point of the egress from the capacitor. First 90 degrees in one direction then back to the original position, and then 90 degrees in the opposite direction.



Note: .42x31x.18 case have one round standoff between leads. .55x.31x.18 has two standoffs between leads.

TYPICAL CURVES





*DuPont trademark

100 VDC

MFD	100 VDC L	W	T	Part No.	Lead Gauge
.001	.42	.29	.17	323B102	24
.0012	.42	.29	.17	323B122	24
.0015	.42	.29	.17	323B152	24
.0018	.42	.29	.17	323B182	24
.0022	.42	.29	.17	323B222	24
.0027	.42	.29	.17	323B272	24
.0033	.42	.29	.17	323B332	24
.0039	.42	.29	.17	323B892	24
.0047	.42	.29	.17	323B472	24
.0056	.42	.29	.17	323B562	24
.0068	.42	.29	.17	323B682	24
.0082	.42	.29	.17	323B822	24
.01	.42	.29	.17	323B103	24
.012	.42	.29	.17	323B123	24
.015	.42	.29	.17	323B153	24
.018	.42	.29	.17	323B183	24
.022	.42	.29	.17	323B223	24
.027	.42	.29	.17	323B273	24
.033	.42	.29	.17	323B333	24
.039	.42	.29	.17	323B393	24
.047	.42	.29	.17	323B473	24
.056	.57	.29	.17	323B563	24
.068	.57	.29	.17	323B683	24
.082	.57	.29	.17	323B823	24
.10	.57	.29	.17	323B104	24
.12	.57	.29	.17	323B124	24
.15	.55	.36	.23	323B154	24
.18	.55	.36	.23	323B184	24
.22	.55	.36	.23	323B224	24
.25	.55	.36	.23	323B254	24
.27	.55	.36	.23	323B274	24
.33	.57	.42	.29	323B334	24
.39	.57	.42	.29	323B394	24
.47	.67	.42	.29	323B474	24
.50	.67	.42	.29	323B504	24
.56	.67	.42	.29	323B564	24
.68	.67	.42	.29	323B684	24
.75	.82	.42	.29	323B754	24
.82	.82	.42	.29	323B824	22
1.0	.82	.54	.39	323B105	22
1.5	.82	.54	.39	323B155	22
2.0	1.04	.54	.39	323B205	22
3.0	1.24	.54	.39	323B305	22
5.0	1.75	.72	.56	323B505	20
8.0	1.75	.72	.56	323B805	20
10.0	1.92	.72	.56	323B106	20

200 VDC

MFD	200 VDC L	W	T	Part No.	Lead Gauge
.001	.42	.29	.17	323C102	24
.0012	.42	.29	.17	323C122	24
.0015	.42	.29	.17	323C152	24
.0018	.42	.29	.17	323C182	24
.0022	.42	.29	.17	323C222	24
.0027	.42	.29	.17	323C272	24
.0033	.42	.29	.17	323C332	24
.0039	.42	.29	.17	323C392	24
.0047	.42	.29	.17	323C472	24
.0056	.42	.29	.17	323C562	24
.0068	.42	.29	.17	323C682	24
.0082	.42	.29	.17	323C822	24
.01	.42	.29	.17	323C103	24
.012	.42	.29	.17	323C123	24
.015	.42	.29	.17	323C153	24
.018	.42	.29	.17	323C183	24
.022	.42	.29	.17	323C223	24
.027	.57	.29	.17	323C273	24
.033	.57	.29	.17	323C333	24
.039	.57	.29	.17	323C393	24
.047	.55	.36	.23	323C473	24
.056	.55	.36	.23	323C563	24
.068	.55	.36	.23	323C683	24
.082	.55	.36	.23	323C823	24
.1	.57	.42	.29	323C104	24
.12	.57	.42	.29	323C124	24
.15	.67	.42	.29	323C154	24
.18	.67	.42	.29	323C184	24
.22	.67	.42	.29	323C224	24
.25	.82	.42	.29	323C254	22
.27	.82	.42	.29	323C274	22
.33	82	.54	.39	323C334	22
.39	.82	.54	.39	323C394	22
.47	.82	.54	.39	323C474	22
.50	.82	.54	.39	323C504	22
.56	1.04	.54	.39	323C564	22
.68	1.04	.54	.39	323C684	22
.75	1.04	.54	.39	323C754	22
.82	1.19	.54	.39	323C824	22
1.0	1.19	.54	.39	323C105	22
1.5	1.75	.72	.56	323C155	20
2.0	1.75	.72	.56	323C205	20
3.0	1.75	.72	.56	323C305	20

SERIES 322

100 VDC

MFD	100 VDC L	H	T	F	Part No.	Ld. Ga.
.001	.42	.31	.18	.300	322B102	22
.0012	.42	.31	.18	.300	322B122	22
.0015	.42	.31	.18	.300	322B152	22
.0018	.42	.31	.18	.300	322B182	22
.0022	.42	.31	.18	.300	322B222	22
.0027	.42	.31	.18	.300	322B272	22
.0033	.42	.31	.18	.300	322B332	22
.0039	.42	.31	.18	.300	322B392	22
.0047	.42	.31	.18	.300	322B472	22
.0056	.42	.31	.18	.300	322B562	22
.0068	.42	.31	.18	.300	322B682	22
.0082	.42	.31	.18	.300	322B822	22
.01	.42	.31	.18	.300	322B103	22
.012	.42	.31	.18	.300	322B123	22
.015	.42	.31	.18	.300	322B153	22
.018	.42	.31	.18	.300	322B183	22
.022	.42	.31	.18	.300	322B223	22
.027	.42	.31	.18	.300	322B273	22
.033	.42	.31	.18	.300	322B333	22
.039	.42	.31	.18	.300	322B393	22
.047	.42	.31	.18	.300	322B473	22
.056	.55	.31	.18	.400	322B563	22
.068	.55	.31	.18	.400	322B683	22
.082	.55	.31	.18	.400	322B823	22
.1	.55	.31	.18	.400	322B104	22
.12	.55	.31	.18	.400	322B124	22
.15	.55	.38	.24	.400	322B154	22
.18	.55	.38	.24	.400	322B184	22
.22	.55	.38	.24	.400	322B224	22
.25	.55	.38	.24	.400	322B254	22
.27	.55	.38	.24	.400	322B274	22
.33	.55	.44	.30	.400	322B334	22
.39	.55	.44	.30	.400	322B394	22
.47	.67	.44	.30	.500	322B474	22
.50	.67	.44	.30	.500	322B504	22
.56	.67	.44	.30	.500	322B564	22
.68	.67	.44	.30	.500	322B684	22
.75	.82	.44	.30	.600	322B754	22
.82	.82	.44	.30	.600	322B824	22
1.0	.82	.56	.40	.600	322B105	22
1.5	.82	.56	.40	.600	322B155	22
2.0	1.04	.56	.40	.800	322B205	22
3.0	1.24	.56	.40	1.100	322B305	20
5.0	1.75	.74	.57	1.600	322B505	20
8.0	1.75	.74	.57	1.600	322B805	20

200 VDC

MFD	200 VDC L	H	T	F	Part No.	Ld. Ga.
.001	.42	.31	.18	.300	322C102	22
.0012	.42	.31	.18	.300	322C122	22
.0015	.42	.31	.18	.300	322C152	22
.0018	.42	.31	.18	.300	322C182	22
.0022	.42	.31	.18	.300	322C222	22
.0027	.42	.31	.18	.300	322C272	22
.0033	.42	.31	.18	.300	322C332	22
.0039	.42	.31	.18	.300	322C392	22
.0047	.42	.31	.18	.300	322C472	22
.0056	.42	.31	.18	.300	322C562	22
.0068	.42	.31	.18	.300	322C682	22
.0082	.42	.31	.18	.300	322C822	22
.01	.42	.31	.18	.300	322C103	22
.012	.42	.31	.18	.300	322C123	22
.015	.42	.31	.18	.300	322C153	22
.018	.42	.31	.18	.300	322C183	22
.022	.42	.31	.18	.300	322C223	22
.027	.55	.31	.18	.400	322C273	22
.033	.55	.31	.18	.400	322C333	22
.039	.55	.31	.18	.400	322C393	22
.047	.55	.38	.24	.400	322C473	22
.056	.55	.38	.24	.400	322C563	22
.068	.55	.38	.24	.400	322C683	22
.082	.55	.38	.24	.400	322C823	22
.1	.55	.44	.30	.400	322C104	22
.12	.55	.44	.30	.400	322C124	22
.15	.67	.44	.30	.500	322C154	22
.18	.67	.44	.30	.500	322C184	22
.22	.67	.44	.30	.500	322C224	22
.25	.82	.44	.30	.600	322C254	22
.27	.82	.44	.30	.600	322C274	22
.33	.82	.56	.40	.600	322C334	22
.39	.82	.56	.40	.600	322C394	22
.47	.82	.56	.40	.600	322C474	22
.50	.82	.56	.40	.600	322C504	22
.56	1.04	.56	.40	.800	322C564	22
.68	1.04	.56	.40	.800	322C684	22
.75	1.04	.56	.40	.800	322C754	22
.82	1.24	.56	.40	1.100	322C824	20
1.0	1.24	.56	.40	1.100	322C105	20
1.5	1.75	.74	.57	1.600	322C155	20
2.0	1.75	.74	.57	1.600	322C205	20
3.0	1.75	.74	.57	1.600	322C305	20

NOTE: Nickel "A" weldable leads are available, simply add the letter "W" as a suffix on the part number.

Note: Larger case sizes may be supplied in plastic case material other than epoxy. Add following to part no. for tolerance: —M = ±20%; —K = ±10%; —J = ±5%; —B = ±2%.

GUDEMAN

a division of

Gulton Industries, Inc.

340 W. HURON STREET, CHICAGO, ILLINOIS 60610 • AREA CODE 312 337-7400 • TWX 910-221-3863

"thinfilm" metallized mylar* dielectric

series 363 & 364

ULTRA MINIATURE FLAT AND TUBULAR CAPACITORS SEALED IN NON-METALLIC CASES with PLASTIC RESIN END SEALS —55°C TO +125°C 100 VDC TO 600 VDC

specifications

DISSIPATION FACTOR
The dissipation factor shall not exceed 1.0% when measured at or referred to a frequency of 1,000 CPS at +25°C per MIL-C-25C. Nominal capacitance values above 1.0 mfd. are measured at or referred to a frequency of 60 cps.

INSULATION RESISTANCE
The minimum insulation resistance when measured with an applied potential of 50 to 500 volts, but not to exceed the rated voltage, shall be as follows:

At + 25°C 50,000 megohm-mfds minimum but need not exceed 150,000 megohms
At + 85°C 500 megohm-mfds minimum but need not exceed 3000 megohms
At + 125°C 10 megohm-mfds minimum but need not exceed 150 megohms

TEST VOLTAGE
Shall withstand a DC voltage equal to 200% of the rated vol age for one minute at a temperature of +25°C, ± 5°C.

ACCELERATED LIFE TEST
Shall withstand an accelerated life test of 250 hours with 140% of applied rated voltage at applicable high test temperature. Only one failure in 12 capacitors tested shall be allowed. A failure is defined as the following:

A) If the capacitor has "opened" or short circuited.
B) If the capacitance has changed more than 10% from its original value.
C) If the insulation resistance is less than 30% of its original value.

VOLTAGE RATINGS
Designed to operate over the temperature range of —55°C to +85°C at full rated DC voltage and up to +125°C with working voltages as follows:

+85°C	+125°C
400 VDC	200 VDC
200 VDC	100 VDC
100 VDC	50 VDC

MOISTURE RESISTANCE
Shall withstand the moisture resistance requirements as specified in military specification MIL-C-25C.

VIBRATION-ACCELERATION
These capacitors shall withstand the Grade 3 vibration-acceleration requirements of MIL-C-25C.

LEAD PULL TEST
Shall withstand a five (5) pound pull applied axially for one minute, per MIL-C-25C.

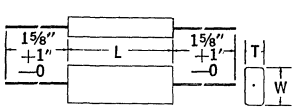
LEAD BEND TEST
Leads shall be bent without breakage about the point of egress from the capacitor. First 90 degrees in one direction then back to the original position, and then 90 degrees in the opposite direction, per MIL-C-25C.

CAPACITANCE TEST WITH TEMPERATURE
The capacitance change shall not exceed the following values with reference to the +25°C capacitance value:

TEMPERATURE	% CAP CHANGE
— 55°C	—10% Maximum
+ 85°C	+ 5% Maximum
+125°C	+16% Maximum

outline drawings

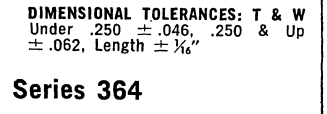
Series 363



NOTE: Nickel "A" weldable leads are available with the capacitors specified in this bulletin, simply add the letter "W" as a suffix on the part number.

DIMENSIONAL TOLERANCES: T & W Under .250 ± .046, .250 & Up ± .062, Length ± 1/16"

Series 364



DIMENSIONAL TOLERANCES: Under .250 dia. ± .046, .250 dia and up ± .062, length ± 1/16"

363 SERIES

100 VDC

Cap. in Mfds.	Part No.	T.	W.	L.	Lead Gau. AWG
.015	363B153	.125"	.250"	1 1/16"	24
.018	363B183	.125"	.250"	1 1/16"	24
.022	363B223	.125"	.250"	1 1/16"	24
.027	363B273	.125"	.250"	1 1/16"	24
.033	363B333	.125"	.250"	1 1/16"	24
.039	363B393	.125"	.250"	1 1/16"	24
.047	363B473	.125"	.250"	1 1/16"	24
.056	363B563	.125"	.250"	1 1/16"	24
.068	363B683	.125"	.250"	1 1/16"	24
.082	363B823	.125"	.250"	1 1/16"	24
.10	363B104	.125"	.250"	1 1/16"	24
.12	363B124	.125"	.250"	1 1/16"	24
.15	363B154	.125"	.250"	1 1/16"	24
.18	363B184	.125"	.250"	1 1/16"	24
.22	363B224	.140"	.250"	1 1/16"	22
.27	363B274	.156"	.281"	1 1/16"	22
.33	363B334	.171"	.296"	1 1/16"	22
.39	363B394	.187"	.312"	1 1/16"	22
.47	363B474	.218"	.343"	1 3/16"	22
.56	363B564	.250"	.375"	1 3/16"	22
.68	363B684	.187"	.312"	1 3/16"	22
.82	363B824	.218"	.343"	1 3/16"	22
1.0	363B105	.218"	.359"	1 1/16"	22
1.5	363B155	.250"	.421"	1 1/16"	22
2.0	*363W205	.296"	.468"	1 1/16"	20
3.0	*363W305	.312"	.500"	1 3/16"	20
4.0	*363W405	.375"	.562"	1 3/8"	20
5.0	*363W505	.437"	.625"	1 3/8"	20
6.0	*363W605	.500"	.687"	1 5/8"	20
7.0	*363W705	.546"	.734"	1 5/8"	20
8.0	*363W805	.500"	.734"	1 7/8"	20
9.0	*363W905	.562"	.796"	1 7/8"	20
10.0	*363W106	.578"	.812"	1 7/8"	20

200 VDC

Cap. in Mfds.	Part No.	T.	W.	L.	Lead Gau. AWG
.015	363C153	.125"	.250"	1 1/16"	24
.018	363C183	.125"	.250"	1 1/16"	24
.022	363C223	.125"	.250"	1 1/16"	24
.027	363C273	.125"	.250"	1 1/16"	24
.033	363C333	.125"	.250"	1 1/16"	24
.039	363C393	.125"	.250"	1 1/16"	24
.047	363C473	.125"	.250"	1 1/16"	24
.056	363C563	.125"	.250"	1 1/16"	24
.068	363C683	.140"	.265"	1 1/16"	22
.082	363C823	.171"	.281"	1 1/16"	22
.10	363C104	.187"	.296"	1 1/16"	22
.12	363C124	.140"	.265"	1 3/16"	22
.15	363C154	.171"	.281"	1 3/16"	22
.18	363C184	.187"	.296"	1 3/16"	22
.22	363C224	.218"	.329"	1 3/16"	22
.27	363C274	.250"	.359"	1 3/16"	22
.33	363C334	.281"	.390"	1 3/16"	22
.39	363C394	.265"	.375"	1 5/16"	22
.47	363C474	.296"	.406"	1 5/16"	20
.56	363C564	.296"	.421"	1 1/4"	20
.68	363C684	.343"	.468"	1 1/4"	20
.82	363C824	.375"	.500"	1 1/4"	20
1.0	363C105	.312"	.468"	1 3/16"	20
1.5	363C155	.406"	.562"	1 3/8"	20
2.0	363C205	.468"	.640"	1 3/8"	20
3.0	363C305	.468"	.640"	1 5/8"	20
4.0	363C405	.500"	.703"	1 7/8"	20
5.0	363C505	.562"	.781"	1 7/8"	20
6.0	363C605	.656"	.875"	1 7/8"	20

400 VDC

Cap. in Mfds.	Part No.	T.	W.	L.	Lead Gau. AWG
.015	363E153	.125"	.250"	1 1/16"	24
.018	363E183	.125"	.250"	1 1/16"	24
.022	363E223	.125"	.250"	1 1/16"	24
.027	363E273	.140"	.250"	1 1/16"	22
.033	363E333	.156"	.265"	1 1/16"	22
.039	363E393	.187"	.281"	1 1/16"	22
.047	363E473	.203"	.312"	1 1/16"	22
.056	363E563	.140"	.250"	1 3/16"	22
.068	363E683	.156"	.265"	1 3/16"	22
.082	363E823	.171"	.281"	1 3/16"	22
.10	363E104	.187"	.296"	1 3/16"	22
.12	363E124	.218"	.328"	1 3/16"	22
.15	363E154	.250"	.359"	1 3/16"	22
.18	363E184	.234"	.343"	1 5/16"	22
.22	363E224	.265"	.375"	1 5/16"	22
.27	363E274	.281"	.406"	1 5/16"	20
.33	363E334	.281"	.437"	1 1/16"	20
.39	363E394	.312"	.468"	1 1/16"	20
.47	363E474	.343"	.500"	1 1/16"	20
.56	363E564	.312"	.468"	1 5/16"	20
.68	363E684	.359"	.515"	1 5/16"	20
.82	363E824	.406"	.546"	1 3/8"	20
1.0	363E105	.375"	.562"	1 5/8"	20
1.5	363E155	.453"	.640"	1 5/8"	20
2.0	363E205	.546"	.734"	1 5/8"	20
3.0	363E305	.609"	.843"	1 7/8"	20
4.0	363E405	.718"	.953"	1 7/8"	20
5.0	363E505	.828"	1.062"	1 7/8"	20

364 SERIES

100 VDC

Cap in Mfds.	Part No.	Dia.	L.	Lead Gau. AWG.
.0068	364B682	.156"	1 1/16"	24
.0082	364B822	.156"	1 1/16"	24
.010	364B103	.156"	1 1/16"	24
.012	364B123	.156"	1 1/16"	24
.015	365B153	.156"	1 1/16"	24
.018	364B183	.156"	1 1/16"	24
.022	364B223	.156"	1 1/16"	24
.027	364B273	.156"	1 1/16"	24
.033	364B333	.156"	1 1/16"	24
.039	364B393	.156"	1 1/16"	24
.047	364B473	.156"	1 1/16"	24
.056	364B563	.156"	1 1/16"	24
.068	364B683	.156"	1 1/16"	24
.082	364B823	.156"	1 1/16"	24
.10	364B104	.171"	1 1/16"	24
.12	364B124	.171"	1 1/16"	24
.15	364B154	.187"	1 1/16"	24
.18	364B184	.203"	1 1/16"	24
.22	364B224	.218"	1 1/16"	22
.27	364B274	.234"	1 1/16"	22
.33	364B334	.250"	1 1/16"	22
.39	364B394	.265"	1 1/16"	22
.47	364B474	.296"	1 3/16"	22
.56	364B564	.328"	1 3/16"	22
.68	364B684	.281"	1 5/16"	22
.82	364B824	.296"	1 5/16"	22
1.0	364B105	.312"	1 1/16"	22
1.5	364B155	.359"	1 1/16"	22
2.0	*364W205	.406"	1 1/16"	20
3.0	*364W305	.421"	1 5/16"	20
4.0	*364W405	.500"	1 3/8"	20
5.0	*364W505	.562"	1 3/8"	20
6.0	*364W605	.625"	1 5/8"	20
7.0	*364W705	.671"	1 5/8"	20
8.0	*364W805	.656"	1 7/8"	20
9.0	*364W905	.718"	1 7/8"	20
10.0	*364W106	.734"	1 7/8"	20
	*60VDC @ +85°C			
	*30VDC @ +125°C			

200 VDC

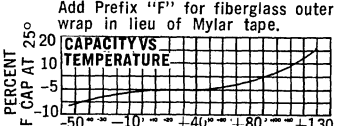
Cap. in Mfds.	Part No.	Dia.	L.	Lead Gau. AWG.
.0068	364C682	.156"	1 1/16"	24
.0082	364C822	.156"	1 1/16"	24
.010	364C103	.156"	1 1/16"	24
.012	364C123	.156"	1 1/16"	24
.015	364C153	.156"	1 1/16"	24
.018	364C183	.156"	1 1/16"	24
.022	364C223	.156"	1 1/16"	24
.027	364C273	.156"	1 1/16"	24
.033	364C333	.171"	1 1/16"	24
.039	364C393	.187"	1 1/16"	24
.047	364C473	.203"	1 1/16"	24
.056	364C563	.203"	1 1/16"	24
.068	364C683	.218"	1 1/16"	22
.082	364C823	.250"	1 1/16"	22
.10	364C104	.265"	1 1/16"	22
.12	364C124	.218"	1 3/16"	22
.15	364C154	.250"	1 3/16"	22
.18	364C184	.265"	1 3/16"	22
.22	364C224	.296"	1 3/16"	22
.27	364C274	.328"	1 3/16"	22
.33	364C334	.343"	1 3/16"	22
.39	364C394	.343"	1 5/16"	22
.47	364C474	.375"	1 5/16"	20
.56	364C564	.390"	1 1/16"	20
.68	364C684	.421"	1 1/16"	20
.82	364C824	.468"	1 1/16"	20
1.0	364C105	.421"	1 5/16"	20
1.5	364C155	.500"	1 3/16"	20
2.0	364C205	.593"	1 3/16"	20
3.0	364C305	.578"	1 5/8"	20
4.0	364C405	.640"	1 7/8"	20
5.0	364C505	.703"	1 7/8"	30
6.0	364C605	.781"	1 7/8"	20

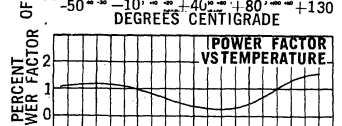
400 VDC

Cap. in Mfds.	Part No.	Dia.	L.	Lead Gau. AWG
.0068	364E682	.156"	1 1/16"	24
.0082	364E822	.156"	1 1/16"	24
.010	364E103	.156"	1 1/16"	24
.012	364E123	.171"	1 1/16"	24
.015	364E153	.187"	1 1/16"	24
.018	364E183	.187"	1 1/16"	24
.022	364E223	.203"	1 1/16"	24
.027	364E273	.218"	1 1/16"	22
.033	364E333	.234"	1 1/16"	22
.039	364E393	.250"	1 1/16"	22
.047	364E473	.265"	1 1/16"	22
.056	364E563	.203"	1 3/16"	22
.068	364E683	.218"	1 3/16"	22
.082	364E823	.250"	1 3/16"	22
.10	364E104	.265"	1 3/16"	22
.12	364E124	.296"	1 3/16"	22
.15	364E154	.328"	1 3/16"	22
.18	364E184	.296"	1 5/16"	22
.22	364E224	.343"	1 5/16"	22
.27	364E274	.375"	1 5/16"	20
.33	364E334	.390"	1 1/16"	20
.39	364E394	.421"	1 1/16"	20
.47	364E474	.453"	1 1/16"	20
.56	364E564	.421"	1 5/16"	20
.68	364E684	.453"	1 5/16"	20
.82	364E824	.500"	1 3/8"	20
1.0	364E105	.500"	1 5/8"	20
1.5	364E155	.578"	1 5/8"	20
2.0	364E205	.671"	1 5/8"	20
3.0	364E305	.765"	1 7/8"	20
4.0	364E405	.875"	1 7/8"	20
5.0	364E505	.984"	1 7/8"	20

*60VDC RATING @ +85°C
*30VDC RATING @ +125°C

Add following to Part No. for Tolerance: —M = ±20%; —K = ±10%; —J = ±5%; —B = ±2%.
Add Prefix "F" for fiberglass outer wrap in lieu of Mylar tape.





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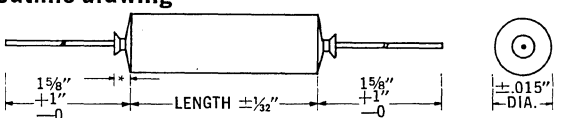
miniature metallized mylar* dielectric
series 68
HERMETICALLY SEALED (GLASS-TO-METAL) TUBULAR METALLIC CASES —55°C TO +125°C WITHOUT DERATING 100 VDC THRU 600 VDC

outline drawing



* .093 max for .125 dia otherwise .156 max

Standard leads consist of solid, bare, tinned wire. Special nickel leads are available for applications requiring a higher degree of weldability.

Case Diameter (Inches)	Lead Gauge (AWG)
.125 thru .187	24
.235 and .312	22
.400 and up	20

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at 25°C are determined by the specified tolerance. Capacitors which have a nominal valu of 1 MFD or less are measured or referred to a frequency of 1000 cps. Nominal capacitances above 1 MFD are measured at or referred to a frequency of 60 cps.

DISSIPATION FACTOR
The dissipation factor at 25°C is less than 1.0%. Reference frequencies are as specified above.

INSULATION RESISTANCE
The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes. Listed below are minimum values:

Temperature	Nominal Capacitance MFD	R x C Megohms x MFD	R Megohms
25°C	Greater than .333	50,000	
	Smaller than .333		150,000
85°C	Greater than .167	500	
	Smaller than .167		3,000
125°C	Greater than .067	10	
	Smaller than .067		150

TEST VOLTAGE
Designed to withstand a test potential equal to 200% of the rated voltage for two minutes at 25°C.
The test voltage must be applied and discharged through a current limiting resistance of approximately 1000 ohms.

VOLTAGE RATING ABOVE 85°
No derating of the voltage is required for nominal ratings of 200, 400 and 600 VDC. All 100 VDC capacitors, however, are to be derated above 85°C at the rate of 1 VDC per degree C.

ACCELERATED LIFE TEST — AT 125°C
Capacitors are designed to withstand a test potential equal to 140% of the voltage at 125°C for a period of 250 hours.
The life test voltage must be applied and discharged through a current limiting resistance of approximately 1000 ohms.

TEMPERATURE AND IMMERSION CYCLING
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

MOISTURE RESISTANCE
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

VIBRATION
Designed to withstand the vibration tests of the applicable paragraph of the latest issue of MIL-C-25.

LEAD PULL TEST
Capacitors of this series are designed to withstand a steady pull force of 5 lbs. applied axially to a capacitor lead for one minute.

LEAD BENDING TEST
The leads withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE
The change of capacitance with reference to the actual value at 25°C does not exceed the following limits:

TEMPERATURE	CHANGE OF CAPACITANCE
— 55°C	— 8%
+ 85°C	+ 5%
+125°C	+18%

AC VOLTAGE RATING
Designed to operate safely up to the following AC voltages at 85°C.

DC VOLTAGE RATING	AC — VOLTAGES AT 85°C (rms) Up to 120 cps	Up to 400 cps
100	70	56
200	140	70
400	280	110
600	420	160

For 105°C operation the listed AC voltages should be derated to 60% of the 85°C values.
If both AC and DC voltages are present, the sum of the DC voltage and the amplitude of the AC voltage must not exceed the specified DC-rating at a given temperature.

100 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F68B102	.0010	.125	7/16
F68B122	.0012	.125	7/16
F68B152	.0015	.125	7/16
F68B182	.0018	.125	7/16
F68B222	.0022	.125	7/16
F68B272	.0027	.125	7/16
F68B332	.0033	.125	7/16
F68B392	.0039	.125	7/16
F68B472	.0047	.125	7/16
F68B562	.0056	.125	7/16
F68B682	.0068	.125	7/16
F68B822	.0082	.125	7/16
F68B103	.010	.125	7/16
F68B123	.012	.125	7/16
F68B153	.015	.125	7/16
F68B183	.018	.125	9/16
F68B223	.022	.125	9/16
F68B273	.027	.125	9/16
F68B333	.033	.125	11/16
F68B393	.039	.125	11/16
F68B473	.047	.175	5/8
F68B563	.056	.175	5/8
F68B683	.068	.175	5/8
F68B823	.082	.175	5/8
F68B104	.10	.235	5/8
F68B124	.12	.235	5/8
F68B154	.15	.235	13/16
F68B184	.18	.235	13/16
F68B224	.22	.235	15/16
F68B274	.27	.312	13/16
F68B334	.33	.312	13/16
F68B394	.39	.312	13/16
F68B474	.47	.312	15/16
F68B564	.56	.400	13/16
F68B684	.68	.400	13/16
F68B824	.82	.400	15/16
F68B105	1.0	.400	15/16
F68B155	1.5	.500	15/16
F68B205	2.0	.562	15/16
F68B305	3.0	.562	1 1/8
F68B405	4.0	.670	1 1/8
F68B505	5.0	.670	1 3/8
F68B605	6.0	.670	1 7/8
F68B805	8.0	.670	1 7/8
F68B106	10.0	.750	1 7/8
F68B126	12.0	.750	2 1/8
F68B146	14.0	.750	2 1/8
F68B166	16.0	1.000	2 1/8
F68B206	20.0	1.000	2 1/8

grounded circuit available in diameters of .175 in. and up.

200 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F68C103	.010	.175	5/8
F68C123	.012	.175	5/8
F68C153	.015	.175	5/8
F68C183	.018	.175	5/8
F68C223	.022	.187	5/8
F68C273	.027	.187	5/8
F68C333	.033	.235	5/8
F68C393	.039	.235	5/8
F68C473	.047	.235	5/8
F68C563	.056	.235	13/16
F68C683	.068	.235	13/16
F68C823	.082	.235	13/16
F68C104	.10	.312	13/16
F68C124	.12	.312	13/16
F68C154	.15	.312	13/16
F68C184	.18	.312	13/16
F68C224	.22	.400	13/16
F68C274	.27	.400	13/16
F68C334	.33	.400	13/16
F68C394	.39	.400	13/16
F68C474	.47	.400	1 1/8
F68C564	.56	.400	1 1/8
F68C684	.68	.562	1 1/8
F68C824	.82	.562	1 1/8
F68C105	1.0	.562	1 1/8
F68C155	1.5	.562	1 5/16
F68C205	2.0	.670	1 5/16
F68C305	3.0	.670	1 9/16
F68C405	4.0	.670	1 13/16
F68C505	5.0	.750	1 13/16
F68C805	8.0	1.000	1 13/16
F68C106	10.0	1.000	2 5/16

400 VOLTS

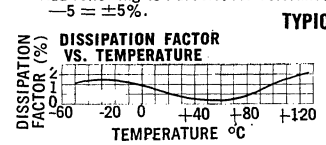
Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F68E103	.010	.235	13/16
F68E123	.012	.235	13/16
F86E153	.015	.235	13/16
F68E183	.018	.235	13/16
F68E223	.022	.312	13/16
F68E273	.027	.312	13/16
F68E333	.033	.312	13/16
F68E393	.039	.312	13/16
F68E473	.047	.400	13/16
F68E563	.056	.400	13/16
F68E683	.068	.400	13/16
F68E823	.082	.400	13/16
F68E104	.10	.400	1 1/8
F68E124	.12	.400	1 1/8
F68E154	.15	.400	1 1/8
F68E184	.18	.400	1 5/16
F68E224	.22	.400	1 5/16
F68E274	.27	.562	1 1/8
F68E334	.33	.562	1 1/8
F68E394	.39	.562	1 5/16
F68E474	.47	.562	1 5/16
F68E564	.56	.670	1 5/16
F68E684	.68	.670	1 5/16
F68E824	.82	.750	1 5/16
F68E105	1.0	.750	1 7/16
F68E155	1.5	1.000	1 5/16
F68E205	2.0	1.000	1 13/16
F68E305	3.0	1.000	2 5/16
F68E405	4.0	1.000	2 9/16

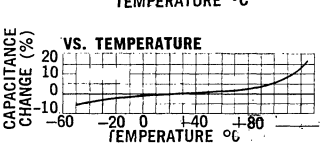
600 VOLTS

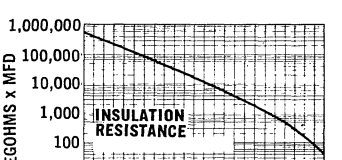
Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F68F103	.010	.312	13/16
F68F123	.012	.312	13/16
F68F153	.015	.312	1 1/8
F68F183	.018	.312	1 1/8
F68F223	.022	.400	1 1/8
F68F273	.027	.400	1 1/8
F68F333	.033	.400	1 1/8
F68F393	.039	.400	1 1/8
F68F473	.047	.400	1 1/8
F68F563	.056	.562	1 1/8
F68F683	.068	.562	1 1/8
F68F823	.082	.562	1 1/8
F68F104	.10	.562	1 1/8
F68F124	.12	.562	1 1/8
F68F154	.15	.562	1 5/16
F68F184	.18	.562	1 7/16
F68F224	.22	.670	1 5/16
F68F274	.27	.670	1 7/16
F68F334	.33	.750	1 7/16
F68F394	.39	.750	1 13/16
F68F474	.47	.750	1 13/16
F68F564	.56	.750	2 5/16
F68F684	.68	.750	2 5/16
F68F824	.82	1.000	1 13/16
F68F105	1.00	1.000	2 1/16

F indicates "Floating". Substitute "G" for "Grounded".
Add following to Part No. for Tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%.

TYPICAL CURVES







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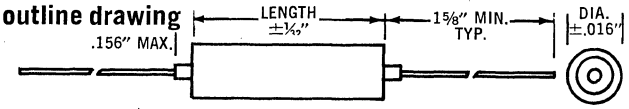
polyester & kraft capacitor tissue dielectric

series 51

WAX IMPREGNATED — METALLIZED DIELECTRIC
HERMETICALLY SEALED (GLASS TO METAL)
TUBULAR METAL CASE
—55°C TO +125°C WITHOUT DERATING
100 THRU 600 VDC

outline drawing



Standard leads consist of solid, bare, tined wire. Special Nickel leads are available for applications requiring a higher degree of weldability.

LEAD SPECIFICATIONS

Case Diameter (inches)	Lead Gauge (AWG)
.187	24
.235 and .312	22
.400 and up	20

specifications

CAPACITANCE AND TOLERANCE
The capacitance limits at +25°C are determined by the specified tolerance. Capacitors which have a nominal value of 1 MFD or less are measured at or referred to a frequency of 1000 cps. Nominal capacitances above 1 MFD are measured at or referred to a frequency of 60 cps.

DISSIPATION FACTOR
The dissipation factor at +25°C is less than 1.0%. Reference frequencies are as specified above.

INSULATION RESISTANCE
The charging potential is equal to the specified operating voltage for a given temperature. The minimum electrification time is two minutes.

TEMPERATURE	Nominal Capacitance MFD	Voltage VDC	R x C Megohms x MFD	R Megohms
+ 25°C	Greater than .167	ALL	2,000	
	Smaller than .167			12,000
+ 125°C	Greater than .067	100 thru	10	
	Smaller than .067	300 VDC		150
	Greater than .067	400 and	40	
	Smaller than .067	600 VDC		600

TEST VOLTAGE
Designed to withstand a test potential equal to 200% of the rated voltage for two minutes at + 25°C.
The test voltage must be applied and discharged through a current limiting resistance of approximately 1,000 ohms.

VOLTAGE RATING ABOVE 85°C.
No derating of the voltage is required for nominal ratings of 200 through 600 VDC. All 100 VDC capacitors, however, are to be derated above + 85°C at the rate of 1 VDC per degree C.

ACCELERATED LIFE TEST — AT 125°C
Designed to withstand a test potential equal to 140% of the rated voltage at + 125°C for a period of 250 hours.
The life test voltage must be applied and discharged through a current limiting resistance of approximately 1,000 ohms.

TEMPERATURE AND IMMERSION CYCLING
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

MOISTURE RESISTANCE
Designed to meet all requirements of the applicable paragraph of the latest issue of MIL-C-25.

VIBRATION
Designed to withstand the vibration tests of the applicable paragraph of the latest issue of MIL-C-25.

AC OPERATION
51 Series capacitors are designed to operate up to the following AC voltages.

NOMINAL VOLTAGE VDC	AC VOLTAGES AT + 85°C (rms) Up to 120 cps	Up to 400 cps
100	70	56
200	140	70
300	220	96
400	280	110
600	420	160

For + 105°C operation the listed AC voltages should be derated to 60% of the + 85°C values.
If both AC and DC voltages are present, the sum of the DC voltage and the amplitude of the AC voltage must not exceed the specified DC rating at a given temperature.

LEAD PULL TEST
Capacitors of this series are designed to withstand a steady pull force of 5 lbs. applied axially to a capacitor lead for one minute.

LEAD BENDING TEST
The leads withstand without breakage the following stresses performed near the point of egress: bend 90 degrees in one direction, then back to the original position and 90 degrees in the opposite direction.

CAPACITANCE CHANGE WITH TEMPERATURE
The change of capacitance with reference to the actual value at 25°C does not exceed the following limits.

TEMPERATURE	CHANGE OF CAPACITANCE
— 55°C	— 10%
+ 85°C	+ 4%
+ 125°C	+ 13%

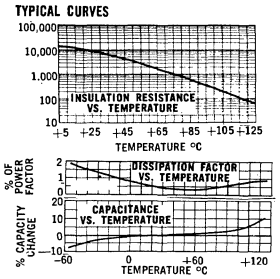
100 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F51B102	.0010	.175	5/8
F51B122	.0012	.175	5/8
F51B152	.0015	.175	5/8
F51B182	.0018	.175	5/8
F51B222	.0022	.175	5/8
F51B272	.0027	.175	5/8
F51B332	.0033	.175	5/8
F51B392	.0039	.175	5/8
F51B472	.0047	.175	5/8
F51B562	.0056	.175	5/8
F51B682	.0068	.175	5/8
F51B822	.0082	.175	5/8
F51B103	.010	.175	5/8
F51B123	.012	.175	5/8
F51B153	.015	.175	5/8
F51B183	.018	.175	5/8
F51B223	.022	.175	5/8
F51B273	.027	.175	5/8
F51B333	.033	.175	5/8
F51B393	.039	.175	5/8
F51B473	.047	.175	5/8
F51B563	.056	.175	5/8
F51B683	.068	.235	5/8
F51B823	.082	.235	5/8
F51B104	.10	.235	5/8
F51B124	.12	.235	13/16
F51B154	.15	.235	13/16
F51B184	.18	.235	13/16
F51B224	.22	.312	13/16
F51B274	.27	.312	13/16
F51B334	.33	.312	13/16
F51B394	.39	.312	15/16
F51B474	.47	.400	13/16
F51B564	.56	.400	13/16
F51B684	.68	.400	15/16
F51B824	.82	.400	15/16
F51B105	1.0	.500	15/16
F51B155	1.5	.562	15/16
F51B205	2.0	.562	1 1/8
F51B305	3.0	.670	1 1/8
F51B405	4.0	.670	1 3/8
F51B505	5.0	.670	1 7/8
F51B605	6.0	.670	1 7/8
F51B805	8.0	.750	1 7/8
F51B106	10.0	.750	2 1/8

200 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F51C103	.010	.235	3/4
F51C123	.012	.235	3/4
F51C153	.015	.235	3/4
F51C183	.018	.235	3/4
F51C223	.022	.235	3/4
F51C273	.027	.235	3/4
F51C333	.033	.235	3/4
F51C393	.039	.312	7/8
F51C473	.047	.312	7/8
F51C563	.056	.312	7/8
F51C683	.068	.312	7/8
F51C823	.082	.312	7/8
F51C104	.10	.312	7/8
F51C124	.12	.312	1 1/8
F51C154	.15	.312	1 1/8
F51C184	.18	.400	7/8
F51C224	.22	.400	7/8
F51C274	.27	.400	1 1/8
F51C334	.33	.400	1 1/8
F51C394	.39	.500	1 1/8
F51C474	.47	.500	1 1/8
F51C564	.56	.500	1 1/8
F51C684	.68	.500	1 1/8
F51C824	.82	.562	1 1/8
F51C105	1.0	.562	1 1/8
F51C155	1.5	.562	1 5/8
F51C205	2.0	.670	1 5/8
F51C305	3.0	.670	1 7/8
F51C405	4.0	.750	1 7/8
F51C505	5.0	1.000	1 7/8
F51C605	6.0	1.000	1 7/8
F51C805	8.0	1.000	1 7/8
F51C106	10.0	1.000	2 3/8
F51C126	12.0	1.000	2 5/8

TYPICAL CURVES



300 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F51D103	.010	.312	7/8
F51D123	.012	.312	7/8
F51D153	.015	.312	7/8
F51D183	.018	.312	7/8
F51D223	.022	.312	7/8
F51D273	.027	.312	7/8
F51D333	.033	.312	1 1/8
F51D393	.039	.312	1 1/8
F51D473	.047	.312	1 1/8
F51D563	.056	.400	7/8
F51D683	.068	.400	7/8
F51D823	.082	.400	1 1/8
F51D104	.10	.400	1 1/8
F51D124	.12	.400	1 1/8
F51D154	.15	.400	1 3/8
F51D184	.18	.400	1 3/8
F51D224	.22	.500	1 3/8
F51D274	.27	.500	1 3/8
F51D334	.33	.562	1 3/8
F51D394	.39	.562	1 3/8
F51D474	.47	.562	1 5/8
F51D564	.56	.562	1 5/8
F51D684	.68	.670	1 7/8
F51D824	.82	.670	1 7/8
F51D105	1.0	.750	1 7/8
F51D155	1.5	.750	2 1/8
F51D205	2.0	1.00	1 7/8
F51D255	2.5	1.00	2 1/8
F51D305	3.0	1.00	2 3/8

400 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F51E103	.010	.312	7/8
F51E123	.012	.312	7/8
F51E153	.015	.312	7/8
F51E183	.018	.312	7/8
F51E223	.022	.312	7/8
F51E273	.027	.312	1 1/8
F51E333	.033	.312	1 1/8
F51E393	.039	.400	1 1/8
F51E473	.047	.400	1 1/8
F51E563	.056	.400	1 1/8
F51E683	.068	.400	1 1/8
F51E823	.082	.500	1 1/8
F51E104	.10	.500	1 1/8
F51E124	.12	.500	1 1/8
F51E154	.15	.500	1 1/8
F51E184	.18	.562	1 3/8
F51E224	.22	.562	1 3/8
F51E274	.27	.562	1 5/8
F51E334	.33	.562	1 5/8
F51E394	.39	.670	1 5/8
F51E474	.47	.670	1 5/8
F51E564	.56	.670	1 7/8
F51E684	.68	.670	1 7/8
F51E824	.82	.750	1 7/8
F51E105	1.0	.750	1 7/8
F51E155	1.5	1.000	1 7/8
F51E205	2.0	1.000	1 7/8
F51E305	3.0	1.000	2 5/8

600 VOLTS

Part No.	Capacitance MFD.	Diameter Inches	Length Inches
F51F103	.010	.312	7/8
F51F123	.012	.312	7/8
F51F153	.015	.312	7/8
F51F183	.018	.312	1 1/8
F51F223	.022	.312	1 1/8
F51F273	.027	.312	1 1/8
F51F333	.033	.312	1 1/8
F51F393	.039	.400	1 1/8
F51F473	.047	.400	1 1/8
F51F563	.056	.400	1 1/8
F51F683	.068	.400	1 1/8
F51F823	.082	.500	1 1/8
F51F104	.10	.500	1 1/8
F51F124	.12	.562	1 1/8
F51F154	.15	.562	1 1/8
F51F184	.18	.562	1 3/8
F51F224	.22	.562	1 3/8
F51F274	.27	.562	1 5/8
F51F334	.33	.562	1 5/8
F51F394	.39	.670	1 5/8
F51F474	.47	.670	1 5/8
F51F564	.56	.670	1 7/8
F51F684	.68	.670	1 7/8
F51F824	.82	1.000	1 7/8
F51F105	1.0	1.000	1 7/8
F51F155	1.5	1.000	2 1/8
F51F205	2.0	1.000	2 1/8
F51F255	2.5	1.000	2 5/8

Add following to Part No. for tolerance: —20 = ±20%; —10 = ±10%; —5 = ±5%.
"F" indicatts Floating. Substitute "G" for grounded. Subtract 1/16" from length for grounded types.

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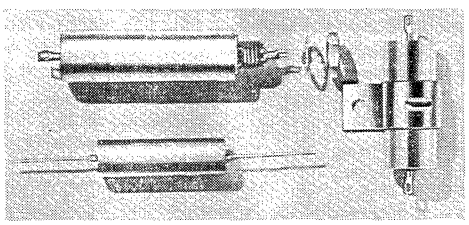
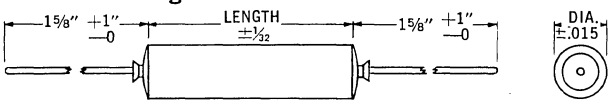
metalized paper dielectric

series 88

HERMETICALLY SEALED (GLASS TO METAL)
TUBULAR METAL CASE
—55°C TO +125°C WITHOUT DERATING
50 VDC
WIRE LEADS OR LUG TERMINALS



outline drawing



Solid Tinned Wire Leads.
The folowing lead sizes will apply:
.235 and .312 diameter #22 AWG
.400 diameter and up #20 AWG
NOTE: Mounting by means of lead wires is not recommended for units larger than .562 x 1 13/16" long
NF STYLE WILL BE FURNISHED WITH #22 AWG LEADS.

specifications

CAPACITANCE AND TOLERANCE
The capacitance shall be within the specified tolerance limits of the nominal rating.
Capacitors of 1.0 MFD or less shall be measured at, or referred to, a frequency of 1000 cycles per second at 25°C. Capacitors greater than 1.0 MFD shall be measured at, or referred to, a frequency of 60 cycles per second at 25°C.

DISSIPATION FACTOR
The dissipation factor shall be a maximum of 1.0% at 25°C.
Capacitors of 1.0 MFD or less shall be measured at, or referred to, a frequency of 1000 cycle per second. Capacitors above 1.0 MFD shall be measured at, or referred to, a frequency of 60 cycles per second.

INSULATION RESISTANCE
Insulation resistance shall be measured at a charging potential of 50 VDC.
The insulation resistance shall equal or exceed the following for capacitance values up to and including 4.0 MFD.

Temperature	Tolerance
25°C	4000 megohms X mfd or 12,000 megohms, whichever is less
85°C	100 megohms X mfd or 300 megohms, whichever is less
125°C	10 megohms X mfd or 150 megohms, whichever is less

For values above 4.0 MFD, the insulation resistance shall equal or exceed the following:

Temperature	Tolerance
25°C	2000 megohms X mfd
85°C	50 megohms X mfd
125°C	5 megohms X mfd

TEST VOLTAGE
Shall withstand a D.C. potential of 200% of rated D.C. voltage at a temperature of 25°C applied for a period not to exceed two minutes, without permanent breakdown.
When the case is not a terminal, they shall withstand a D.C. potential of 200% of rated voltage between the case and the terminals.

LIFE TEST
Shall withstand a test potential of 140% of the rated D.C. voltage at 125°C for 250 hours.
One failure out of twelve (12) samples tested is allowed. A capacitor will be considered to have failed when:
A. The capacitance has changed more than 10% from its original value.
B. The insulation resistance is less than 50% of its original requirements.
C. It exhibits a permanent open or short circuit.

TEMPERATURE & IMMERSION CYCLING
These capacitors shall meet the temperature and immersion cycling test of Military Specification MIL-C-25C.

MOISTURE RESISTANCE
Shall meet the moisture resistance requirements of Military Specification MIL-C-25C.

VIBRATION
Shall withstand the Grade 3 vibration as specified in Military Specification MIL-C-25C.

CORROSION RESISTANCE
These capacitors shall meet the corrosion test of Military Specification MIL-C-25C.

specifications (continued)

LEAD PULL TEST
Shall withstand a pull of 5 lbs. applied axially to the lead for a period of one minute.

LEAD BEND TEST
The leads shall withstand without breakage, a bend at the point of egress from the capacitor first 90° in one direction, back to the original position and then 90° in the opposite direction.

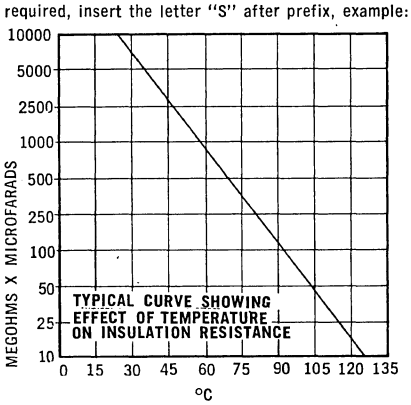
SHOCK
When securely mounted by their normal mounting means, the capacitors shall withstand 3 impact shocks of 50G intensity (18 shocks total) in each direction of each of the three major axis. The time duration of each impulse shock shall be 11 ±1 milli-seconds.
There shall be no intermittent or permanent open or short circuit as a result of this test.

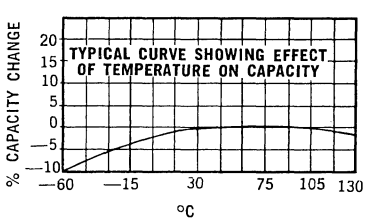
CAPACITANCE CHANGE WITH TEMPERATURE
The Capacitance change at 125°C shall not be greater than 5% of the measured capacitance value at +25°C.
The capacitance change at —55°C shall not be greater than 10% of the measured capacitance value at +25°C.

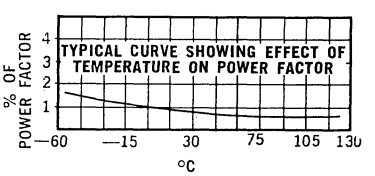
Part No.	Capacity	Voltage	O.D.	XMG Length	XMF Length
	Under .1 MFD	50 VDC	.235	5/8"	1 1/16"
XMF-88A104	.1	50 VDC	.235	5/8"	1 1/16"
XMF-88A124	.12	50 VDC	.235	3/4"	1 3/16"
XMF-88A154	.15	50 VDC	.235	3/4"	1 3/16"
XMF-88A184	.18	50 VDC	.235	15/16"	1"
XMF-88A224	.22	50 VDC	.235	15/16"	1"
XMF-88A274	.27	50 VDC	.312	15/16"	1"
XMF-88A334	.33	50 VDC	.312	15/16"	1"
XMF-88A394	.39	50 VDC	.312	15/16"	1"
XMF-88A474	.47	50 VDC	.312	15/16"	1"
XMF-88A564	.56	50 VDC	.400	15/16"	1"
XMF-88A684	.68	50 VDC	.400	15/16"	1"
XMF-88A824	.82	50 VDC	.400	15/16"	1"
XMF-88A105	1.00	50 VDC	.400	1 1/16"	1 1/8"
XMF-88A155	1.50	50 VDC	.500	1 1/16"	1 1/8"
XMF-88A205	2.00	50 VDC	.562	1 1/16"	1 1/8"
XMF-88A305	3.00	50 VDC	.562	1 1/4"	1 5/16"
XMF-88A405	4.00	50 VDC	.670	1 1/4"	1 5/16"
XMF-88A505	5.00	50 VDC	.670	1 1/2"	1 7/16"
XMF-88A605	6.00	50 VDC	.750	1 3/4"	1 13/16"
XMF-88A805	8.00	50 VDC	.750	2"	2 1/16"
XMF-88A106	10.00	50 VDC	.750	2"	2 1/16"
XMF-88A126	12.00	50 VDC	1.000	1 3/4"	1 13/16"
XMF-88A146	14.00	50 VDC	1.000	2"	2 1/16"
XMF-88A166	16.00	50 VDC	1.000	2"	2 1/16"
XMF-88A206	20.00	50 VDC	1.000	2 5/8"	2 11/16"

"F" Indicates "Floating". Substitute "G" for "Grounded".
NOTE: 1—When sleeving is required, insert the letter "S" after prefix, example: XMFS — XMGS.

TYPICAL CURVES







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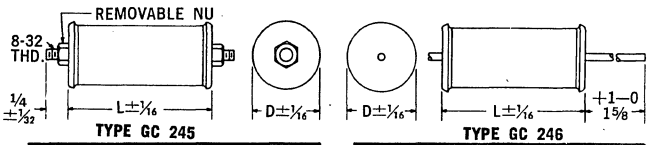
paper dielectric — inserted tab construction

series GC245 & 246

HERMETICALLY SEALED IN GLASS CASES
HIGH VOLTAGE — 1000 VDC THRU 10,000 VDC
—55°C TO +85°C WITHOUT DERATING
75% RATING TO 105°C



TYPE GC 245

Catalog Number	CAP. MFD.	Dimensions L.	D.
1000 WVDC at 85°C			
GC246G102	.001	1 3/16	* 17/32
GC246G202	.002	1 3/16	17/32
GC246G502	.005	1 3/16	17/32
GC246G103	.01	1 3/16	17/32
GC246G203	.02	1 3/16	17/32
GC246G503	.05	1 3/16	17/32
GC246G104	.1	1 3/4	5/8
GC245G254	.25	2 1/4	3/4
GC245G504	.5	2 3/4	7/8
GC245G105	1.0	2 3/4	1 1/4
2000 WVDC at 85°C			
GC246J102	.001	1 3/16	17/32
GC246J202	.002	1 3/16	17/32
GC246J502	.005	1 3/16	17/32
GC246J103	.01	1 3/16	17/32
GC246J203	.02	1 3/16	17/32
GC245J503	.05	1 1/2	3/4
GC245J104	.1	2 1/4	3/4
GC245J254	.25	2 3/4	1
GC245J504	.5	2 3/4	1 3/8
3000 WVDC at 85°C			
GC246L102	.001	1 3/16	17/32
GC246L202	.002	1 3/16	17/32
GC246L502	.005	1 3/16	17/32
GC246L103	.01	1 3/16	17/32
GC245L203	.02	1 1/2	3/4
GC245L503	.05	2 1/4	3/4
GC245L104	.1	2 3/4	7/8
GC245L254	.25	2 3/4	1 3/8
5000 WVDC at 85°C			
GC246N102	.001	1 3/16	17/32
GC246N202	.002	1 3/16	17/32
GC246N502	.005	1 3/4	5/8
GC245N103	.01	1 3/4	7/8
GC245N203	.02	2 1/4	7/8
GC245N503	.05	2 3/4	1 1/8
GC245N104	.1	2 3/4	1 5/16
7500 WVDC at 85°C			
GC245R102	.001	1 3/4	3/4
GC245R202	.002	2	3/4
GC245R502	.005	2 1/4	3/4
GC245R103	.01	2 3/4	7/8
GC245R203	.02	2 3/4	1 1/8
GC245R503	.05	2 3/4	1 5/16
GC245R104	.1	4 1/4	1 5/16

TYPE GC 246

Catalog Number	CAP. MFD.	Dimensions L.	D.
1500 WVDC at 85°C			
GC246H102	.001	1 3/16	17/32
GC246H202	.002	1 3/16	17/32
GC246H502	.005	1 3/16	17/32
GC246H103	.01	1 3/16	17/32
GC246H203	.02	1 3/16	17/32
GC246H503	.05	1 3/4	5/8
GC245H104	.1	2	3/4
GC245H254	.25	2 3/4	7/8
GC245H504	.5	2 3/4	1 1/4
GC245H105	1.0	3 1/2	1 3/8
2500 WVDC at 85°C			
GC246K102	.001	1 3/16	17/32
GC246K202	.002	1 3/16	17/32
GC246K502	.005	1 3/16	17/32
GC246K103	.01	1 3/16	17/32
GC246K203	.02	1 3/16	5/8
GC245K503	.05	2	3/4
GC245K104	.1	2 1/4	7/8
GC245K254	.25	2 3/4	1 1/8
GC245K504	.5	3 1/2	1 3/8
4000 WVDC at 85°C			
GC246M102	.001	1 3/16	17/32
GC246M202	.002	1 3/16	17/32
GC246M502	.005	1 3/16	5/8
GC245M103	.01	1 3/4	3/4
GC245M203	.02	2	3/4
GC245M503	.05	2 1/4	1
GC245M104	.1	2 3/4	1 3/8
GC245M254	.25	4 1/4	1 3/8
6000 WVDC at 85°C			
GC246P102	.001	1 3/16	5/8
GC246P202	.002	1 3/4	5/8
GC245P502	.005	2	3/4
GC245P103	.01	2	7/8
GC245P203	.02	2 3/4	7/8
GC245P503	.05	2 3/4	1 3/8
GC245P104	.1	4 1/4	1 3/8
10,000 WVDC at 85°C			
GC245S102	.001	2 1/4	3/4
GC245S202	.002	2 3/4	3/4
GC245S502	.005	2 3/4	7/8
GC245S103	.01	2 3/4	1 3/8
GC245S203	.02	3 1/2	1 3/8
GC245S503	.05	4 1/4	1 23/32

Tolerance = ±20%. Closer tolerances available upon request.

specifications

HIGH ALTITUDE APPLICATION:
The DC Voltage ratings listed are primarily for application at a barometric pressure between 28 and 32 inches. For high altitude application the permissible DC voltage should never exceed the rated DC voltage and shall be equal to or less than the maximum permissible operating voltage per length of glass tubing as follows:

PERMISSIBLE VOLTAGE RATING FOR HIGH ALTITUDE

Tube Length (in.)	1 3/16	1 5/16	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
Max. Volt. at 50,000 ft.	4500	5000	5300	5500	6000	7000	8000
Max. Volt. at 60,000 ft.	2400	2800	3500	4000	4300	4500	4700

RIPPLE VOLTAGE:
The ratings given are the steady-state DC voltage, or the DC voltage plus the permissible ripple voltage wherein the peak value of the permissible ripple voltage shall not exceed:

20% of the rating at 60 cps.
15% of the rating at 120 cps.
8% of the rating at 400 cps.
5% of the rating at 1000 cps.

INSULATION RESISTANCE:
The minimum insulation resistance when measured with an applied potential of 100 to 500 volts shall be as follows:
At 25°C—10,000 megohm-mfds. minimum but need not exceed 20,000 megohms.
At 85°C—100 megohm-mfds. minimum but need not exceed 1000 megohms.
At 105°C—30 megohm-mfds. minimum but need not exceed 300 megohms.

TEST VOLTAGE:
Shall withstand a DC voltage equal to 200% of the rated voltage for five seconds at a temperature of 25°C.

LIFE TEST:
Shall withstand an accelerated life test of 250 hours at 85°C with an applied voltage as follows:

Watt-Second Group	% of Rated Voltage for life test
0. to 0.49 watt-seconds	140
0.5 to 4.9 watt-seconds	130

One failure in 12 samples tested is permitted.

VOLTAGE DERATING:
When operated at high ambient temperature the capacitors shall be derated as follows:
At 85°C ..... No derating
At 105°C ..... 25% derating

POWER FACTOR:
The power factor at 25°C shall not be more than 1% when measured at or referred to a frequency of 1000 cycles per second.

LEAD PULL TEST
Shall withstand for one minute a steady 5 pound pull applied axially.

VIBRATION:
The GC246 Series capacitors (wire leads) shall be mounted and soldered to rigidly supported terminals and the length of the lead shall be approximately 5/8 of an inch when measured from the capacitor to the supporting terminal. The GC245 Series shall be mounted to brackets.
The capacitors when mounted and subjected to a simple harmonic motion having an amplitude of 0.03 inches (Total excursion 0.06 inches maximum), and the frequency being varied uniformly between 10 to 55 cycles per second and return in approximately one minute. This motion shall be applied for a period of three hours in any direction. During the last ½ hour of vibration measurement shall be made for intermittent contacts, open circuits or short circuits. One failure in six samples tested is permitted.

TEMPERATURE AND IMMERSION CYCLING:
These capacitors shall be subjected to five thermal cycles as follows:

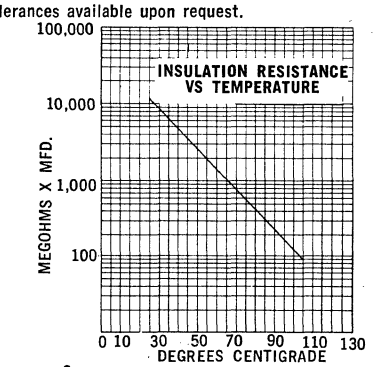
Start at +25°C
Raise to +105°C
Return to +25°C
Reduce to —55°C
Return to +25°C

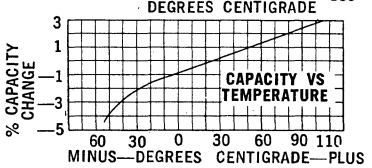
After the thermal cycle the capacitors shall be subjected to five successive immersion cycles in two tanks of saturated solutions of sodium chloride and water, one at 65°C and the other at 0°C. The period of each cycle shall consist of 60 minutes immersion in each tank. After immersion cycling, the capacitors shall be washed in tap water, surface dried with a clean cloth and dried from 4 to 6 rours at room temperature. Tre capacitor srall meet the following requirements:

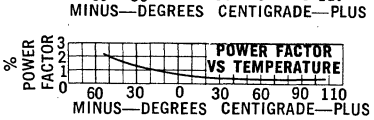
Dielectric Strength ..... 125% Rated Voltage
Insulation Resistance ..... 4000 megohms-mfds. minimum but need not exceed 8000 megohms.

In addition, the capacitors shall show no harmful or extensive corrosion and at least 90% of the exposed metallic surfaces of the capacitors shall be protected by the finish.

TYPICAL CURVES







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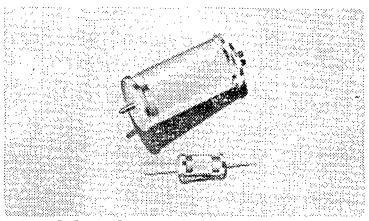
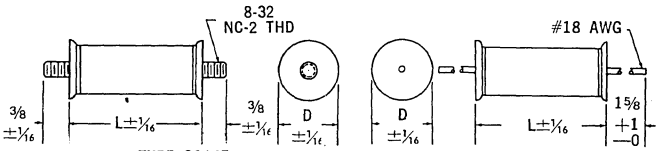
high voltage capacitors — 2000 VDC thru 10,000 VDC

series GC145 & GC146

PAPER PLASTIC FILM DIELECTRIC — INSERTED TAB CONSTRUCTION
HERMETICALLY SEALED IN GLASS CASE
—55°C TO +125°C WITHOUT DERATING
SERIES 145 — SCREW STUD TERMINALS
SERIES 146 — WIRE LEADS





specifications

HIGH ALTITUDE APPLICATION:
The DC Voltage ratings listed are primarily for application at a barometric pressure between 28 and 32 inches. For high altitude application the permissible DC voltage should never exceed the rated DC voltage and shall be equal to or less than the maximum permissible operating voltage per length of glass tubing as follows:

PERMISSIBLE VOLTAGE RATING FOR HIGH ALTITUDE							
Tube Length (in.)	1 3/16	1 9/16	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
Max. Volt at 50,000 Ft.	4500	5000	5300	5500	6000	7000	8000
Max. Volt at 60,000 Ft.	2400	2800	3500	4000	4300	4500	4700

RIPPLE VOLTAGE:
The ratings given are the steady-state DC voltage, or the DC voltage plus the permissible ripple voltage wherein ahe peak value of the permissible ripple voltage shall not exceed:

20% of the rating at 60 cps.
15% of the rating at 120 cps.
8% of the rating at 400 cps.
5% of the rating at 1000 cps.
1% of the rating at 10,000 cps.

INSULATION RESISTANCE:
The minimum insulation resistance when measured with an applied potential of 500 volts shall be as follows:

At + 25°C—20,000 megohm-mfds. minimum but need not exceed 100,000 megohms.
At +125°C—20 megohm-mfds. minimum but need not exceed 250 megohms.

TEST VOLTAGE:
Shall withstand a DC Voltage equal to 200% of the rated voltage for five seconds at a temperature of +25°C.

ACCELERATED LIFE TEST:
These capacitors shall withstand an accelerated life test at 250 hours at +125°C with an applied voltage as follows:

Watt-Second Group	% of Rated Voltage for Life Test
0. to 0.49 Watt-Seconds	140
0.5 to 4.9 Watt-Seconds	130

One failure in 12 samples tested is permitted.

TEMPERATURE AND IMMERSION CYCLING:
Shall meet the temperature and immersion cycling tests of military specification MIL-C-25C.

POWER FACTOR:
The power factor of the capacitors at +25°C shall not be more than 1% when measured at or referred to a frequency of 1000 cycles per second.

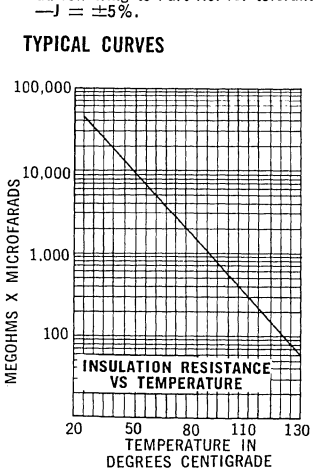
MOISTURE RESISTANCE:
Shall meet the moisture resistance tests of the military specification MIL-C-25C.

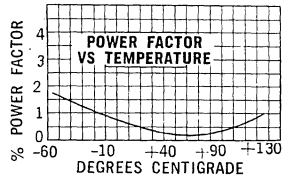
VIBRATION:
Shall meet the high frequency vibration requirements of MIL-C-25C.

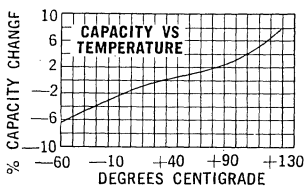
Part No.	CAP. MFD	DIMENSIONS D	L
2000 VOLTS DC			
GC146J102	.001	17/32"	1 3/16"
GC146J202	.002	17/32"	1 3/16"
GC146J502	.005	17/32"	1 3/16"
GC146J103	.01	17/32"	1 3/16"
GC146J203	.02	5/8"	1 9/16"
GC145J503	.05	3/4"	2 1/4"
GC145J104	.1	1"	2 1/4"
GC145J254	.25	1 3/8"	2 3/4"
3000 VOLTS DC			
GC146L102	.001	17/32"	1 3/16"
GC146L202	.002	17/32"	1 3/16"
GC146L502	.005	17/32"	1 9/16"
GC146L103	.01	5/8"	1 9/16"
GC145L203	.02	3/4"	1 3/4"
GC145L503	.05	1"	2 1/4"
GC145L104	.1	1 3/8"	2 3/4"
4000 VOLTS DC			
GC146M102	.001	17/32"	1 3/16"
GC146M202	.002	17/32"	1 9/16"
GC146M502	.005	5/8"	1 9/16"
GC145M103	.01	3/4"	1 3/4"
GC145M203	.02	3/4"	2 1/4"
GC145M503	.05	1 1/8"	2 3/4"
GC145M104	.1	1 3/8"	2 3/4"
5000 VOLTS DC			
GC146N102	.001	17/32"	1 3/16"
GC146N202	.002	5/8"	1 9/16"
GC145N502	.005	3/4"	1 9/16"
GC145N103	.01	1"	1 3/4"
GC145N203	.02	1"	2 1/4"
GC145N503	.05	1 3/8"	2 3/4"
GC145N104	.1	1 3/8"	3 1/2"
7500 VOLTS DC			
GC146R102	.001	5/8"	2 1/4"
GC145R202	.002	3/4"	1 3/4"
GC145R502	.005	3/4"	2 1/4"
GC145R103	.01	1"	2 1/4"
GC145R203	.02	1 3/8"	2 3/4"
GC145R503	.05	1 3/8"	4 1/4"
10,000 VOLTS DC			
GC145S102	.001	3/4"	2 1/4"
GC145S202	.002	1"	2 1/4"
GC145S502	.005	1"	2 3/4"
GC145S103	.01	1 3/8"	2 3/4"
GC145S203	.02	1 3/8"	4 1/4"

Add following to Part No. for tolerance: —M = ±20%; —K= ±10%; —J = ±5%.

TYPICAL CURVES







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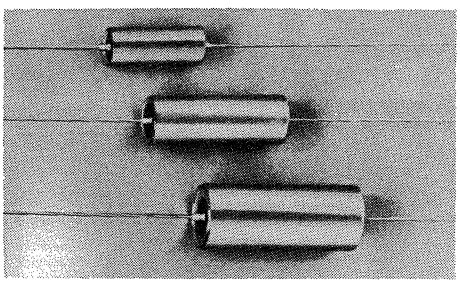
paper plastic dielectric

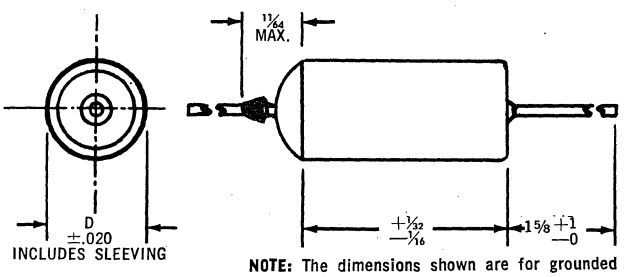
series 462

HIGH RELIABILITY CAPACITORS
HERMETICALLY SEALED (GLASS TO METAL)

TUBULAR METALLIC CASE

—65°C TO +125°C WITHOUT DERATING





NOTE: The dimensions shown are for grounded (XRGS) units. For floating (XRFS) units add 3/32" to length for diameters of .255, .332 and .420. Above .420 diameter, add 1/16" to length.

Furnished with "copper-clad" steel wire leads.

Case Diameter (In.)	AWG Size
.235 to .312	22
.400 to 1.00	20

Cap.	Dia.	Length	Part No.	MIL-C-14157 Designation
200 VOLTS D.C.				
.0068	.255	23/32	XRGS462C682	CPV09A3C682
.022	.332	27/32	XRGS462C223	CPV09A3C223
.033	.332	31/32	XRGS462C333	CPV09A3C333
.047	.420	27/32	XRGS462C473	CPV09A3C473
.068	.420	1 3/32	XRGS462C683	CPV09A3C683
.1	.420	1 11/32	XRGS462C104	CPV09A3C104
.15	.582	1 1/16	XRGS462C154	CPV09A3C154
.22	.582	1 5/16	XRGS462C224	CPV09A3C224
.33	.582	1 9/16	XRGS462C334	CPV09A3C334
.47	.690	1 9/16	XRGS462C474	CPV09A3C474
.68	.770	1 13/16	XRGS462C684	CPV09A3C684
1.0	.770	2 5/16	XRGS462C105	CPV09A3C105
300 VOLTS D.C.				
.0047	.255	23/32	XRGS462Z472	CPV09A3D472
.015	.332	27/32	XRGS462Z153	CPV09A3D153
.022	.332	31/32	XRGS462Z223	CPV09A3D223
.033	.420	27/32	XRGS462Z333	CPV09A3D333
.047	.420	1 3/32	XRGS462Z473	CPV09A3D473
.068	.420	1 7/32	XRGS462Z683	CPV09A3D683
.1	.582	1 1/16	XRGS462Z104	CPV09A3D104
.15	.582	1 5/16	XRGS462Z154	CPV09A3D154
.22	.582	1 9/16	XRGS462Z224	CPV09A3D224
.33	.690	1 11/16	XRGS462Z334	CPV09A3D334
.47	.770	1 13/16	XRGS462Z474	CPV09A3D474
.68	.770	2 5/16	XRGS462Z684	CPV09A3D684
1.0	1.020	2 1/16	XRGS462Z105	CPV09A3D105
400 VOLTS D.C.				
.0022	.255	23/32	XRGS462E222	CPV09A3E222
.0033	.255	23/32	XRGS462E332	CPV09A3E332
.0068	.332	27/32	XRGS462E682	CPV09A3E682
.01	.332	27/32	XRGS462E103	CPV09A3E103
.015	.332	31/32	XRGS462E153	CPV09A3E153
.022	.420	27/32	XRGS462E223	CPV09A3E223
.033	.420	31/32	XRGS462E333	CPV09A3E333
.047	.420	1 7/32	XRGS462E473	CPV09A3E473
.068	.420	1 15/32	XRGS462E683	CPV09A3E683
.1	.582	1 3/16	XRGS462E104	CPV09A3E104
.15	.582	1 7/16	XRGS462E154	CPV09A3E154
.22	.690	1 7/16	XRGS462E224	CPV09A3E224
.33	.690	1 13/16	XRGS462E334	CPV09A3E334
.47	.770	2 1/16	XRGS462E474	CPV09A3E474
.68	.770	2 5/16	XRGS462E684	CPV09A3E684
1.0	1.020	2 3/16	XRGS462E105	CPV09A3E105
600 VOLTS D.C.				
.001	.255	23/32	XRGS462F102	CPV09A3F102
.0015	.255	23/32	XRGS462F152	CPV09A3F152
.0022	.332	27/32	XRGS462F222	CPV09A3F222
.0033	.332	27/32	XRGS462F332	CPV09A3F332
.0047	.332	27/32	XRGS462F472	CPV09A3F472
.0068	.332	31/32	XRGS462F682	CPV09A3F682
.01	.420	27/32	XRGS462F103	CPV09A3F103
.015	.420	31/32	XRGS462F153	CPV09A3F153
.022	.420	1 3/32	XRGS462F223	CPV09A3F223
.033	.420	1 15/32	XRGS462F333	CPV09A3F333
.047	.582	1 1/16	XRGS462F473	CPV09A3F473
.068	.582	1 3/16	XRGS462F683	CPV09A3F683
.1	.582	1 11/16	XRGS462F104	CPV09A3F104
.15	.690	1 11/16	XRGS462F154	CPV09A3F154
.22	.770	1 13/16	XRGS462F224	CPV09A3F224
.33	.770	2 3/16	XRGS462F334	CPV09A3F334
.47	1.020	2 1/16	XRGS462F474	CPV09A3F474

"G" in Part No. indicates "Grounded". Substitute "F" for "Floating".
Add following to part no. for tolerance: —K = ±10%; —J = ±5%.

specifications

XRFS462 units meet all electrical environmental requirements of MIL-C-14157.

INSULATION RESISTANCE

The minimum insulation resistance when measured in accordance with Specification MIL-C-14157 shall be as follows:

At 25°C—15,000 megohm-mfds. for capacitance values .6MFD and greater. 25,000 megohms for capacitance values below .6 MFD.

AT 125°C—20 megohm-mfds. for capacitance values .08 MFD and greater. 250 megohms for capacitance values below .08 MFD.

CAPACITANCE CHANGE FROM +25°C ±5°C.

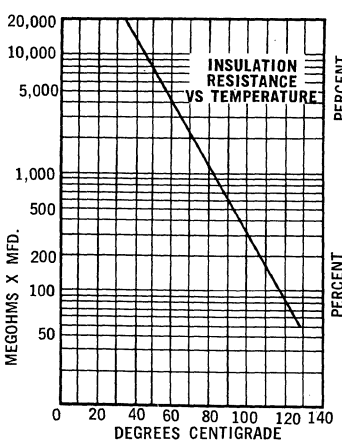
The maximum capacitance change shall be as follows:

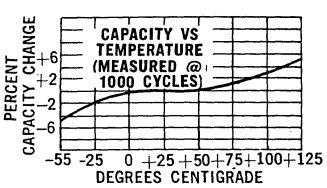
At — 65°C ±3°C . . . + 2%, —10%
At +125°C ±3°C . . . +10%, — 3%

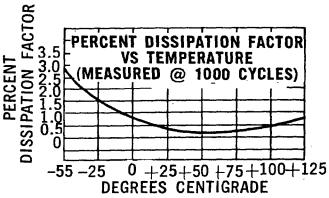
DISSIPATION FACTOR

The dissipation factor when measured at room temperature shall not be more than 0.6%.

TYPICAL CURVES







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ac capacitors
power supplies — motor run
series 9800

Hermetically Sealed
Terne Plate Steel Case
Kraft Paper & Aluminum Foil Assembly

Double-Blade Quick-Connect Terminals
—40°C to +55°C Without Derating
165 VAC thru 660 VAC

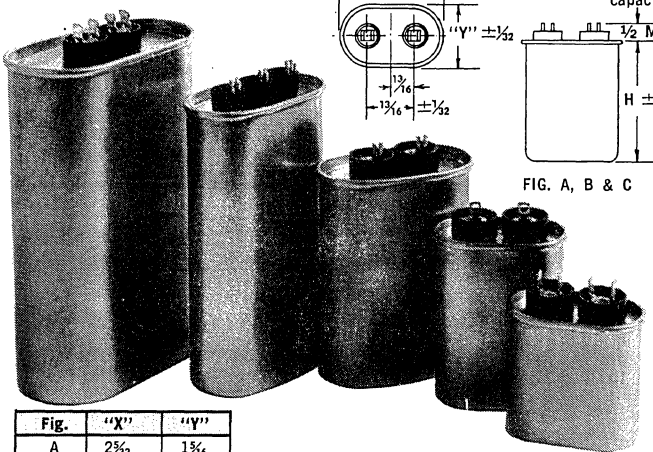


Fig.	"X"	"Y"
A	2 5/32	1 5/16
B	2 29/32	1 25/32
C	3 21/32	1 31/32

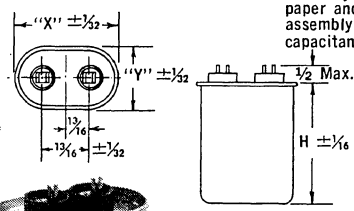


FIG. A, B & C

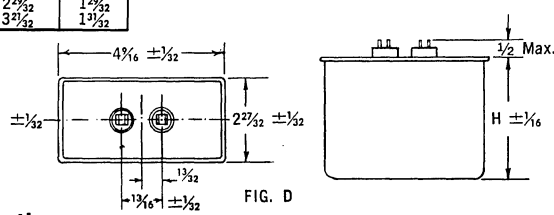
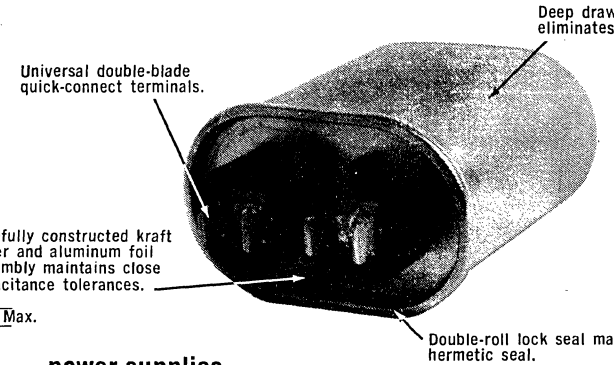


FIG. D



power supplies

Gudeman Series 9800 AC capacitors are ideal for power supply applications. They find use in typical filter networks for rectifiers or may be used for ferro-resonant transformer applications as a means of stabilizing and regulating the output voltage of constant-voltage supplies.

motor run

A typical application for the Series 9800 capacitors is improving the starting torque and efficiency of single phase motors. The capacitor provides the necessary split phase between the main and starting windings to produce sufficient starting torque.

specifications

CAPACITANCE AND TOLERANCE:
Capacitance shall be measured at a frequency of 60 Hz at 25°C ±5°C. Standard tolerance is ±10%.

POWER FACTOR:
The power factor shall not exceed .6% when measured at 60 Hz at 25°C ±5°C.

DIELECTRIC STRENGTH TESTS:
Capacitors shall withstand the following dielectric strength tests.

RATED AC VOLTAGE	TERMINAL TO TERMINAL TEST VOLTAGE DC	TERMINAL TO CASE TEST VOLTAGE DC
165	575	2800
236	700	2800
370	1200	3500
440	1600	3500
660	2400	4200

CAPACITANCE CHANGE WITH TEMPERATURE:

TEMPERATURE	CHANGE OF CAPACITANCE (MAX.)
25°C to +70°C	7.5%
25°C to 0°C	5%
25°C to −40°C	−30%

TERMINALS AVAILABLE:
Where not specified, capacitors are supplied with double blade quick-connect terminal. Other terminals available are:
Forked lug — add suffix "FL" to type number.
Solder lug with 0.12 dia. hole — add suffix "SL" to type number.

BRACKETS:
Spade or footed brackets available.

165 VAC 60 Hz

μf	Type No.	See Fig.	Case Height "H"
4	9800	A	2 1/16
5	9801	A	2 1/16
6	9802	A	2 1/16
7.5	9803	A	2 5/16
10	9804	A	2 13/16
12	9805	A	3 7/16
15	9806	A	3 13/16

236 VAC 60 Hz

μf	Type No.	See Fig.	Case Height "H"
3	9807	A	2 1/16
3	9808	A	2 1/16
4	9809	A	2 1/16
5	9810	A	2 5/16
6	9811	A	2 13/16
7.5	9812	A	3 7/16
10	9813	A	4 3/16
10	9814	B	2 5/8
12.5	9815	B	2 7/8
15	9816	B	3 1/2
17.5	9817	B	3 7/8
20	9818	B	4 1/4
20	9819	C	3 1/2
25	9820	B	5 1/4
30	9821	B	6 1/4
30	9822	C	4 3/4
35	9823	B	6 3/4
35	9824	C	5 3/4
40	9825	C	6 1/4
45	9826	C	7 1/4
50	9827	D	4 3/8

370 VAC 60 Hz

μf	Type No.	See Fig.	Case Height "H"
2	9828	A	2 1/16
3	9829	A	2 1/16
4	9830	A	2 5/16
5	9831	A	2 13/16
6	9832	A	3 7/16
7.5	9833	A	3 13/16
10	9834	A	4 3/4
10	9835	B	2 7/8
15	9836	B	3 7/8
17.5	9837	C	3 1/2
17.5	9838	B	4 3/8
20	9839	B	5 1/4

370 VAC 60 Hz (continued)

μf	Type No.	See Fig.	Case Height "H"
25	9840	B	6 1/4
25	9841	C	4 3/4
30	9842	C	5 3/4
35	9843	C	6 3/4
35	9844	D	4 3/8
40	9845	D	5 1/16
45	9846	D	5 5/8
50	9847	D	6 1/4

440 VAC 60 Hz

μf	Type No.	See Fig.	Case Height "H"
1	9848	A	1 5/8
2	9849	A	2 1/16
3	9850	A	2 5/16
4	9851	A	3 1/16
5	9852	A	3 13/16
6	9853	A	4 3/16
7.5	9854	B	3 1/8
10	9855	B	3 7/8
10	9856	C	3 1/8
12.5	9857	B	4 3/4
15	9858	B	5 1/4
17.5	9859	B	6 1/4
20	9860	B	7 1/4
20	9861	C	5 1/4
25	9862	C	6 1/4
30	9863	C	8
30	9864	D	5 1/16
35	9865	D	5 1/16
40	9866	D	6 1/4
45	9867	D	6 3/4
50	9868	D	7 1/4

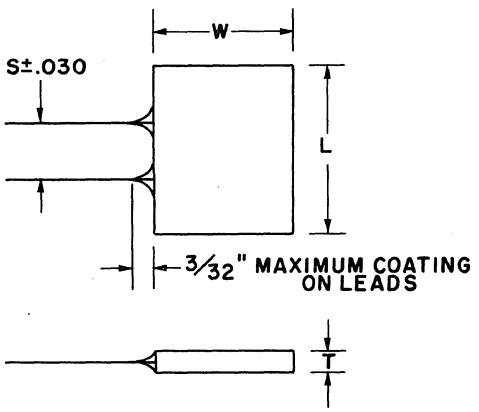
660 VAC 60 Hz

μf	Type No.	See Fig.	Case Height "H"
1	9869	A	2 1/4
2	9870	A	3 3/8
3	9871	B	2 5/8
4	9872	B	3 3/4
5	9873	B	4 1/8
6	9874	B	4 3/4
7.5	9875	B	5 3/4
10	9876	C	6 1/4
12	9877	D	4 3/16
15	9878	D	5 3/16

Gulton

CERAMIC CAPACITORS
DR Series

- **NPO**
- **RADIAL LEADS**



SPECIFICATIONS

WORKING VOLTAGE: 50 DC, 100 DC

TEMPERATURE RANGE: -55°C to +125°C (without derating)

INSULATION RESISTANCE: 100,000 megohms at +25°C initial
1000 megohms at +125°C

DISSIPATION FACTOR: Per MIL-C-20 (latest revision)

TEMPERATURE COEFFICIENT: NPO ±30 ppm/°C

LIFE TEST: 2 x WVDC at +125°C for 1000 hours

LEAD SIZE: #26 AWG (.016 dia.) tinned copper; DR10, 20, 30
#24 AWG (.020 dia.) tinned copper; DR31, 51, 67
#22 AWG (.025 dia.) tinned copper; DR71

COATING: Dipped plastic

MILITARY SPECIFICATIONS: Meet or exceed the requirements of MIL-C-20 (latest revision)

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
4.3 pf	DR10DCG439*	100	.120	.120	.080	.100
5.6 pf	DR10DCG569*	100	.120	.120	.080	.100
6.8 pf	DR10DCG689*	100	.120	.120	.080	.100
8.2 pf	DR10DCG829*	100	.120	.120	.080	.100
10 pf	DR10DCG100*	100	.120	.120	.080	.100
12 pf	DR10DCG120*	100	.120	.120	.080	.100
15 pf	DR10DCG150*	100	.120	.120	.080	.100
18 pf	DR20DCG180*	100	.150	.150	.080	.100
22 pf	DR20DCG220*	100	.150	.150	.080	.100
27 pf	DR20DCG270*	100	.150	.150	.080	.100
33 pf	DR30DCG330*	100	.200	.200	.080	.100
39 pf	DR30DCG390*	100	.200	.200	.080	.100
47 pf	DR30DCG470*	100	.200	.200	.080	.100
56 pf	DR30DCG560*	100	.200	.200	.080	.100
68 pf	DR31BCG680*	50	.200	.200	.100	.100
82 pf	DR31BCG820*	50	.200	.200	.100	.100
100 pf	DR31BCG101*	50	.200	.200	.100	.100
120 pf	DR31BCG121*	50	.200	.200	.100	.100
150 pf	DR31BCG151*	50	.200	.200	.100	.100
180 pf	DR31BCG181*	50	.200	.200	.100	.100
220 pf	DR31BCG221*	50	.200	.200	.100	.100
270 pf	DR31BCG271*	50	.200	.200	.100	.100
330 pf	DR31BCG331*	50	.200	.200	.100	.100
390 pf	DR31BCG391*	50	.200	.200	.100	.100
470 pf	DR31BCG471*	50	.200	.200	.100	.100

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
560 pf	DR31BCG561*	50	.200	.200	.100	.100
680 pf	DR31BCG681*	50	.200	.200	.100	.100
820 pf	DR31BCG821*	50	.200	.200	.100	.100
1000 pf	DR31BCG102*	50	.200	.200	.100	.100
1200 pf	DR31BCG122*	50	.200	.200	.100	.100
1500 pf	DR31BCG152*	50	.200	.200	.100	.100
1800 pf	DR31BCG182*	50	.200	.200	.100	.100
2200 pf	DR31BCG222*	50	.200	.200	.100	.100
2700 pf	DR31BCG272*	50	.200	.200	.100	.100
3300 pf	DR31BCG332*	50	.200	.200	.100	.100
3900 pf	DR31BCG392*	50	.200	.200	.100	.100
4700 pf	DR31BCG472*	50	.200	.200	.100	.100
5600 pf	DR51BCG562*	50	.300	.300	.100	.200
6800 pf	DR51BCG682*	50	.300	.300	.100	.200
8200 pf	DR51BCG822*	50	.300	.300	.100	.200
.010 µf	DR51BCG103*	50	.300	.300	.100	.200
.012 µf	DR51BCG123*	50	.300	.300	.100	.200
.015 µf	DR51BCG153*	50	.300	.300	.100	.200
.018 µf	DR67BCG183*	50	.400	.400	.125	.300
.022 µf	DR67BCG223*	50	.400	.400	.125	.300
.027 µf	DR67BCG273*	50	.400	.400	.125	.300
.033 µf	DR67BCG333*	50	.400	.400	.125	.300
.039 µf	DR67BCG393*	50	.400	.400	.125	.300
.047 µf	DR67BCG473*	50	.400	.400	.125	.300
.056 µf	DR71BCG563*	50	.500	.500	.125	.375
.068 µf	DR71BCG683*	50	.500	.500	.125	.375

*Add appropriate letter to designate tolerance as follows: Less than 10 pf; C = ±0.25 pf, D = ±0.5 pf; 10 pf and above; J = ±5%, K = ±10%

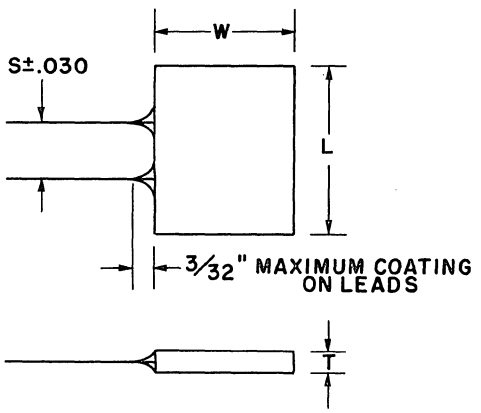
Most 50 VDC rated part numbers can be supplied with 100 VDC rating.

Gulton Industries, Inc. Microceramics Division
Metuchen, New Jersey 08840
Phone: 201-548-2800 • TWX-710-998-0592

Gulton

CERAMIC CAPACITORS
DR Series

- K4000
- RADIAL LEADS



SPECIFICATIONS

WORKING VOLTAGE: 50 DC, 100 DC

TEMPERATURE RANGE: -55°C to +125°C

INSULATION RESISTANCE: 1000 megohms - microfarads but need not exceed 100,000 megohms at +25°C

DISSIPATION FACTOR: 2.5% Max. at .5 VAC and 1 KHz

TEMPERATURE CHARACTERISTIC: +22%, -56% from -55°C to +85°C

LIFE TEST: 2 x WVC for values up to 1 µf; 1.5 x WDC for values greater than 1 µf

LEAD SIZE: #26 AWG (.016 dia.) tinned copper; DR10, 20, 30
#24 AWG (.020 dia.) tinned copper; DR31, 51, 67
#22 AWG (.025 dia.) tinned copper; DR71

COATING: Dipped plastic

MILITARY SPECIFICATIONS: Meet or exceed the requirements of MIL-C-11015 (latest revision)

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
470 pf	DR10DBN471*	100	.120	.120	.080	.100
560 pf	DR10DBN561*	100	.120	.120	.080	.100
680 pf	DR10DBN681*	100	.120	.120	.080	.100
820 pf	DR10DBN821*	100	.120	.120	.080	.100
1000 pf	DR10DBN102*	100	.120	.120	.080	.100
1200 pf	DR20DBN122*	100	.150	.150	.080	.100
1500 pf	DR20DBN152*	100	.150	.150	.080	.100
1800 pf	DR20DBN182*	100	.150	.150	.080	.100
2200 pf	DR30DBN222*	100	.200	.200	.080	.100
2700 pf	DR30DBN272*	100	.200	.200	.080	.100
3300 pf	DR30DBN332*	100	.200	.200	.080	.100
3900 pf	DR30DBN392*	100	.200	.200	.080	.100
4700 pf	DR31BBN472*	50	.200	.200	.100	.100
5600 pf	DR31BBN562*	50	.200	.200	.100	.100
6800 pf	DR31BBN682*	50	.200	.200	.100	.100
8200 pf	DR31BBN822*	50	.200	.200	.100	.100
.01 µf	DR31BBN103*	50	.200	.200	.100	.100
.015 µf	DR31BBN153*	50	.200	.200	.100	.100
.018 µf	DR31BBN183*	50	.200	.200	.100	.100
.022 µf	DR31BBN223*	50	.200	.200	.100	.100
.027 µf	DR31BBN273*	50	.200	.200	.100	.100
.033 µf	DR31BBN333*	50	.200	.200	.100	.100
.039 µf	DR31BBN393*	50	.200	.200	.100	.100
.047 µf	DR31BBN473*	50	.200	.200	.100	.100

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
.056 µf	DR31BBN563*	50	.200	.200	.100	.100
.068 µf	DR31BBN683*	50	.200	.200	.100	.100
.082 µf	DR31BBN823*	50	.200	.200	.100	.100
.10 µf	DR31BBN104*	50	.200	.200	.100	.100
.12 µf	DR31BBN124*	50	.200	.200	.100	.100
.15 µf	DR31BBN154*	50	.200	.200	.100	.100
.18 µf	DR31BBN184*	50	.200	.200	.100	.100
.22 µf	DR31BBN224*	50	.200	.200	.100	.100
.27 µf	DR31BBN274*	50	.200	.200	.100	.100
.33 µf	DR31BBN334*	50	.200	.200	.100	.100
.39 µf	DR51BBN394*	50	.300	.300	.100	.200
.47 µf	DR51BBN474*	50	.300	.300	.100	.200
.56 µf	DR51BBN564*	50	.300	.300	.100	.200
.68 µf	DR51BBN684*	50	.300	.300	.100	.200
.82 µf	DR51BBN824*	50	.300	.300	.100	.200
1.0 µf	DR51BBN105*	50	.300	.300	.100	.200
1.5 µf	DR67BBN155*	50	.400	.400	.125	.300
2.0 µf	DR67BBN205*	50	.400	.400	.125	.300
2.5 µf	DR67BBN255*	50	.400	.400	.125	.300
3.0 µf	DR67BBN305*	50	.400	.400	.125	.300
3.5 µf	DR71BBN355*	50	.500	.500	.125	.375
4.0 µf	DR71BBN405*	50	.500	.500	.125	.375
4.5 µf	DR71BBN455*	50	.500	.500	.125	.375
5.0 µf	DR71BBN505*	50	.500	.500	.125	.375

*Add appropriate letter to designate tolerance as follows: M = ±20%
Z = +80%, -20%
Most 50 VDC rated part numbers can be supplied with 100 VDC rating.

Gulton Industries, Inc. Microceramics Division
Metuchen, New Jersey 08840
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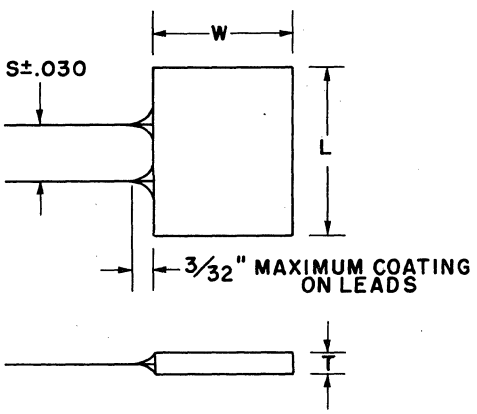
Gulton

CERAMIC CAPACITORS
DR Series

- **K1200**
- **RADIAL LEADS**



SPECIFICATIONS

WORKING VOLTAGE: 50 DC, 100 DC

TEMPERATURE RANGE: -55°C to +125°C

INSULATION RESISTANCE: 100,000 megohms at +25°C initial
1000 megohms at +125°C

DISSIPATION FACTOR: Per MIL-C-11015 (latest revision)

TEMPERATURE CHARACTERISTIC: ±15% -55°C to +125°C

LIFE TEST: 2 x WDC for values up to 1 µf; 1.5 x WDC for values greater than 1 µf

LEAD SIZE: #26 AWG (.016 dia.) tinned copper; DR10, 20, 30
#24 AWG (.020 dia.) tinned copper; DR31, 51, 67
#22 AWG (.025 dia.) tinned copper; DR71

COATING: Dipped plastic

MILITARY SPECIFICATIONS: Meet or exceed the requirements of MIL-C-11015 (latest revision)

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
100 pf	DR10DBM101*	100	.120	.120	.080	.100
120 pf	DR10DBM121*	100	.120	.120	.080	.100
150 pf	DR10DBM151*	100	.120	.120	.080	.100
180 pf	DR10DBM181*	100	.120	.120	.080	.100
220 pf	DR10DBM221*	100	.120	.120	.080	.100
270 pf	DR10DBM271*	100	.120	.120	.080	.100
330 pf	DR10DBM331*	100	.120	.120	.080	.100
390 pf	DR10DBM391*	100	.120	.120	.080	.100
470 pf	DR10DBM471*	100	.120	.120	.080	.100
560 pf	DR20DBM561*	100	.150	.150	.080	.100
680 pf	DR20DBM681*	100	.150	.150	.080	.100
820 pf	DR20DBM821*	100	.150	.150	.080	.100
1000 pf	DR20DBM102*	100	.150	.150	.080	.100
1200 pf	DR30DBM122*	100	.200	.200	.080	.100
1500 pf	DR30DBM152*	100	.200	.200	.080	.100
1800 pf	DR30DBM182*	100	.200	.200	.080	.100
2200 pf	DR30DBM222*	100	.200	.200	.080	.100
2700 pf	DR31BBM272*	50	.200	.200	.100	.100
3300 pf	DR31BBM332*	50	.200	.200	.100	.100
3900 pf	DR31BBM392*	50	.200	.200	.100	.100
4700 pf	DR31BBM472*	50	.200	.200	.100	.100
5600 pf	DR31BBM562*	50	.200	.200	.100	.100
6800 pf	DR31BBM682*	50	.200	.200	.100	.100
8200 pf	DR31BBM822*	50	.200	.200	.100	.100
.01 µf	DR31BBM103*	50	.200	.200	.100	.100
.012 µf	DR31BBM123*	50	.200	.200	.100	.100

CAP.	PART NUMBER	VOLTAGE	L max.	W max.	T max.	S ±.030
.015 µf	DR31BBM153*	50	.200	.200	.100	.100
.018 µf	DR31BBM183*	50	.200	.200	.100	.100
.022 µf	DR31BBM223*	50	.200	.200	.100	.100
.027 µf	DR31BBM273*	50	.200	.200	.100	.100
.033 µf	DR31BBM333*	50	.200	.200	.100	.100
.039 µf	DR31BBM393*	50	.200	.200	.100	.100
.047 µf	DR31BBM473*	50	.200	.200	.100	.100
.056 µf	DR31BBM563*	50	.200	.200	.100	.100
.068 µf	DR31BBM683*	50	.200	.200	.100	.100
.082 µf	DR31BBM823*	50	.200	.200	.100	.100
.10 µf	DR31BBM104*	50	.200	.200	.100	.100
.12 µf	DR31BBM124*	50	.200	.200	.100	.100
.15 µf	DR31BBM154*	50	.200	.200	.100	.100
.18 µf	DR51BBM184*	50	.300	.300	.100	.200
.22 µf	DR51BBM224*	50	.300	.300	.100	.200
.27 µf	DR51BBM274*	50	.300	.300	.100	.200
.33 µf	DR51BBM334*	50	.300	.300	.100	.200
.39 µf	DR51BBM394*	50	.300	.300	.100	.200
.47 µf	DR51BBM474*	50	.300	.300	.100	.200
.56 µf	DR51BBM564*	50	.300	.300	.100	.200
.68 µf	DR67BBM684*	50	.400	.400	.125	.300
.82 µf	DR67BBM824*	50	.400	.400	.125	.300
1.0 µf	DR67BBM105*	50	.400	.400	.125	.300
1.5 µf	DR67BBM155*	50	.400	.400	.125	.300
2.0 µf	DR71BBM205*	50	.500	.500	.125	.375
2.5 µf	DR71BBM255*	50	.500	.500	.125	.375

*Add appropriate letter to designate tolerance as follows: J = ±5%
K = ±10%
M = ±20%

Most 50 VDC rated parts can be supplied with 100 VDC rating.

Gulton Industries, Inc. Microceramics Division
Metuchen, New Jersey 08840
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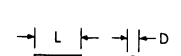
Gulton

CERAMIC CAPACITORS

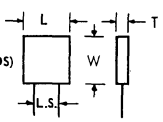
CT10, CT14, CK05, CK06 Series

A NEW NPO CERAMIC CAPACITOR featuring significantly increased volumetric efficiency

CT STYLE: (AXIAL LEADS)



CK STYLE: (RADIAL LEADS)



Dimensional Tolerances: D, L, W, and T ±.010
Lead Spacing (L.S.) ±.015

SPECIFICATIONS

TEMPERATURE RANGE:	-55°C to +125°C
TEMPERATURE COEFFICIENT:	< 30 ppm/°C from -55 to +125°C
DISSIPATION FACTOR:	0.1% at 1 VAC, 1 MHz
INSULATION RESISTANCE:	1000 megohms - microfarads but need not exceed 100,000 megohms at +25°C
FLASH TEST VOLTAGE:	3 times WVDC
LIFE TEST:	2 times WVDC at +125°C for 1000 hours
LEAD SIZE:	#22 AWG
CAPACITANCE TOLERANCE:	F, G, J, and K
MILITARY SPECIFICATIONS:	Will meet or exceed latest revision MIL-C-20
ENCAPSULATION:	Epoxy molded case

D	.090	
L	.250	.190
W		.190
T		.090
Lead Spacing		.100
Style and Size Code	CT10	CK05
Capacitance Value	WVDC 50 100	WVDC 50 100
10 pF		
12		
15		
18		
22		
24		
27		
30		
33		
36		
39		
43		
47		
51		
56		
62		
68		
75		
82		
91		
100		
110		
120		
130		
150		
160		
180		
200		
220		
240		
270		
300		
330		
360		
390		

D	.090		.130	
L	.250	.190	.390	.290
W		.190		.290
T		.090		.090
Lead Spacing		.100		.200
Style and Size Code	CT10	CK05	CT14	CK06
Capacitance Value	WVDC 50 100	WVDC 50 100	WVDC 50 100	WVDC 50 100
430 pF				
470				
510				
560				
620				
680				
750				
820				
910				
1000				
1200				
1500				
1800				
2000				
2200				
2400				
2700				
3000				
3300				
3600				
3900				
4300				
4700				
5100				
5600				
6200				
6800				
7500				
8200				
9100				
.010 µF				
.012				
.015				
.018				
.020				

HOW TO ORDER NUMBERING CODE

Typical

1. CK06
2. B
3. CG
4. 153
5. J
6. 1

Code

1. Style/Size: CT10, CT14 CK05, CK06
2. WVDC: 50 V - B 100 V - D
3. Dielectric: CG
4. Capacitance: EIA Code
5. Tolerance: ± 1% - F ± 2% - G ± 5% - J ±10% - K
6. Lead Type: Tinned Copper - blank; Gold Dumet - 1; Nickel Lead - 2

Gulton Industries, Inc. Microceramics Division
Metuchen, New Jersey 08840
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How to use eem

to find manufacturers of a specific product

GREEN SECTION

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Blocksom & Co., Michigan City, Ind.
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Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
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Lieco, Inc., Lindenhurst, N.Y.
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Maury Microwave Corp., Cucamonga, Calif.

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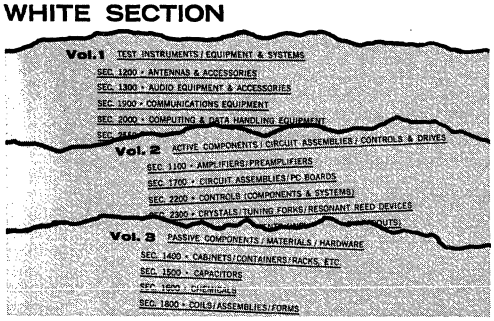
Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

to find manufacturers' catalog information

WHITE SECTION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SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1500 • COMMUNICATIONS EQUIPMENT
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SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

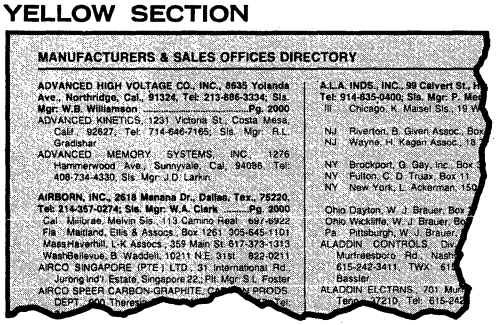
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. in Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627; Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal, 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Melbrae, Melvin Sls., 113 Camino Real, 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass:Haverhill, L-K Assocs., 359 Main St 617-373-1313
Wash:Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
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A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill: Chicago, K. Masel Sls., 19 W...
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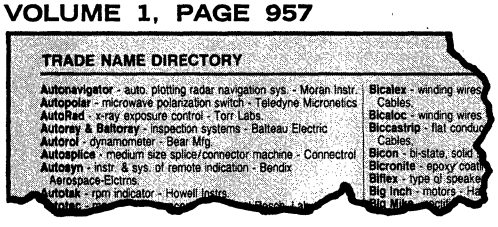
NJ: Wayne, H. Kagan Assoc., 18 ...
NY: Brockport, D. Gay, Inc., Box ...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box ...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa.: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411, TWX: 61... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn. 37210, Tel: 615-24...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autorey & Battorey - inspection systems - Batteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible] - Reach Lab
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat conduc Cables.
Bicon - bi-state, solid-
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha
Big Mike - [illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

If you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

capacitors—HV

HIPOTRONICS®

CORSON ELECTRIC
A DIVISION OF HIPOTRONICS®

. . . COMBINING 4 DECADES OF EXPERIENCE WITH EXTENSIVE, MODERN FACILITIES TO BRING YOU HIGH VOLTAGE CAPACITORS AND PULSE FORMING NETWORKS FOR YOUR UNIQUE APPLICATIONS — WITHOUT ANY LOSS OF RELIABILITY.

HOWEVER UNUSUAL YOUR APPLICATIONS, CORSON ELECTRIC CAN VERY LIKELY FILL YOUR NEEDS IMMEDIATELY — OR HAS PROBABLY DESIGNED TO SIMILAR SPECIFICATIONS IN THE PAST. THE ADVANTAGE TO YOU IS PROVEN DESIGNS — WHICH MEANS LESS TIME, LESS COST, MORE RELIABILITY.

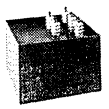
CORSON ELECTRIC ALSO HAS A STANDARD SINGLE CAN CAPABILITY UP TO 200 MFD, WITH ASSEMBLIES TO EVEN HIGHER RATINGS.

CORONA TEST

To assure high reliability and long life, all equipment is tested to Hipotronics' specification #2514 or #2515. These specifications require a corona detector with a basic sensitivity of 1 picocoulomb per centimeter.

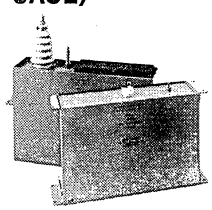
HV (HEAVY DUTY) CAPACITORS

Voltage range	0.0001 mfd @ 500 KV to 100 mfd @ 10 KV
Application	HV DC power supplies



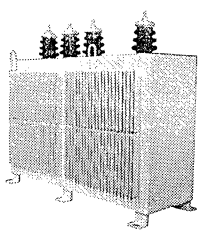
PULSE CAPACITORS (SINGLE CASE)

Voltage range	Typically to 100 KV
Frequency	1 to 25,000 pps
Application	Pulse forming networks



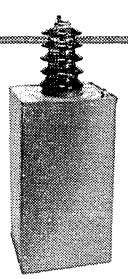
PULSE FORMING NETWORKS

Voltage range	Typically to 100 KV
Frequency	1 to 25,000 pps
Pulse width	Unlimited
HV sections	Unlimited
Impedance	0.001 to 1000 ohms
Application	Line type modulation



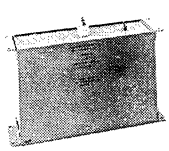
IMPULSE GENERATOR DUTY CAPACITORS

Voltage range	Typically to 100 KV
Capacitance	0.05 to 1.0 mfd
Application	Impulse generators for lightning strike simulation



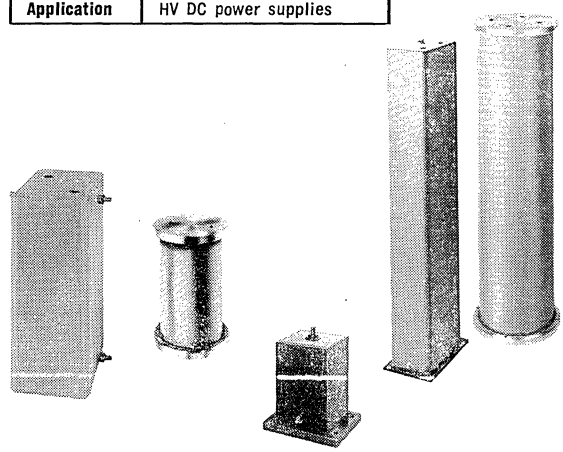
ENERGY STORAGE CAPACITORS

Voltage range	Typically to 75 KV DC
Capacitance	0.05 to 0.5 mfd
Application	Hard tube modulators



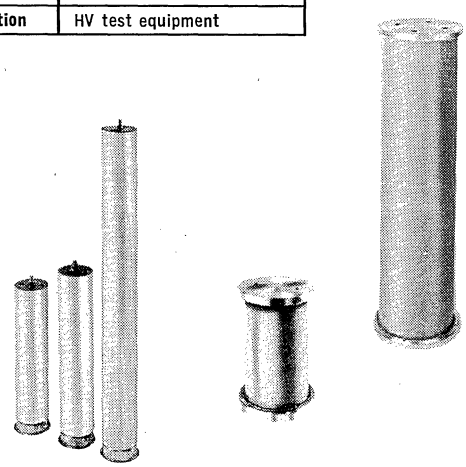
HV (DC FILTER) CAPACITORS

Voltage range	0.0075 mfd @ 500 KV to 200 mfd @ 4 KV
Application	HV DC power supplies



CORONA-FREE CAPACITORS

Voltage range	Typically to 125 KV @ 60 Hz
Capacitance	To 0.004 mfd
Application	HV test equipment



HIPOTRONICS®

HIPOTRONICS, INC.
Brewster, N. Y. 10509 / (914) 279-8091

The above are just some of the capacitors manufactured by Corson Electric. Call Don Corson for immediate assistance on these and other unique applications. See other Hipotronics' listings under Test Instruments, Power Supplies, and Transformers.

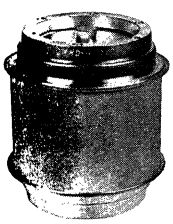
vacuum capacitors

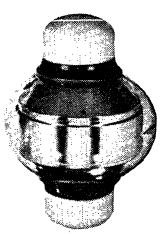
INTRODUCTION: ITT Jennings offers the broadest available line of high voltage capacitors for radio frequency applications. Units are available in glass and ceramic envelopes with working voltage ratings of 2 kv to 40 kv, at capacitance values to 5000pfd, with current ranges of 250 amps air cooled and 750 amps rms water cooled at 16 mhz.

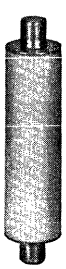
ADVANTAGES: The use of a vacuum dielectric allows a unit design with a number of electrical, mechanical, and environmental advantages which include the following:

1. *High Voltage*—The high dielectric strength allows maximum voltage levels of any capacitor for a given capacity rating.
2. *High Current*—Due to low losses and heavy copper construction, vacuum capacitors carry high rf currents.
3. *Compact Design*—Units are small for their power handling capabilities due to the high breakdown voltage of the vacuum dielectric.
4. *High Maximum to Minimum Capacity Ratio*—Capacity change ratios are available to 150:1, making them desirable for wide tuning ranges.
5. *Low Losses*—Extremely low losses occur because of the dielectric, the low loss glass and ceramic envelopes, and the copper and silver solder construction. Therefore, units are able to handle large currents at high rf frequencies that would destroy capacitors with other dielectrics.
6. *Self Healing*—The vacuum dielectric permits moderate overloads that would damage other materials.
7. *High Altitude Operation*—Vacuum capacitors are free from internal degradation from extreme environmental conditions.

vacuum fixed capacitors







RF WORKING KV	TYPE		CAPACITY PF	PEAK WORKING VOLTAGE[1] KILOVOLTS	CONTINUOUS RMS AMPERES[2] (16 MHz)	NOMINAL DIMENSIONS (Inches) LENGTH	DIAMETER
3 kv	G*	JSLF	1000	3	30	1.7	3.2
		JSLF	5000	3	100	2.9	4.3
		JCSL	1000, 1500, 2000	3	50	4.0	2.9
	C	CFCD	500, 1000, 2000	3	85	2.7	3.8
10 kv	G	JCSF	25, 40, 50, 80, 120, 150	10	30	1.7	1.7
		JCS	250, 400, 500	10	65	4.0	3.1
		JCS	1000	10	65	4.7	3.7
		MC1	500, 750, 1000	10	80	4.2	4.2
		MMC1	2000	10	125	5.0	6.2
		MMC	1500, 2000	10	140	9.3	6.2
	C	CFDP	2000	10	125	3.3	5.7
12 kv to 20 kv	G	MC	500, 750, 1000	12	100	8.4	5.0
		VC	6, 12, 25, 50, 75, 100	20	70	6.5	2.3
		VCCE	200, 250	18	70	6.5	2.7
		MLC	500, 750, 1000	18	125	9.3	4.5
	C	CY	1, 2, 3, 4, 5	18	8	3.3	0.8
		CFED	150, 300	18	100	3.7	3.8
		CFED	500, 750, 1000	15	125	3.9	4.9
		CFFP	2000	20	215	5.8	8.2
30 kv to 35 kv	G	MMHC	450	35	145	9.3	6.2
		MMHC	1000	30	200	13.0	9.3
30 kv to 36 kv	C	CFHD	12, 25, 50, 100	36	130	5.2	3.8
		CFHD	200, 300	36	180	5.4	4.9
		CFHP	450	33	215	5.5	5.7
		CFHP	1000	30	215	6.2	7.2

ITT JENNINGS
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DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

vacuum variable capacitors

RF WORKING KV		TYPE	CAPACITY PF	PEAK WORKING VOLTAGE[1] KILOVOLTS	CONTINUOUS RMS AMPERES[2] (16 MHz)	NOMINAL DIMENSIONS (Inches) LENGTH	DIAMETER
2 kv to 3 kv	G	UCSL	4-250	3	30	4.2	2.2
		UCSL	5-750, 7-1000, 10-1500, 20-2000	3	42	8.3	3.2
		UCSL	50-3000	2	42	8.8	4.2
		USL	5-500	3	40	5.8	2.4
		USLS	5-465 Shorting	3	40	5.7	2.4
	C	CVCC	25-2500	3	60	5.3	3.8
		CVCD	5-500	3	70	6.0	2.8
		CVCD	10-1500, 20-2000, 50-3000	3	80	8.3	4.9
		CVCE	10-750	3	80	7.1	3.8
		CVQA	8-1000	3	25	4.4	1.8
7.5 kv to 15 kv	G	ECS	2-8, 3-30	10	20	4.2	1.2
		UCS	5-200, 10-400	10	42	9.0	3.2
		UCSB	5-100	10	40	4.9	2.4
		UCSF	12-500	10	45	7.9	3.6
		UCSF	50-1700	10	45	6.9	6.0
		UCSX	25-1000	10	45	9.9	3.8
		UCSXF	12-1000, 15-1200	10	50	10.1	4.4
		UCSXF	20-1500, 50-2000	7.5	50	10.1	5.2
		VMMC	50-1000, 100-2000	10	90	15.7	6.2
		VMMC	100-5000	10	125	21.4	9.3
	C	CADA	40-600	10	65	5.8	3.5
		CADC	3-30	10	36	4.7	1.4
		CVDD	6.5-50, 10-100	10	70	6.7	2.8
		CVDD	10-300, 20-500	10	80	7.6	3.8
		CVDD	25-1000	10	105	8.0	4.9
		CVEP	25-500, 50-1000, 100-1500	15	140	10.2	7.2
		CVEP	100-2000	10	150	10.2	7.2
20 kv to 35 kv	G	UCSVH	8-35	20	35	4.8	3.0
		UHC	10-75	35	60	12.0	5.0
	C	CVFP	15-250, 25-450	25	140	9.6	5.7
		CVFP	20-750, 35-1000	25	150	11.7	7.2
		CVFP	100-2000	20	150	14.5	8.2
		CVHC	100-1600 (Air Cooled)	25	250	17.8	8.2
		CVHE	25-650 (Air Cooled)	35	250	12.5	7.2
		CVHP	10-250, 25-450, 30-650	35	170	11.9	7.2
		CVHP	60-1000	30	170	14.5	8.2
		CVHW	20-250, 25-450 (Water Cooled)	30	700	13.5	7.6
40 kv	C	CVTW	100-1600 (Water Cooled)	40	750	23.0	12.6

* G = Glass; C = Ceramic

[1] RF working voltage is the maximum RF voltage that can be applied to the capacitor over the 2-32 MHz frequency range, provided the RF current rating is not exceeded.

[2] RF current rating is dependent upon capacity and frequency. Write for complete applications data.

APPLICATIONS: Because of the high power handling capability of vacuum capacitors, their application is broad in the field of communications where space is critical or where high voltage must be safely handled with maximum reliability.

Specific uses for the Jennings capacitor would include tunable or fixed elements in transmitter tank circuits, in impedance matching networks for antenna couplers, in high power filters for multi-coupling and harmonic reduction, and in various voltage dividing networks.

ITT JENNINGS
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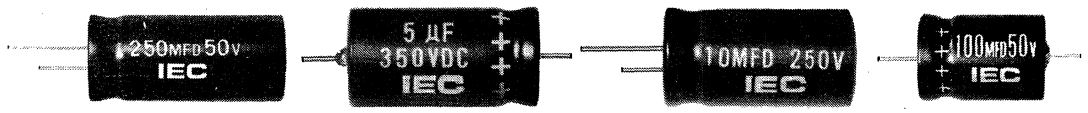
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE

IEC CAPACITORS

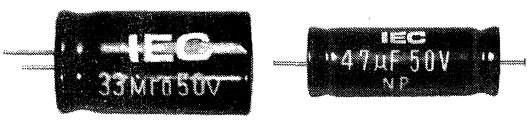
INTERNATIONAL ELECTRONICS CORPORATION

ELECTROLYTIC CAPACITORS



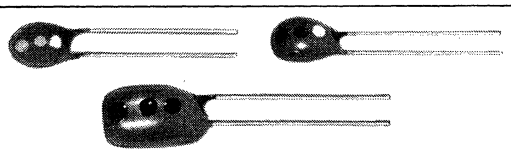
Miniature Aluminum Electrolytic — Axial and radial lead styles with welded construction, in PVC insulated aluminum cans. Unique spinning and crimping method assures a tight fitting end seal that provides proper venting while effectively resisting humidity and cleaning agents.

Capacitance Range	.47 MFD—2000 MFD
Operating Voltage	6.3 Volts D.C.—450 Volts D.C.
Temperature	—40°C to +85°C



Non-Polarized Electrolytic — Designed for use in circuits seeing polarity reversals, such as speaker crossover networks, and bypass applications. A unique method of sealing permits the capacitor leads to be connected directly to the electrolytic element.

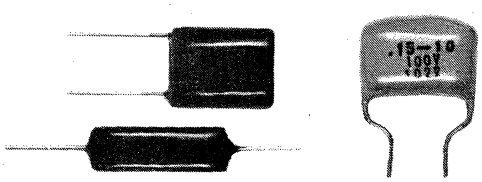
Capacitor Range	1.0 MFD—100 MFD
Operating Voltage	25, 35, 50 Volts D.C.
Temperature	—30°C to +85°C



Dipped Solid Tantalum — Epoxy-dipped miniature capacitors with radial leads for printed circuit applications.

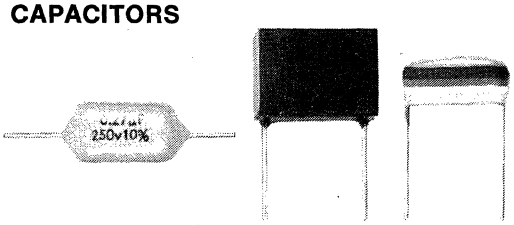
Capacitance Range	.1 MFD—100 MFD
Operating Voltage	3 Volts D.C.—35 Volts D.C.
Temperature	—55°C to +85°C

POLYESTER FILM CAPACITORS



Subminiature Polyester Film — Subminiature package with radial leads for easy insertion in printed circuit boards. Axial and radial lead versions are triple epoxy dipped to assure a high insulation resistance and humidity protection.

Capacitance Range	.001 MFD—.5 MFD
Operating Voltage	100, 200, 400, 600 Volts D.C.
Temperature	—40°C to +85°C, with no derating



Metalized Polyester Film — Non-inductively wound, extended foil construction. Self-healing characteristics assure extended life in all applications.

Capacitance Range	.0047 MFD—10 MFD
Operating Voltage	63 Volts D.C.— 600 Volts D.C.
Temperature	—40°C to +125°C

Over 4,000 types and sizes available from stock.

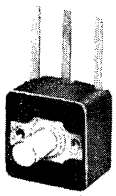
Our manufacturing and distribution control system guarantees that we never run short. So IEC or our distributors can deliver the capacitors you want, when you want them.

And we know that quality is as crucial as delivery. That's why our capacitors are built for accuracy and have to pass the industry's most demanding life tests before shipment. These are some of the reasons leading manufacturers of entertainment and industrial equipment everywhere depend on IEC.

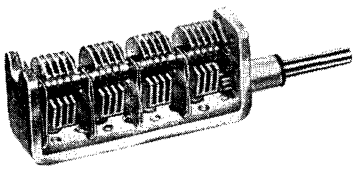
If you use electrolytic or film capacitors, trust IEC to deliver quality at a competitive price. For complete details, write or call International Electronics Corporation, Melville, New York 11749, (516) 694-7700.

IEC

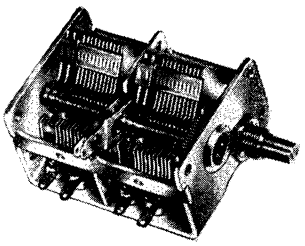
JACKSON BROS. (LONDON) LTD. VARIABLE CAPACITORS FOR ALL PURPOSES MADE IN ENGLAND



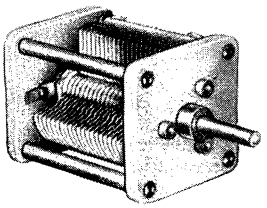
Miniature
Solid
Dielectric
1 or 2 gang.



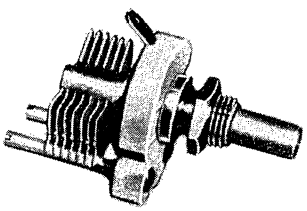
Miniature FM
2, 3, and 4 gang.



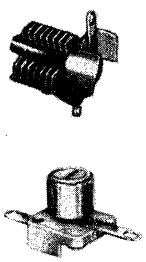
AM Tuning
1, 2, 3, and 4 gang.



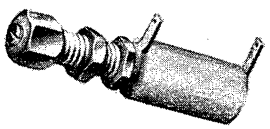
TRANSMITTING.



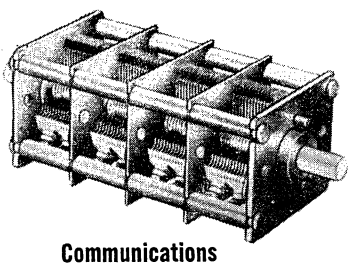
TRIMMING.



MINIATURE
PRESET.

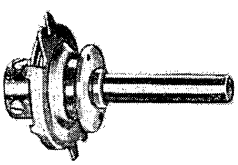


Precision
Plunger Trimmers.

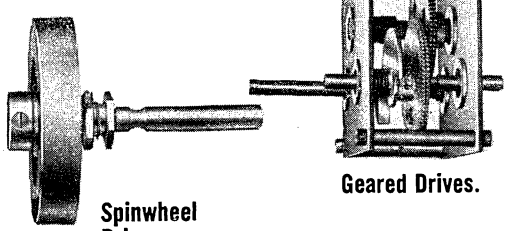


Communications
1 to 6 gang.

JACKSON BROS. (LONDON) LTD. TUNING CONTROLS/DRIVES/ TERMINALS MADE IN ENGLAND

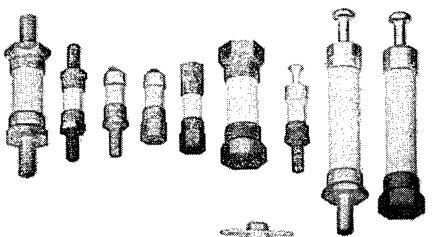


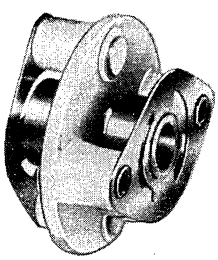
Epicyclic
Coaxial Drives.



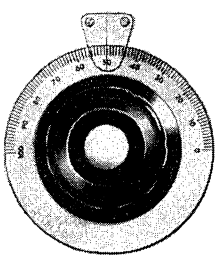
Spinwheel
Drives.

Geared Drives.





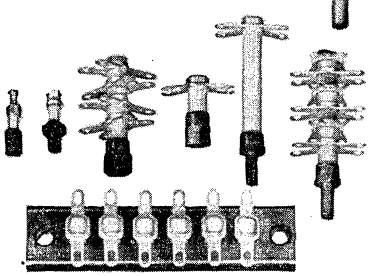
Flexible Constant
Velocity Shaft
Couplings.



Slow Motion Drives.

Spindle Locks.

Drive Drums.



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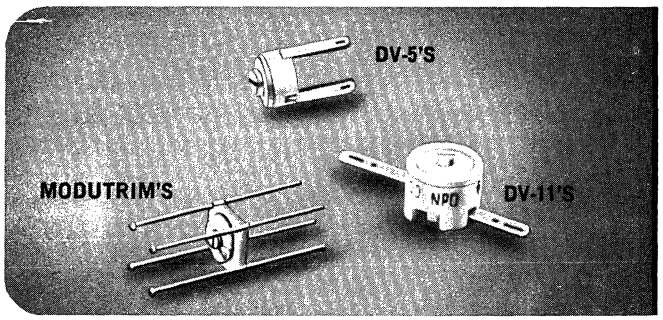
JFD

FIXED AND VARIABLE CAPACITORS



CERAMIC VARIABLES offer a wide choice of mounting configurations and capacitance values for use in the low cost commercial thru high grade Military markets. Meet applicable Mil-C-81A requirements.

Modutrims—especially designed for micromodule and hybrid circuit applications. MT's are available in 5 basic mounting configurations. Capacitance range 5 to 60 pf. max.

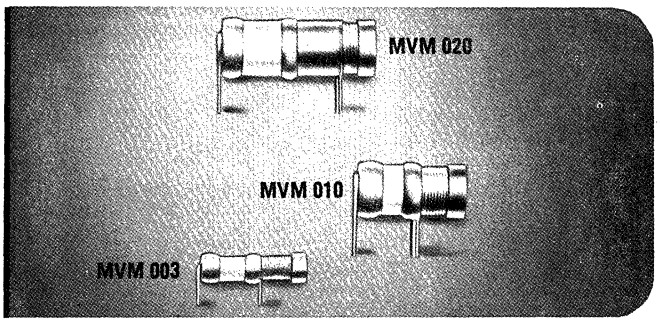
DV-5's—5 mm's in diameter, these microminiature units occupy less than .050 square inches of printed circuit board space. Capacitance range 9 to 30 pf. max.

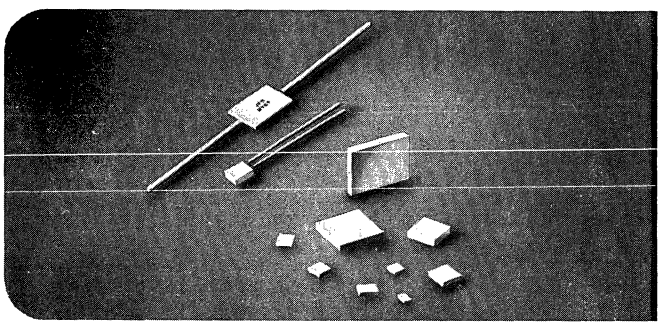
DV-11's—9.5 mm's in diameter, these low cost capacitors were designed for TV, AM, FM receivers, test equipment, communication equipment, low power transmitters, filters and delay line applications. 4 mounting configurations are available. Capacitance range 8 to 60 pf. max.

Write for Ceramic Variable catalogs.

AIR VARIABLES—designed for high frequency requirements. JFD air variables are rugged, small in size and offer many unique advantages over competitive units. These are: a metal rotor that provides more constant torque during and beyond torque life (600 turns), increased electrical contact assuring lower noise levels and a unique internal guiding element that keeps the rotor centered under the severest environmental conditions. Conforms to applicable portions of Mil-C-14409. Five series comprise this line.

MVM 003—Microminiature in size. Capacitance range is 0.35 pf to 3.5 pf.
MVM 006—Microminiature in size. Capacitance range 0.40—6.0 pf (not shown).
MVM 010—Capacitance range 0.8—10 pf.
MVM 020—Capacitance range 1.0—20 pf.
VAM 010—Capacitance range 0.8—10 pf (not shown).
All MVM's are completely interchangeable with competitive units. Write for Air Variable Catalogs.





UNICERAM HI Q & K CHIPS—Monolithic Hi Q chips offer the ultimate in stability and small size for high frequency applications. With typical Q values of 10,000 and more; these units offer a high ratio of capacity per unit volume. Available in 5 case sizes from .109" to .406" and in capacitance ranges of .5 pf to 3000 pf. Meet or exceed portions of MIL-C-11272B.

Uniceram Hi Q capacitors are also available in leaded configurations. 5 case sizes are included with capacitance values of 0.5 pf to 3000 pf.

Hi K chips are ideal for high density packaging in cordwood, hybrid and thick film circuits. Manufactured in 18 case sizes. Capacitance range 5 pf to 1.5 mfd. Meet or exceed portions of MIL-C-11015 and MIL-C-39014.

Hi Q and K chips are available with silver leads and glass encapsulation for difficult applications.

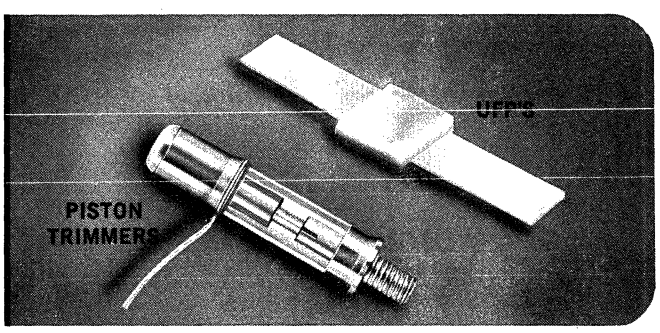
Write for Uniceram catalogs.

HI RF POWER CAPACITORS—FIXED AND VARIABLE were designed for communication applications.

Piston Trimmers—units feature a unique fused quartz cylinder that yields an extremely low dissipation factor and temperature coefficient. Piston Trimmers operate over a frequency range of from 1 to 30 MHz. Two models comprise this series: VCJ1616M—operates on an RF voltage level of 3100 V peak at +25°C derated to 2500 V peak at +200°C (superimposed on 2500 V DC). Capacitance range 0.5 to 5 pf. VCJ1616E—operates on an RF voltage level of 4,000 V peak at +25°C derated to 3500 V peak at +200°C (superimposed on 2,500 V DC). Capacitance range: 0.9 to 5 pf.—These units can be used at much higher frequencies with proper RF voltage derating.

UFP-Fixed Ceramics—UFP's are the smallest RF power capacitors made. Offered in three standard sizes, these highly stable and reliable fixed ceramics have been used in frequencies as high as 200 MHz. Capacitance values from 10 to 3,000 pf (±.5 for low capacitance values; ±5% and ±10% for higher values).

Write for Hi RF Voltage Piston Trimmer and Uniceram High RF Current Fixed Ceramic Catalogs.



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HIGH Q VARIABLE CAPACITORS

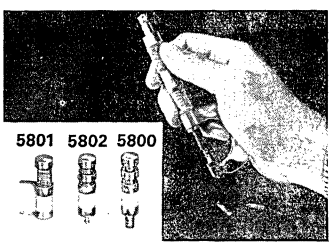
air—ceramic—
glass—quartz

ROTARY CERAMIC DISC TRIMMER CAPACITORS

The 9300 series miniature and microminiature rotary ceramic disc trimmer capacitors provide the circuit engineer features previously not available in units of such small size. The precision designed rotor plate provides long life and environmental stability. The series is mechanically designed to insure high resistance to shock and vibration. Their low cost in quantity makes them ideal for a wide variety of applications.

Capacitance Range: 1.7 pF to 70.0 pF
Working Voltage: 250 VDC (test voltage 500 VDC)
Q @ 10 MHz: > 200 to > 500
Temperature Coefficient: NPO ±250 ppm/°C to −1400 ±800 ppm/°C
Temperature Range: − 55°C to +85°C
Insulation Resistance: 10^4 Megohms @ 250 VDC @ Maximum Capacity

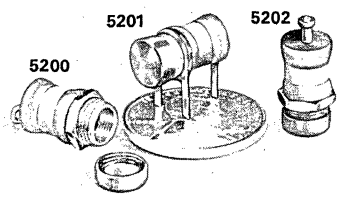
MICROWAVE AIR VARIABLE CAPACITORS



These new Ultra High Q Trimmers incorporate a new patented contact mechanism which affords Q's previously unavailable in trimmer capacitors, excellent tuning stability with very low dynamic noise, approximately zero temperature coefficient and extended frequency range into the C-band region. These capacitors are ideally suited for VHF, UHF and microwave applications.

Capacitance Range: 0.35 pF to 3.5 pF
Working Voltage: 250 VDC (test voltage 500 VDC)
Q @ 100 MHz: > 10,000; @ 250 mc: > 2000
Insulation Resistance: > 10^6 megohms
Temperature Range: −55°C to +125°C
Temperature Coefficient: 0 ±15 ppm/°C

MIL APPROVED HIGH Q VARIABLE AIR CAPACITORS

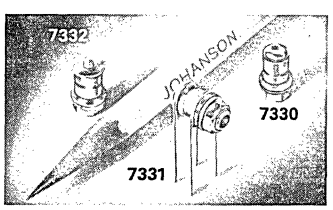


Models 5200 & 5201 are included in QPL List 14409 and bear PC25J100 & PC26J100 part number designations.

These capacitors feature Johanson's patented one piece contact-rotor mechanism and afford Q's previously unavailable in trimmers of such a miniature size. They are ruggedly designed for complete protection against all environmental conditions yet provide critical tuning stability.

Capacitance Range: 0.8 to 10.0 pF
Working Voltage: 250 VDC (test voltage 500 VDC)
Breakdown: > 500 VDC
Insulation Resistance: > 10^6 megohms @ 500 VDC
Q @ 100 MHz: > 5000
Temperature Coefficient: 0 ±15 ppm/°C
Shock: >275 g (6.0 millisec.)

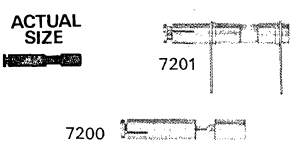
GLASS TRIMMER CAPACITORS



The Johanson 7300 series of variable capacitors is ideally suited for both commercial and military applications. The unique solid metal band design assures electrical and mechanical reliability in excess of conventional trimmers. The three mounting configurations available in this series affords the circuit designer wide latitude in mechanical layout.

Capacitance Range: 1.0 pF to 10.0 pF
Working Voltage: 500 VDC (test voltage 1000 VDC)
Q @ 100 MHz: > 900
Insulation Resistance: > 10^6 megohms
TemperatureRange: −55°C to +125°C
Temperature Coefficient: 0 ±50 ppm/°C

MICROCIRCUIT TRIMMER CAPACITORS



The 7200 series Microcircuit Trimmer is the *smallest* device of this type available. It is ideally suited for hybrid circuits, UHF oscillators, striplines, balancing of semiconductors and microwave components. They eliminate the need for abrasive trimming, trimming by interchange of fixed capacitors or trimming by inductors as well as providing the ability to "tweak" a circuit after encapsulation.

Capacitance Range: 0.1 pF to 2.0 pF
Working Voltage: 500 VDC, Test 1000 VDC
Q @ 100 MHz: > 3000
Temperature Coefficient: 50 ±50 ppm/°C
Insulation Resistance: 10^4 megohms at 200 VDC

Variable capacitors are our business. We make all types: air, quartz and glass. And we can offer you a choice of nearly 100 models directly from stock. Including:

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- Microcircuit Trimmer Capacitors
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- Microwave Power Capacitors
- Tuning Capacitors
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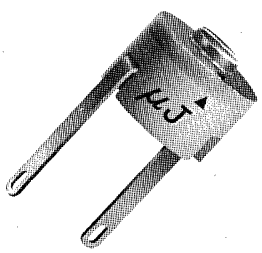
Free Capacitor Catalog 16-page catalog gives specific information on complete capacitor line. Send request on your letterhead to E. F. Johnson Co., 1923 10th Avenue S.W., Waseca, Minn. 56093.



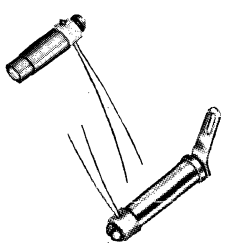
CERAMIC DISC TRIMMERS

Sub-miniature ceramic disc trimmer exhibits extreme environmental stability and long life due to the encapsulation of the rotor plate in titinate. Diameter: 0.218". Designed to meet or exceed performance criteria of MIL-C-81B. Operating range is −55° to 125°C. NPO temperature characteristics, Type A. Working voltage 100 VDC up to 85°C, 50 VDC up to 125°C. Peak withstanding voltage is greater than twice the working voltage.

Maximum Percentage Capacitance Change from value at 25°C

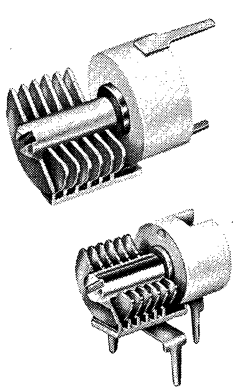
−55°C		+85°C		+125°C	
Max. C	Min. C	Max. C	Min. C	Max. C	Min. C
+2.0%	−4.5%	+2.0%	−2.5%	+3.4%	−4.2%

Vertical Mount Cat. No.	Nominal Capacity (pF) Max.	Min.
274-0009-005	9.0	2.5
274-0020-005	20.0	3.5
274-0025-005	25.0	5.0



TEFLON TRIMMERS

Cat. No.	Mounting	Nominal Capacity (pF) Max.	Min.	Torque Oz. In.	Peak Withstanding Voltage	Adjustment Turns Per Inch
273-0001-001	PC	1.5	.25	.2-3.0	2,000	80
273-0001-002	Solder Lug	1.5	.25	.2-3.0	2,000	80



TYPE "T" CAPACITORS

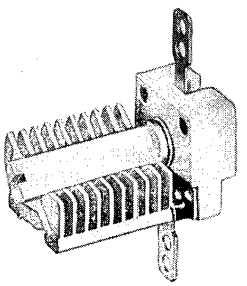
Vertical and Horizontal Printed Circuit Mount—Single Section

Vertical Mounting Cat. No.	Horizontal Mounting Cat. No.	Nominal Capacity (pF) Max.	Min.	Total Plates	Lgth. (in.)
187-0103-005	**187-0103-105**	5.4	1.3	6	.36
187-0106-005	**187-0106-105**	11.0	1.7	12	.47
187-0109-005	**187-0109-105**	15.7	1.9	18	.58

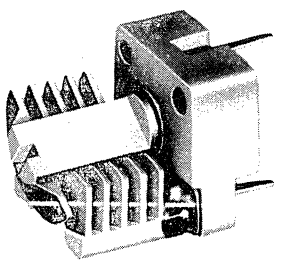
Also available as specials with minimum of 4 plates to maximum of 20 plates.

TYPE "U" CAPACITORS

Cat. No.	Nominal Capacity (pF) Max.	Nominal Capacity (pF) Min.	Plates	L±1/32"	Peak Withstanding Voltage	Air Gap
Two-Hole Mounting Type "U" Capacitors—Single Section						
189-0501-004	4.2	1.2	4	27/64"	650	.010"
189-0502-004	6.7	1.3	6	15/32"	650	.010"
189-0503-004	9.2	1.4	8	33/64"	650	.010"
189-0504-004	11.6	1.5	10	9/16"	650	.010"
189-0505-004	14.1	1.7	12	39/64"	650	.010"
189-0506-004	16.7	1.8	14	43/64"	650	.010"
189-0507-004	19.3	2.0	16	23/32"	500	.010"
189-0508-004	21.9	2.2	18	49/64"	500	.010"
189-0509-004	24.5	2.4	20	13/16"	500	.010"



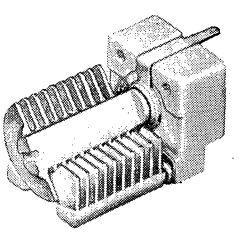
Cat. No.	Nominal Capacity (pF) Max.	Nominal Capacity (pF) Min.	Plates	L±1/32"	Peak Withstanding Voltage	Air Gap
Printed Circuit Mounting Vertical Type "U" Capacitors—Single Section						
189-0501-005	4.2	1.2	4	27/64"	650	.010"
189-0502-005	6.7	1.3	6	15/32"	650	.010"
189-0503-005	9.2	1.4	8	33/64"	650	.010"
189-0504-005	11.6	1.5	10	9/16"	650	.010"
189-0505-005	14.1	1.7	12	39/64"	650	.010"
189-0506-005	16.7	1.8	14	43/64"	650	.010"
189-0507-005	19.3	2.0	16	23/32"	500	.010"
189-0508-005	21.9	2.2	18	49/64"	500	.010"
189-0509-005	24.5	2.4	20	13/16"	500	.010"



TYPE "V" CAPACITORS

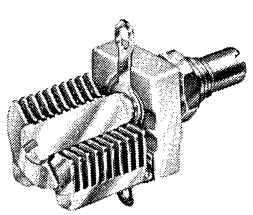
Cat. No.	Nominal Capacity (pF) Max.	Nominal Capacity (pF) Min.	Plates	L±1/32"	Peak Withstanding Voltage	Air Gap
Printed Circuit Mounting Type "V" Capacitors—Single Section						
193-0004-005	13	1.4	8	37/64"	650	.010"
193-0006-005	20	1.7	12	11/16"	650	.010"
193-0008-005	27	2.0	16	25/32"	650	.010"
193-0010-005	34	2.2	20	57/64"	650	.010"

Capacitors with .016" air gap available as specials.



Cat. No.	Nominal Capacity (pF) Max.	Nominal Capacity (pF) Min.	Plates	L±1/32"	Peak Withstanding Voltage	Air Gap
Panel Mounting Type "V" Capacitors—Single Section						
193-0004-001	13	1.4	8	35/64"	650	.010"
193-0006-001	20	1.7	12	21/32"	650	.010"
193-0008-001	27	2.0	16	3/4"	650	.010"
193-0010-001	34	2.2	20	55/64"	650	.010"

Capacitors with .016" air gap available as specials.



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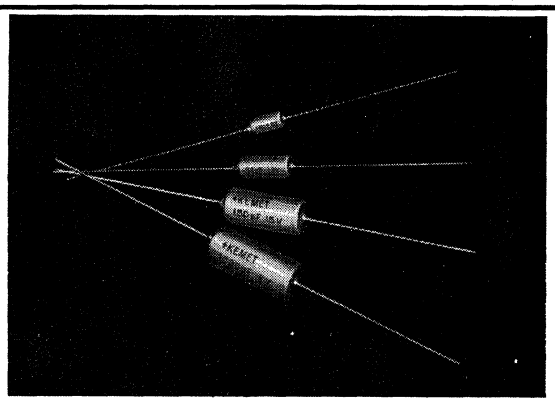
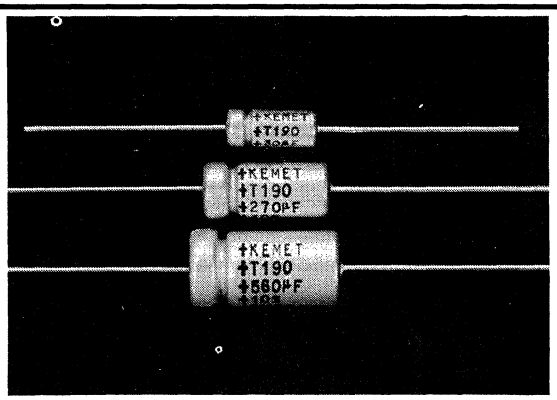


KEMET J-Series



KEMET Wet Tantalum Capacitors

Series	Description & Features	Capacitance & Voltage Range	Size Range (Inches)	Leads	Request Catalog
C	Molded epoxy, polar, self insulating. Ideal for commercial and industrial applications which do not require performance standards of hermetically sealed capacitors. Precision dimensions suitable for automatic insertion equipment. Bullet shaped for positive polarity identification.	.1 - 220μF 6 - 50 VDC	4-case sizes .138 x .390 to .365 x .875	Axial	F-2622B
D	Extended range molded sub-miniature sizes featuring extremely high capacitance-to-volume ratio. Dimensions and tight lead wire-to-body concentricity permit automatic insertion by same equipment used for diodes and resistors. Suitable for decoupling, blocking, by-passing and filtering applications.	.0047 - 68 μF 6 - 50 VDC	3-case sizes .100 x .290 to .190 x .530	Axial	F-2632A
E	Dip coated plastic encapsulation providing the widely recognized shelf and operational life performance characteristics inherent in solid tantalum capacitors at prices competitive with conventional electrolytics. The dipped plastic case provides a tough barrier coating against moisture and shock and maintains precision lead spacing.	.1 - 330 μF 6 - 50 VDC	4-case sizes .175 x .350 to .400 x .750	Radial	F-2638C
J	Popular military hermetic sealed A, B, C & D case solid tantalum capacitors conforming to all requirements of Mil-C-39003. Designed for miniaturized circuitry, they exhibit excellent stability, long life, extremely low DC leakage and D.F. over a wide temperature and frequency range.	.0047 - 330 μF 6 - 125 VDC	4-case sizes .125 x .250 to .341 x .750	Axial	F-1851D
MICRON	A complete line of microminiature capacitors designed for use in high density military, industrial and consumer circuits. Combines space saving advantages of .003 Mil MYLAR cases and KEMET's reliabiltiy engineering to achieve outstanding performance. Available in a wide variety of case styles, sizes and lead configurations.	.0047 - 220 μF 2 - 100 VDC	29-case sizes .125 x .070 x .040 to .475 x .374 x .150	Axial & Radial	F-2710B
WET TANTALUM	KEMET Wets are offered in three case sizes for use in circuits requiring the advantages of tantalum oxide dielectric plus maximum capacitance per unit volume. Product line includes KEMET T190 Series, MIL-C-3965C CL64 and CL65, MIL-C-39006B CLR65, extended range, and gel electrolyte capacitors.	1.7 - 560 μF 6 - 125 VDC	3-case sizes .188 x .453 .281 x .641 .375 x .766	Axial	F-2732A

For a complete listing of KEMET capacitors, request Form F-2644 — KEMET Condensed Catalog.

UNION CARBIDE

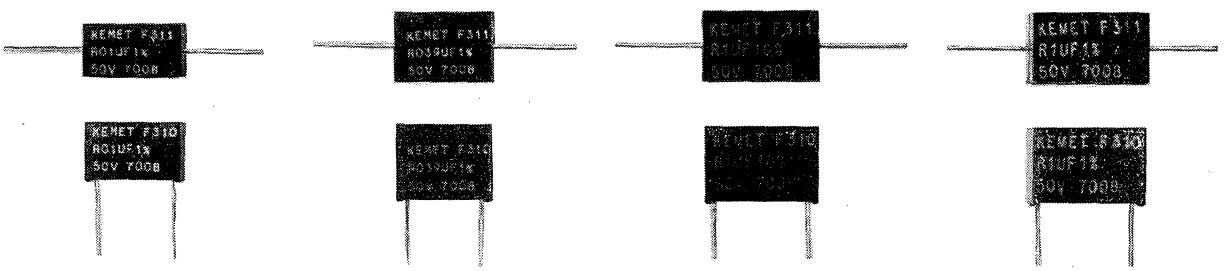
UNION CARBIDE CORP. • MATERIAL SYSTEMS DIV. • COMPONENTS DEPT.
P.O. Box 5928, Greenville, S. C. 29606 • Tel.: (803) 963-7421 • TWX: 810-287-2536

UNION CARBIDE **KEMET® CAPACITORS** UNION CARBIDE

KEMET® PARYLENE FILM CAPACITORS

- Ultra stable — available to 0 ±50 PPM/°C
- Capacitance tolerance to ½%
- Compliance with Mil-C-55514
- Small size
- Radial and axial leads
- Capacitance range of .001 to 1.0μF

Ideal for filters, timing, tuning, differentiating and integrating circuits, band pass and band elimination.



STANDARD

Series	Description	Case Size	Capacitance μF 50VDC	Case Size (radial) Height	Length	Thickness	Request Catalog
FLAT KAP	THE OUTSTANDING CHARACTERISTICS OF THESE CAPACITORS ARE OBTAINED BY UTILIZING THE UNIQUE PROPERTIES OF PARYLENE, AN ULTRA-THIN DIELECTRIC FILM DEVELOPED BY UNION CARBIDE CORPORATION IN COMBINATION WITH SPECIALLY DEVELOPED THERMOSETTING RESIN IMPREGNANTS TO PROVIDE STABILITY AND PREDICTABLE TEMPERATURE CHARACTERISTICS IN A COMPACT SIZE. THIS DESIGN PROVIDES THREE DIFFERENT TEMPERATURE COEFFICIENT CHARACTERISTICS (−200 ±30, 0 ±100, 0 ±50 PPM/°C) FOR PRECISION MATCHING OF THE COEFFICIENT OF OTHER COMPONENTS WHERE PREDICTABLE DRIFT IS ESSENTIAL TO THE STABILITY OF THE CIRCUIT. KEMET FLAT KAPS ARE AVAILABLE IN STANDARD AND NON-STANDARD VALUES IN TOLERANCES TO ±½%. CLOSER TOLERANCES AND/OR SPECIAL CAPACITORS IN MATCHED GROUPS ARE AVAILABLE ON SPECIAL ORDER.	A	.001 - .01	.280	.500	.125	F-2274D
		B	.012 - .039	.375	.500	.195	
		C	.047 - .1	.375	.600	.195	
		D	.15	.375	.600	.295	
		E	.22	.375	.750	.500	
		F	.33 & .47	.375	1.00	.600	
		G	.56 & .68	.375	1.50	.600	
		H	.82 & 1.0	.550	1.50	.600	
		HERMETIC SEAL					
				+0.005 −0.015	±0.010	±0.010	
		A	.001 - .01	.375	.550	.170	F-2742
		B	.012 - .039	.470	.550	.250	
		C	.047 - .1	.470	.650	.250	
		D	.12 & .15	.470	.650	.350	

For a complete listing of KEMET capacitors, request Form F-2644 — KEMET Condensed Catalog.

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P.O. Box 5928, Greenville, S. C. 29606 • Tel.: (803) 963-7421 • TWX: 810-287-2536

KEMET® MONOLITHIC CERAMIC CAPACITORS

- **Ideal for Bypass, Filtering & Coupling in Low Voltage and Transistorized Circuits**
- **Designed, Manufactured & Tested to Mil-C-11015D & Mil-C-39014B**
- **Capacitance Range from 10 pf to 3.3 μF**
- **Temperature Range −55° to +125°C**

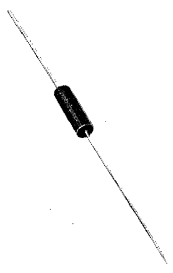
K05 - CK05 - CKR05

10 - 100,000 pF

K06 - CK06 - CKR06

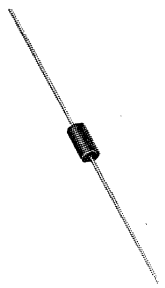
1200 - 1.0 μF

K12 - CK13 - CKR12



10 - 47,000 pF

K11 - CK12 - CKR11



10 - 10,000 pF

K19 - CK14 - CKR14

12,000 - 270,000 pF

Category	Designation	Capacitance Range	Voltage Range	Size (max.)	Leads	Request Catalog
Commercial	K01	.25 - 1.0 μF	50	.375 x .500 x .200	Radial	F-2724B
	K02	1.0 - 2.0 μF	50	.375 x .690 x .200	Radial	
	K05	10 pF - .056 μF	50-200	.200 x .200 x .100	Radial	
	K06	1200 pF - 1.0 μF	25-200	.300 x .300 x .100	Radial	
	K11	10 - 10,000 pF	100	.100 x .170	Axial	
	K12	10 pF - .027 μF	50-100	.100 x .250	Axial	
	K13	.012 - .5 μF	50-100	.200 x .500	Axial	
	K19	.012 - .1 μF	100	.140 x .400	Axial	
	K20	.25 - .5 μF	50	.260 x .495	Axial	
	K21	.5 - 1.0 μF	50	.260 x .690	Axial	
	K22	1.0 - 2.0 μF	50	.350 x .690	Axial	
MIL-C-11015D	CK05	10 - 100,000	50-200	.200 x .200 x .100	Radial	F-2724B
	CK06	1200 - 1,000,000 pF	50-200	.300 x .300 x .100	Radial	
	CK12	10 - 10,000 pF	50-100	.100 x .170	Axial	
	CK13	5600 - 47,000 pF	50-100	.100 x .260	Axial	
	CK14	12,000 - 270,000 pF	50-100	.150 x .400	Axial	
	CK15	100,000 pF - 1.0 μF	50-100	.265 x .520	Axial	
	CK16	470,000 pF - 3.3 μF	50-100	.370 x .720	Axial	
MIL-C-39014B (To "R" (0.01% / 1000 hr.) Failure Rate Level)	CKR05	10 - 100,000 pF	50-200	.200 x .200 x .100	Radial	F-2724B
	CKR06	1200 - 1,000,000 pF	50-200	.300 x .300 x .100	Radial	
	CKR11	10 - 10,000 pF	50-100	.100 x .170	Axial	
	CKR12	5600 - 47,000 pF	50-100	.100 x .260	Axial	
	CKR14	12,000 - 270,000 pF	50-100	.150 x .400	Axial	
	CKR15	56,000 - 1,000,000 pF	50-100	.265 x .520	Axial	
	CKR16	470,000 - 3,300,000 pF	50-100	.370 x .720	Axial	
*Ceramic Chip	BX & NPO	10 - 330,000 pF	50-100	6 Chip Sizes	—	F-2731

*** For additional information regarding KEMET Solder Guard Ceramic Chips, see next page.**

UNION CARBIDE

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UNION CARBIDE **KEMET® CAPACITORS** UNION CARBIDE

KEMET® HYBRID CIRCUIT CHIP CAPACITORS

"SOLDER GUARD" CERAMIC CHIPS

A NEW GENERATION CERAMIC CHIP CAPACITOR WITH A UNIQUE COPPER BARRIER LAYER IN THE END METALLIZATION THAT PREVENTS SILVER LEACHING OR SCAVENGING DURING SOLDER REFLOW ASSEMBLY OPERATIONS.

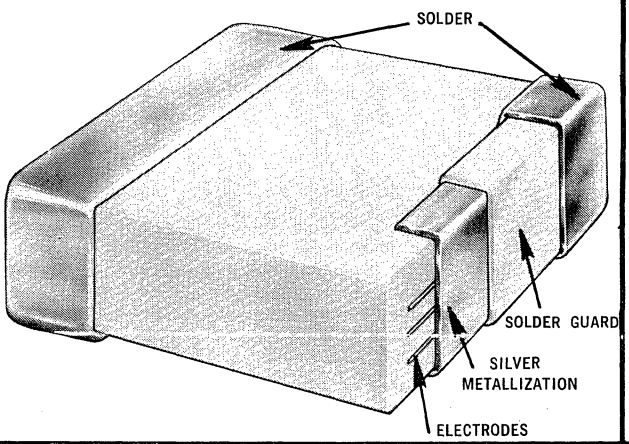
COPPER COUNTER ELECTRODE TANTALUM CHIPS

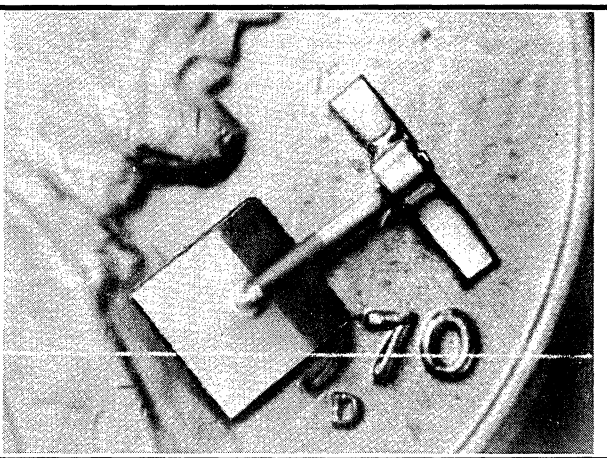
HIGH TEMPERATURE CAPABILITY
- **ASSEMBLY TEMPERATURES TO 300°C**
- **CONTINUOUS OPERATING TEMPERATURE TO 175°C**

MAXIMUM VOLUMETRIC EFFICIENCY

ECONOMICAL

0.1 TO 100 μF, 4 - 50 VDC





Series	Capacitance (pF) BX	Capacitance (pF) NPO	Voltage VDC	Actual Size
0805	100 - 2700 100 - 6800	10 - 120 10 - 150	100 50	
1006	10 - 5600 10 - 15,000	10 - 150 10 - 270	100 50	
1210	100 - 18,000 100 - 39,000	47 - 470 47 - 680	100 50	
1806	820 - 18,000 820 - 39,000	10 - 390 10 - 470	100 50	
1813	1000 - 47,000 1000 - 100,000	220 - 1000 220 - 1800	100 50	
2224	15,000 - 180,000 15,000 - 330,000	470 - 3900 470 - 5600	100 50	

Request Catalog F-2631

T411 SERIES

Case Size	Dimensions (Max.) Width	Length	Height	Capacitance 4 - 50 VDC
A	.150	.210	.070	0.10 - 6.8 μF
B	.180	.250	.070	0.47 - 15 μF
C	.180	.310	.100	1.0 - 33 μF
D	.180	.310	.150	2.2 - 68 μF

T421 SERIES

	±.015	±.015	Max.	
A	.060	.150	.060	0.10 - 4.7 μF
B	.105	.170	.060	0.33 - 10 μF
C	.140	.210	.080	0.68 - 33 μF
D	.145	.265	.110	2.2 - 68 μF
E	.150	.265	.150	4.7 - 100 μF

Request Catalog F-2715D

For a complete listing of KEMET capacitors, request Form F-2644 — KEMET Condensed Catalog.

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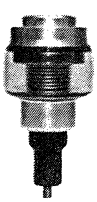
Kilovac® CORPORATION

HIGH VACUUM VARIABLE CAPACITORS

KILOVAC, leading manufacturer of high voltage vacuum relays, PENTA power tubes and DOW-KEY coaxial relays, now offers a line of high voltage vacuum variable capacitors for the most demanding applications. The use of a high vacuum as dielectric in variable capacitors results in a component with unique characteristics, particularly suited to applications in high power radio frequency circuits. The maximum capacitance that can be provided in a single unit is normally a few thousand picofarads. The high dielectric strength and freedom from environmental factors, such as dust and humidity, give the vacuum capacitor a far higher voltage capability than air dielectric capacitors of similar size. Vacuum capacitors have frequently been used to replace existing air dielectric capacitors many times their size, with the additional benefit of greater reliability.

(Manufactured under license from E.E.V. Co. Ltd.)

				
TYPE	**KVC-1/S1**	**KVC-2/S1**	**KVC-4/S1**	**KVC-7/S1**
Capacitance Range, pF	7-1000	5-500	50-2000	3-30
Maximum RF Voltage (Peak), kV	3.0 (1)	5.0	8.0	15.0 (2)
Maximum RF Current (to 27 MHz), A	40	40	75	20
Overall Length (Max.) In.	7.81	5.94	10.31	4.12
Overall Diameter (Max.) In.	3.08	2.38	5.13	1.28
Tuning Shaft Turns	18	19	33	22
Diameter of Shaft (Max.) In.	0.50	0.25	0.50	0.25
Length of Shaft (Nom.) In.	0.75	0.40	0.75	1.0
Cooling	Natural	Natural	Natural	Natural
Maximum Ambient Temperature, °C.	55	55	55	55
Net Weight (Approx.), Lbs.	2	1.5	6	0.25

(1) 6.0 kV below 100 pF

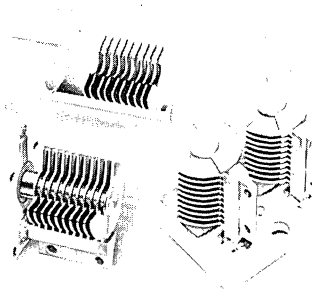
(2) 25.0 kV at 3 pF

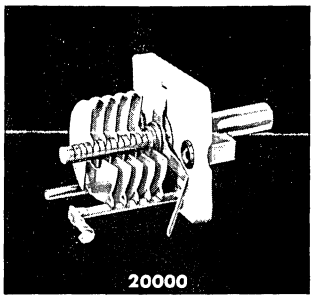
IF YOU HAVE AN APPLICATION PROBLEM, WE WOULD LIKE TO DISCUSS IT WITH YOU.

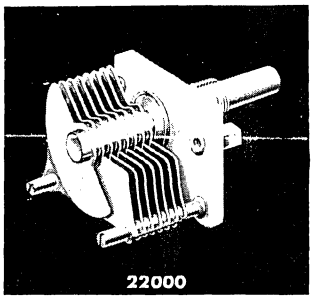
Kilovac® CORPORATION

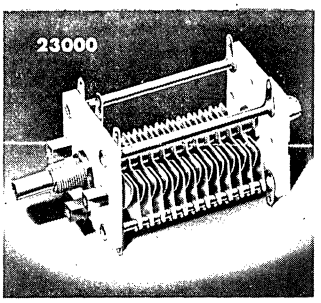
P. O. Box 4422 / Santa Barbara, California 93103
Telephone (805) 684-4560 • TWX 910/336-1141

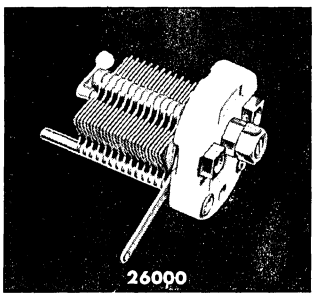
Kilovac Vacuum Relays • **Penta** Power Tubes • **Dow-Key** Coaxial Relays

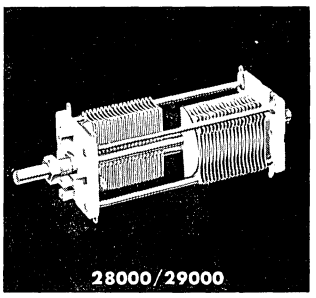


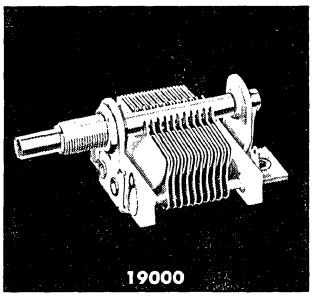


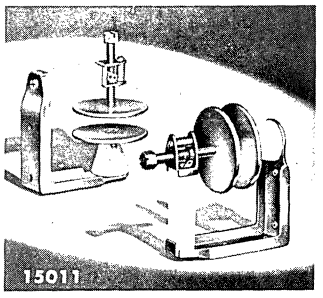


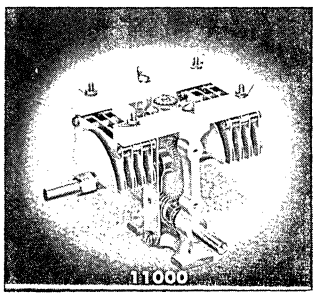


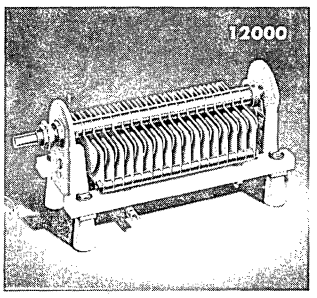


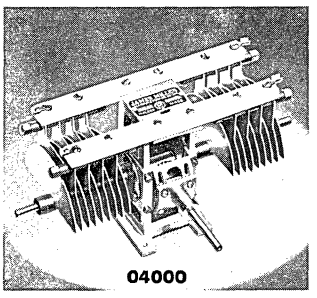


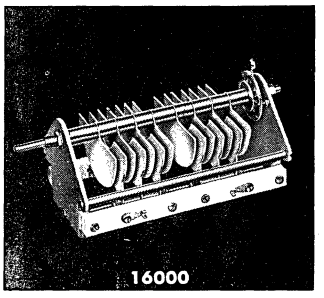












"Designed for Application"® CAPACITORS

No. 25000 miniature, precision, high Q variable air dielectric capacitors with high reliability are machined from solid bars of extruded brass. Knob or screw-driver adjust from the front. Single hole mount, mount with two screws, or with tabs. 0.010" air gap. 350V. 21 plate **25035** is 4.0 to 35.8pf. 0.750" x 0.562" x 23/32"L.

No. 20000 Ceramic end plate 1-3/16" x 1-5/16". Silver plated plates. 0.015" air gap — 600V. peak or 0.045" air gap — 1400V. peak.

20005 2.0-4.5pf. 600V. ¾"L—**20100** 5.2- 111pf. 600V. 1½"L

20904 2.5-3.8pf. 1400V. ⅞"L—**20935** 6.7-39.5pf. 1400V. 2⅛"L

No. 22000 Ceramic end plate 1-1/16" x 1-7/16". Single bearing or double bearing. Air gap 0.020"—800V. peak or 0.060"—2000V. peak.

22006 2.8- 7.5pf. 800V. 1⅛"L—**22200MK** 11-207pf. 800V. 2-9/16"

22910 4.1-12.5pf. 2000V. 1¼"L—**22950MK** 8.5-57.0pf. 2000V. 3"L

No. 23000 Ceramic end plate 1-7/16" x 1½". Single bearing or double bearing. Single or dual section. Balanced or inline rotor. Air gap 0.020"-800V. peak or 0.060"—2000V. peak.

23907MKY 3.5-7pf. 2000V. 1-9/16"L—**23140MK** 10-146.5pf. 800V. 2⅛"L

No. 26000 Ceramic end plate 15/16" x 1-7/32". Silver plated plates. 0.015" air gap — 600V. peak or 0.045" air gap — 1400V. peak.

26010 2.9-11pf. 600V. ⅞"L—**26100** 5.5-109pf. 600V. 1-9/16"L

26910 3.3-11pf. 1400V. 1⅛"L—**26935** 6.8-39.5pf. 1400V. 2-3/16"L

No. 28000 Straight line capacity or **No. 29000** straight line frequency. Double ceramic end plates 1-9/16" x 1-11/16". Double bearing. Single or double section. Balanced or inline rotor. Air gap 0.022"-850V. peak, 0.040"-1350V. peak or 0.066"—2250V. peak.

28227MKW 16-227pf. 1350V. 4-1/16"L—**29025KM** 3.9-23.3pf. 850V. 1-9/16L

No. 19000 Ceramic insulators. Cross section 1-9/16" x 1-11/16". Double bearing. Air gap 0.022"-850V. peak, 0.040" — 1350 V. peak or 0.066" — 2250V. peak. Single section. Tapped mounting brackets.

19335 14.7-339pf. 850 V. 2⅜"L—**19950** 11.6-60pf. 2250V. 2¼"L

No. 15000 NEUTRALIZING CAPACITORS. Parallel discs or concentric cylinders. **15011** Disc 3.5pf. at 0.4" gap to 18pf. at 0.04" gap.

15005 Cylindrical Capacitor — 3.5pf. to 16.2pf. — 4000V. peak.

15006 Cylindrical Capacitor — 3.2pf. to 9.7pf. — 6000V. peak.

No. 11000 TRANSMITTING CAPACITORS. 16/1 or 48/1 ratio center gear drive. Ceramic insulation. Air gap 0.077"-3000V. peak or 0.176"-6000V. peak. Polished aluminum plates 0.040" thick. Dual section.

11035 5.3-34pf. 3000V. 5-7/16"L—**11090** 10-93pf. 3000V. 7⅜"L

No. 12000 TRANSMITTING CAPACITORS. Rigid, heavy channeled aluminum end plates. Ceramic insulation. Single or dual section. Air gap 0.077"-3000V. peak or 0.176"-6000V. peak. Polished aluminum plates 0.040" thick. Unpolished plates available for 3000V. gap.

12536 9.7-28pf. 6000V. 4"L—**12515** 16-150pf. 3000V. 5¼"L

No. 04000 BALANCED TRANSMITTING CAPACITORS. 1/1 right angle center gear drive. Adjustable drive angle for sloping panel. Sturdy cast aluminum frame. Ceramic insulation. Air gap 0.077"-3000V. peak, 0.171"-6000V. peak or 0.265"-9000V. peak. Polished plates.

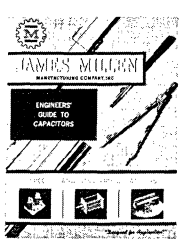
No. 16000 TRANSMITTING CAPACITORS. Ceramic insulation. Air gap 0.077"-3000V. peak, 0.171"-6000V. peak or 0.265"-9000V. peak. Polished aluminum plates 0.050" thick. Single or dual section.

16550 13-52pf. 6000V. 3⅜"L—**16530** 45-297pf. 6000V. 12½"L

16559 11-65pf. 9000V. 6¼"L—**16512** 40-128pf. 9000V. 11½"L

NEW James Millen Mfg. Co., Inc.
ENGINEERS' GUIDE
TO CAPACITORS

"Special" and Standard
CAPACITOR CATALOG



JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

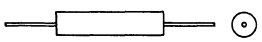
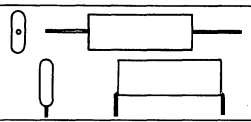
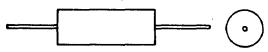
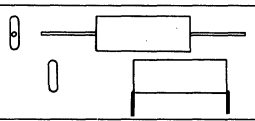
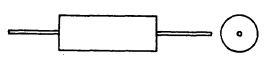
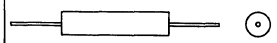
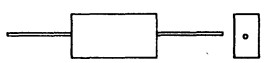
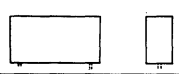
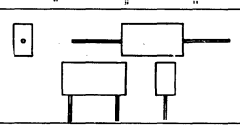
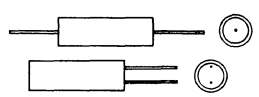
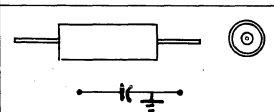
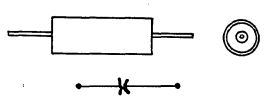
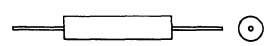
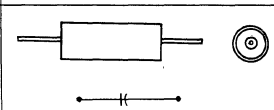
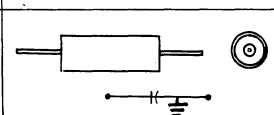
150 EXCHANGE ST., MALDEN, MASSACHUSETTS, U. S. A.

MIDWEC CORPORATION

Subsidiary of Southwestern Research Corporation

P.O. BOX 417 SCOTTSBLUFF, NEBRASKA 69361

Telephone 308-632-4127 TWX 910-627-0061

Type	Configuration	Case Style	Cap. Range (MFDS)	Volt Range (VDC)	Size Range (Inches)
MYLAR FOIL					
3		Plastic Wrap & Fill	.001 to 2.00	100 to 1000	.156 x .500 to 1.609 x 3.000
3F 3FR		Plastic Wrap & Fill	.001 to 2.00	100 to 600	.125 x .250 x .500 to .984 x 1.937 x 3.000
3X		Plastic Wrap & Fill	.010 to 5.00	up to 100	.117 x .406 to .812 x 1.812
3XF 3XFR		Plastic Wrap & Fill	.010 to 5.00	up to 100	.075 x .149 x .437 to .625 x .900 x 1.812
301 3X1		Plastic Wrap & Fill	.0001 to .33	up to 100	.140 x .500 to .500 x .500
CTM		Plastic Wrap & Fill	.0068 to 1.00	50 to 300	.172 x .437 to .548 x 1.562
E3F		Epoxy	.001 to 2.00	100 or 200	.160 x .240 x .420 to .560 x .720 x 1.950
E3FR		Epoxy	.0010 to 1.00	100 or 200	.095 x .265 x .375 to .295 x 1.100 x 1.785
E3XF E3XFR		Epoxy	.0082 to 2.00	up to 100	.170 x .290 x .550 to .560 x .720 x 1.250 .095 x .265 x .375 to .250 x .890 x .985
P3 P3P		Phenolic	.001 to 2.0	100 to 600	.250 x .625 to 1.00 x 2.0
H3G H3GS		Hermetic Seal	.001 to 2.00	100 to 600	.173 x .687 to 1.00 x 2.812
H3 H3S		Hermetic Seal	.001 to 2.00	100 to 600	.173 x .750 to 1.00 x 2.875
POLYSULFONE-FOIL					
8		Plastic Wrap & Fill	.001 to 2.00	100	.218 x .562 to .875 x 1.687
H8 H8S		Hermetic Seal	.001 to 2.00	100	.193 x .750 to 1.000 x 1.875
H8G H8GS		Hermetic Seal	.001 to 2.00	100	.193 x .687 to 1.000 x 1.781

GENERAL NOTES

Capacitance Tolerance: Standard tolerance is ±5%. All types available in ±20%, ±10%, ±3%, ±2%, and ±1%. The capacitance shall be measured at 1000 cps at 25°C for values up to and including 5.0 mfd. Values larger than 5.0 mfd shall be measured at 60 cps and 25°C.

Dissipation Factor: Less than 0.60% when measured at 1000 cps and 25°C for values up to and including 5.0 mfd and 60 cps for values larger than 5.0 mfd 60 cps and 25°C.

Insulation Resistance: Greater than 100,000 megohm-microfarads after a 2-minute electrification at rated voltage and 25°C, but the I.R. need not exceed 200,000 megohms.

Dielectric Strength: Twice rated voltage for 60 seconds at 25°C, thru a current limiting resistance of 100 ohms per volt.

Temperature Range: May be operated at rated voltage from −55°C to +85°C and +125°C with 50% derating.

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±3%, ±2%, and ±1%. Capacitance shall be measured at 1000 Hz. and 25°C.

Dissipation Factor: Less than 0.2% when measured at 1000 Hz. and 25°C.

Insulation Resistance: Greater than 50,000 megohm-mfds after a 2-minute electrification period at rated voltage and 25°C. I.R. need not exceed 100,000 megohms. Higher I.R. is available upon special request.

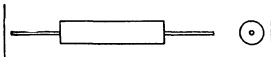
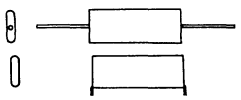
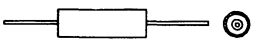
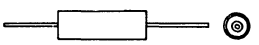
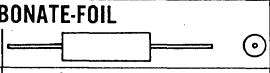
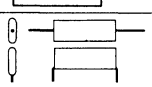
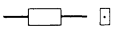
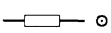
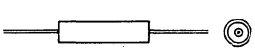
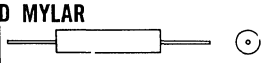
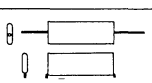
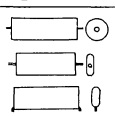
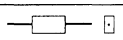
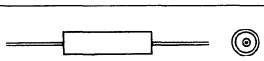
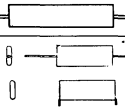
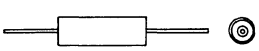
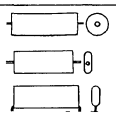
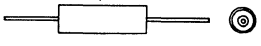
Dielectric Strength: Twice rated voltage for 60 seconds at 25°C through current limiting resistance of 100 ohms per volt, when applied terminal to terminal and terminal to case.

Life Test: 500 hours at 125% of rated voltage and 150°C.

Humidity Resistance: Meet or exceed requirements of MIL-C-19978B for H8, H8S, H8G, H8GS; MIL-C-27287 for Type 8.

Temperature Range: May be operated at rated voltage from −55°C to +150°C with no derating.

Construction: Extended foil winding, polysulfone dielectric.

Type	Configuration	Case Style	Cap. Range (MFDS)	Volt Range (VDC)	Size Range (Inches)
POLYSTYRENE-FOIL					
4		Plastic Wrap & Fill	.001 to 1.000	100 to 600	.187 x .500 to 1.187 x 2.125
4F **4FR**		Plastic Wrap & Fill	.001 to 1.500	100 to 600	.125 x .250 x .500 to .812 x 1.250 x 2.125
H4 **H4S**		Hermetic Seal	.001 to 1.00	up to 100	.193 x .750 to 1.00 x 2.125
H44A **H44B**		Hermetic Seal	.01 to 1.00	up to 100	.312 x .875 to .750 x 2.375
POLYCARBONATE-FOIL					
6		Plastic Wrap & Fill	.001 to 1.00	50 to 200	.125 x .437 to .812 x 2.375
6F **6FR**		Plastic Wrap & Fill	.001 to 1.00	100 or 200	.062 x .137 x .437 to .625 x 1.100 x 2.375
E6F		Epoxy	.001 to 1.00	up to 100	.160 x .240 x .420 x .560 x .720 x 1.950
P6		Phenolic	.001 to 1.00	50 to 200	.250 x .500 to 1.000 x 2.437
H6 **H6S**		Hermetic Seal	.001 to 1.00	up to 100	.193 x .562 to 1.00 x 2.00
METALIZED MYLAR					
7		Plastic Wrap & Fill	.0047 to 10.00	100 to 600	.125 x .437 to 1.187 x 2.250
7F **7FR**		Plastic Wrap & Fill	.0050 to 12.00	100 to 600	.125 x .187 x .437 to 1.218 x 1.750 x 2.00
7X **7XF** **7XFR**		Plastic Wrap & Fill	.10 to 22.00	up to 100	.218 x .468 to .937 x 1.750 .140 x .218 x .468 to .733 x 1.062 x 1.812
E7F		Epoxy	.005 to 6.00	100 to 600	.160 x .240 x .420 to .560 x .720 x 1.950
H7 **H7S**		Hermetic Seal	.0047 to 10.00	100 and 200	.173 x .625 to 1.00 x 2.250
METALIZED POLYCARBONATE					
12		Plastic Wrap & Fill	.01 to 10.00	up to 100	.171 x .437 to 1.00 x 2.25
12F **12FR**		Plastic Wrap & Fill	.01 to 10.00	up to 100	.109 x .234 x .437 to 1.00 x 1.125 x 2.25
H12 **H12S**		Hermetic Seal	.01 to 10.00	up to 100	.173 x .625 to 1.00 x 2.312
12X **12XF** **12XFR**		Plastic Wrap & Fill	.10 to 20.00	up to 100	.218 x .468 to .937 x 1.750 .140 x .218 x .468 to .703 x 1.031 x 1.750
H12X **H12XS**		Hermetic Seal	.10 to 20.00	up to 100	.233 x .625 to 1.00 x 2.125

GENERAL NOTES

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±3%, ±2%, and ±1%. The capacitance shall be measured at 1000 Hz. and 25°C.
Dissipation Factor: Less than 0.1% when measured at 1000 Hz. and 25°C.
Insulation Resistance: 500,000 megohm-microfarads after a 2 minute electrification period at rated voltage and 25°C. The I.R. need not exceed 500,000 megohms.
Dielectric Strength: 200% of rated voltage for 60 seconds at 25°C thru a current limiting resistance of 100 ohms per volt.
Life Test: 250 hours at 140% of rated voltage and 85°C.
Temperature Range: May be operated at rated voltage from −55°C to +85°C.
Temperature Coefficient: −120 parts per million per °C, ±20 PPM.
Dielectric Absorption: Will not exceed 0.1% when measured at 25°C.

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±3%, ±2%, and ±1%. The capacitance shall be measured at 1000 Hz at 25°C.
Dissipation Factor: Less than .05% when measured as above.
Temperature Coefficient: H44A ≦ ±20 PPM/°C
H44B ≦ ±40 PPM/°C
Insulation Resistance: 1,000,000 megohm-microfarads following a 2 minute electrification at rated voltage and 25°C. I.R. need not exceed 1,000,000 megohms. 250,000 meg. mfd. at 85°C.
Dielectric Strength: Twice rated voltage for 60 seconds at 25°C through a current limiting resistance of 100 ohms per volt.
Temperature Range: May be operated at rated voltage from −55°C to +85°C.
Life Test: 250 hours at 140% of rated voltage and 85°C.
Humidity Resistance: Meet or exceed requirements of MIL-C-27287.
Construction: Extended foil winding, polystyrene dielectric, hermetically sealed case.

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±4%, ±3%, ±2%, and ±1%. Capacitance shall be measured at 1000 Hz. and 25°C.
Dissipation Factor: Less than 0.20% when measured at 1000 Hz. and 25°C.
Insulation Resistance: Greater than 200,000 megohm-mfds following a 2 minute electrification period at rated voltage or 500 VDC; whichever is less; and 25°C. I.R. need not exceed 500,000 megohms.
Dielectric Strength: Twice rated voltage for 60 seconds at 25°C, thru current limiting resistance of 100 ohms per volt.
Dielectric Absorption: Shall not exceed 0.5% (Ref. MIL-C-19978B).
Life Test: 250 hours at 140% of rated voltage and +125°C.
Temperature Range: May be operated at rated voltage from −55°C to +125°C.

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±3%, ±2%, and ±1%. Capacitance shall be measured at 1000 Hz. and 25°C for values up to and including 5.0 mfd. Larger values shall be measured at 60 Hz. and 25°C.
Dissipation Factor: Less than 1.0% when measured as specified above.
Dielectric Strength: Twice rated voltage for 60 seconds at 25°C; thru a current limiting resistance of 100 ohms per volt.
Insulation Resistance: 30,000 megohm-microfarads following a 2 minute electrification period at rated voltage and 25°C. I.R. need not exceed 30,000 megohms.
Life Test: 500 hours at 140% of rated voltage and 85°C.
Humidity Resistance: Meets or exceeds requirement of MIL-202C method 103A.
Temperature Range: May be operated at rated voltage from −55°C to +85°C and to +125°C with 50% derating.

Capacitance Tolerance: Standard tolerance is ±5%. Also available in ±20%, ±10%, ±3%, ±2%, and ±1%. Capacitance shall be measured at 1000 Hz. and 25°C for values up to and including 5.0 mfd. Larger values to be measured at 60 Hz.
Dissipation Factor: Less than 0.50% when measured as specified above.
Insulation Resistance: Greater than 75,000 megohm-microfarads after a two-minute electrification period at rated voltage and 25°C. I.R. need not exceed 150,000 megohms.
Dielectric Strength: 200% of rated voltage for 60 seconds at 25°C thru a current limiting resistance of 100 ohms per volt.
Temperature Range: May be operated at rated voltage from −55°C to +125°C.
Life Test: 250 hours at 140% of rated voltage and 85°C.

Monolithic Dielectrics Inc.

MDI CERAMIC CHIP CAPACITORS TYPE K1200 TYPE NPO

INTRODUCTION

MDI offers a truly solid-state capacitor featuring monolithic construction which is inherently impervious to moisture and contamination — yet without space and cost consuming exterior encapsulation.

A new breakthrough in the state-of-the-art enables MDI to provide capacitance ranges previously unattainable in comparable sizes and characteristics.

GENERAL SPECIFICATIONS

MIL Specifications: Meets applicable portions MIL-C-11015 and MIL-C-39014
Working Voltage: 25/50/100/200 VDC
Insulation Resistance: 1000 megohm-mfd or 100,000 megohms @ 25°C and VDCW (÷ 10 for 125°C)
Flash Test: 3 X VDCW below .1 mfd, 2.5 X VDCW .1 mfd and above (5 sec @ 25°C, 50 ma max.)

Life Test: 2 X VDCW @ 125°C, 1000 hrs
Electrodes: .015 min silver band-width standard except R11 band .005 min.; Gold, Palladium-Silver, Palladium-Gold and Platinum-Gold also available
Inspection Sequence:
1. Capacitance
2. Dissipation Factor
3. Insulation Resistance
4. Flash Test

K1200 SERIES

Capacitance Range: 10 pf to 2.5 mfd, tested @ 1 kHz, 1 VRMS, 25°C
Tolerance: ±20% std., ±10%, ±5% and GMV
Dissipation Factor: Less than 2% @ 1 kHz
Temperature Coefficient: ±15% max., −55°C to 125°C
Voltage-Temperature Coefficient: +15%, −25%, −55°C to 125°C

NPO SERIES

Capacitance Range: 1 pf to .1 mfd, tested @ 1 kHz, 1 VRMS, 25°C
Tolerance: ±10% std., ±5%, ±2%, ±1%, ±.5 pf and ±.25 pf*
Dissipation Factor: Less than 0.1% @ 1 kHz
Temperature Coefficient: Less than ±30 ppm/°C., −55°C to 125°C
Voltage-Temperature Coefficient: 0%, ±30 ppm/°C, −55°C to 125°C
*Tolerances of ±.5 pf or ±.25 pf available for values between 1 pf and 10 pf in size R16 or smaller only.

ACTUAL PHYSICAL SIZE		MDI SIZE	DIMENSIONS L*	W*	T (MAX)	MAXIMUM CAPACITANCE AVAILABLE 25 VDCW	50 VDCW	100 VDCW	200 VDCW
SMALL RECTANGULAR	K1200	R11	.050	.040	.040	.01 mfd	6800 pf	2700 pf	1000 pf
	NPO	R11	.050	.040	.040	330 pf	330 pf	330 pf	330 pf
	K1200	R13	.075	.045	.045	.015 mfd	.012 mfd	3900 pf	1200 pf
	NPO	R13	.075	.045	.045	560 pf	560 pf	560 pf	560 pf
	K1200	R15	.080	.050	.050	.027 mfd	.015 mfd	4700 pf	1500 pf
	NPO	R15	.080	.050	.050	680 pf	680 pf	680 pf	680 pf
	K1200	R16	.100	.050	.050	.039 mfd	.027 mfd	.012 mfd	2700 pf
	NPO	R16	.100	.050	.050	1200 pf	1200 pf	1200 pf	1200 pf
	K1200	R23	.150	.050	.050	.056 mfd	.047 mfd	.022 mfd	.01 mfd
	NPO	R23	.150	.050	.050	2000 pf	2000 pf	2000 pf	2000 pf
	K1200	R25	.170	.065	.065	.12 mfd	.1 mfd	.039 mfd	.012 mfd
	NPO	R25	.170	.065	.065	4700 pf	4700 pf	4700 pf	4700 pf
	K1200	R27	.190	.065	.065	.15 mfd	.12 mfd	.056 mfd	.015 mfd
	NPO	R27	.190	.065	.065	5600 pf	5600 pf	5600 pf	5600 pf
	K1200	R29	.180	.080	.065	.18 mfd	.12 mfd	.056 mfd	.015 mfd
	NPO	R29	.180	.080	.065	6800 pf	6800 pf	6800 pf	6800 pf
	K1200	R31	.270	.080	.070	.27 mfd	.2 mfd	.1 mfd	.033 mfd
	NPO	R31	.270	.080	.070	.01 mfd	.01 mfd	.01 mfd	.01 mfd
SQUARE	K1200	S41	.125	.095	.065	.12 mfd	.1 mfd	.056 mfd	.012 mfd
	NPO	S41	.125	.095	.065	4700 pf	4700 pf	4700 pf	4700 pf
	K1200	S43	.175	.125	.065	.2 mfd	.15 mfd	.068 mfd	.018 mfd
	NPO	S43	.175	.125	.065	8200 pf	8200 pf	8200 pf	8200 pf
	K1200	S45	.197	.180	.065	.47 mfd	.33 mfd	.22 mfd	.047 mfd
	NPO	S45	.197	.180	.065	.015 mfd	.015 mfd	.015 mfd	.015 mfd
	K1200	S47	.225	.210	.065	.56 mfd	.47 mfd	.27 mfd	.056 mfd
	NPO	S47	.225	.210	.065	.02 mfd	.02 mfd	.02 mfd	.02 mfd
	K1200	S49	.390	.425	.065	2.0 mfd	1.5 mfd	1.0 mfd	.39 mfd
	NPO	S49	.390	.425	.065	.08 mfd	.08 mfd	.08 mfd	.08 mfd
LARGE RECTANGULAR	K1200	L64	.350	.095	.070	.5 mfd	.27 mfd	.12 mfd	.056 mfd
	NPO	L64	.350	.095	.070	.015 mfd	.015 mfd	.015 mfd	.015 mfd
	K1200	L68	.395	.145	.070	.68 mfd	.56 mfd	.22 mfd	.1 mfd
	NPO	L68	.395	.145	.070	.027 mfd	.027 mfd	.027 mfd	.027 mfd
	K1200	L72	.595	.185	.070	1.0 mfd	.68 mfd	.47 mfd	.12 mfd
	NPO	L72	.595	.185	.070	.047 mfd	.047 mfd	.047 mfd	.047 mfd
	K1200	L76	.585	.298	.070	2.5 mfd	1.5 mfd	1.0 mfd	.27 mfd
	NPO	L76	.585	.298	.070	.1 mfd	.1 mfd	.1 mfd	.1 mfd

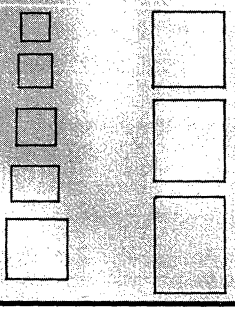
*±.010 or ±7%, whichever is greater

Monolithic Dielectrics Inc.
Post Office Box 647 ■ Burbank, California 91503 ■ (213) 848-4465

Monolithic Dielectrics Inc.

HIGH VOLTAGE MINIATURE CERAMIC CAPACITORS

ACTUAL PHYSICAL SIZE

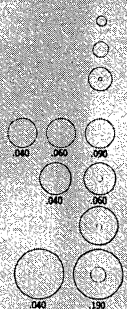


MDI SIZE	L*	W*	T (MAX)	Maximum Capacitance Available with Voltage Applied 1000 VDCW	2000 VDCW	3000 VDCW	4000 VDCW
HV42	.15	.15	.10	.01 mfd	2700 pf	560 pf	330 pf
HV44	.18	.18	.10	.015 mfd	3900 pf	820 pf	560 pf
HV46	.19	.19	.10	.018 mfd	4700 pf	1000 pf	680 pf
HV47	.19	.25	.10	.022 mfd	5600 pf	1200 pf	750 pf
HV50	.325	.325	.10	.027 mfd	8200 pf	1500 pf	1000 pf
HV60	.405	.395	.10	.056 mfd	.015 mfd	3300 pf	2200 pf
HV63	.435	.395	.10	.068 mfd	.018 mfd	3900 pf	2700 pf
HV65	.535	.395	.10	.15 mfd	.033 mfd	8200 pf	5600 pf

*±7% †Electrodes: .015 max. silver-band-width Flash Test: 1.2 min. x VDCW

FEED-THRU DATA SHEET

CIRCLE FEED-THRU DATA



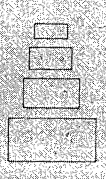
MDI SIZE	MIN I.D.	NOM OD*	T (MAX)	Max. Capacitance Available 25 VDC	50 VDC	100 VDC	200 VDC
CF14-04	.040	.130	.060	.033 mfd	.027 mfd	.022 mfd	.01 mfd
CF18-04	.040	.175	.080	.15 mfd	.12 mfd	.10 mfd	.05 mfd
CF28-04	.040	.265	.090	.33 mfd	.27 mfd	.22 mfd	.10 mfd
CF34-04	.040	.325	.090	.82 mfd	.75 mfd	.56 mfd	.25 mfd
CF34-06	.060	.325	.090	.82 mfd	.75 mfd	.56 mfd	.25 mfd
CF34-10	.090	.325	.090	.82 mfd	.75 mfd	.56 mfd	.25 mfd
CF36-04	.040	.355	.090	1.2 mfd	1.0 mfd	.82 mfd	.33 mfd
CF36-06	.060	.355	.090	1.2 mfd	1.0 mfd	.82 mfd	.33 mfd
CF50-04	.040	.450	.100	1.33 mfd	1.2 mfd	1.0 mfd	.47 mfd
CF60-04	.040	.600	.100	1.82 mfd	1.68 mfd	1.5 mfd	.68 mfd
CF60-20	.190	.600	.100	1.82 mfd	1.68 mfd	1.5 mfd	.68 mfd

SQUARE FEED-THRU DATA

MDI SIZE	MIN I.D.	NOM OD*	T (MAX)	Max. Capacitance Available 25 VDC	50 VDC	100 VDC	200 VDC
SF15	.040	.150	.060	.056 mfd	.047 mfd	.039 mfd	.018 mfd
SF25	.040	.245	.080	.18 mfd	.15 mfd	.12 mfd	.056 mfd
SF35	.040	.355	.090	.68 mfd	.56 mfd	.47 mfd	.22 mfd
SF50	.040	.500	.100	1.33 mfd	1.2 mfd	1.0 mfd	.47 mfd

MULTI FEED-THRU DATA

(U.S. Pat. #3,426,257)



MDI SIZE	MIN I.D.	NOM HOLE SPACING*	T (MAX)	NOM SIZE PER CAP*	Max. No. of Caps LENGTH	WIDTH	UNIT TOTAL
MF15	.030	.15	.060	.15 x .15	7	7	49
MF25	.040	.245	.080	.245 x .245	4	4	16
MF35	.040	.355	.090	.355 x .355	3	3	9
MF50	.040	.500	.100	.500 x .500	3	2	6

Maximum unit capacitance available same as SF Series above *±7%

MONOLITHIC CERAMIC CAPACITOR CHIP KITS

CHIP KIT NO. 1

300 monolithic ceramic K1200 capacitor chips for hybrid circuits. There are 10 chips of each standard RETMA values from 1.2 pf to 330 pf in ±10% tolerances at 50 VDCW in Kit No. 1. Complete kit $49.50.

CHIP KIT NO. 2

Kit No. 2 has 10 chips each of all standard RETMA values from 390 pf to .1 MFD in ±10% tolerances at 50 VDCW. Complete kit $49.50.

CHIP KIT NPO

300 monolithic ceramic NPO capacitor chips for hybrid circuits. Kit includes 10 chips of each standard RETMA values from 3.9 pf to 1000 pf in ±10% tolerances at 50 VDCW. Values below 10 pf are generally supplied in a chip size of .050" x .040" x .025". Complete NPO kit $99.50.

HOW TO ORDER

100 — **WORKING VOLTAGE**
25 = 25 VDC
50 = 50 VDC
100 = 100 VDC
200 = 200 VDC

R16 — **SIZE DESIGNATION**

W or N — **TEMPERATURE STABILITY**
W = ±15% max
N = ±30 ppm max/°C
−55°C to 125°C

103 — **CAPACITANCE IN PICOFARADS**
The first two figures are significant, last digit specifies number of zeros to follow (103=10,000 pf)

M — **TOLERANCE**
M = ±20%
K = ±10%
J = ±5%
G = ±2%
F = ±1%
D = ±.5 pf
C = ±.25 pf

Monolithic Dielectrics Inc.
Post Office Box 647 ■ Burbank, California 91503 ■ (213) 848-4465

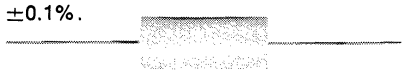
Nytronics, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 • TWX 810-665-2182

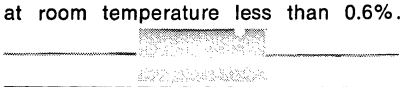
Capacitors

Film and Paper

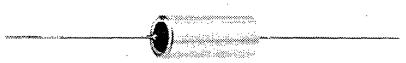
TYPE 231 (Polystyrene Film — Extended Foil) — Designed for applications requiring high insulation resistance, low dissipation factor and minimal dielectric absorption. Hermetically sealed. Available in standard tolerance of ±1% to ±20%. Can be provided to special close tolerance of ±0.1%.



TYPE 107 (Mylar and Foil) — Designed for applications requiring a flat capacitance change with temperature from +15 to +65°C. Provides exceptional electrical properties in the range of −55° to +125°C. Dissipation factor at room temperature less than 0.6%.



TYPE 223 & 230 (Metalized Mylar and Metalized Paper/Mylar) — Self-healing property makes this hermetic unit suitable for the most stringent applications. Special capacitance tolerance of ±1% can be provided.



TYPE 207 (Paper/Polyester Film) — Hermetically Sealed — Temperature range: −65°C to +125°C. Available in 8 style variations. Made to meet Mil-C-19978 character K.

TYPE 216 (Polyester Film) Hermetically Sealed — Temperature range: −65°C to +125°C. Available in 8 style variations. Made to meet Mil-C-19978.

TYPE CPO SERIES (Paper & Foil) Approved to Mil-C-25. Hermetically Sealed. CP04, CP05, CP08, CP09, CP25 through CP29, CP40, CP41, CP53, CP54, CP55, CP63, CP65, CP67, CP69, CP70, CP91. Wide range of capacitances, voltages and circuits.

Tantalum

STYLE MCS (Mil Type CS12 and CS13) — Miniature solid electrolyte hermetically sealed capacitor. Available in non-polar construction. Capacitance range: .0047 to 330 μf.

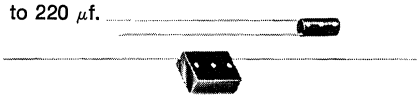
STYLE CSR 13 — Established reliability capacitor, manufactured to exacting military standards. Solid electrolyte. Meets or exceeds the requirements of MIL-C-39003A. Capacitance range: .0047 to 330 μf. Failure rate level L, M, P & R.

STYLE TAK and TAK-H — (Mil Type CL64 and CL65) A sintered anode gelled electrolyte miniature capacitor, operates under extreme environmental conditions and wide temperature ranges. Capacitance range: 1.7 to 560 μf.

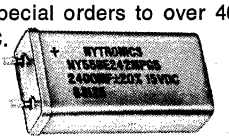
STYLE MTAK — Subminiature version of TAK series. Offers all the advantages of TAK in a smaller configuration. Capacitance range: 3.3 to 330 μf.

STYLE ACS — Solid electrolyte in metal can with epoxy end fill. Available in both standard MCS and subminiature cans. Axial leads. Capacitance range: .0047 to 330 μf.

STYLE CMS and RMS — Subminiature solid electrolyte tantalums produced to same rigid specs and quality as our MIL types. Cylindrical (CMS) and rectangular (RMS) configurations—both epoxy-encapsulated. Rugged mylar cases. Axial or radial leads. From .001 to 220 μf.



STYLE NY55 (MIL-Style CL55) — New metal-cased, wet sintered slug tantalum capacitors, meeting MIL-C-3965 requirements. High capacitance, 70 to 2400 μf; special orders to over 4000 μf. 10-150VDC.

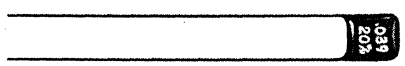


Ceramic

TYPE EK — An epoxy molded monolithic ceramic capacitor designed to meet Mil-C-11015/20B. Capacitance range from 10 pf to 3.3 μf.

DECI-CAP — A subminiature monolithic capacitor with an epoxy molded envelope 0.100″ diameter by 0.250″ long. Designed to meet Mil-C-11015. Capacitance range 4.7 pf to 27,000 pf ±10%.

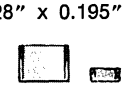
HY-CAP — Offers high capacitance range .01 mfd to 2.5 mfd ±20%. Voltage 100 WVDC, no derating to 125°C. Designed to meet Mil-C-11015.



Ultra High Stability

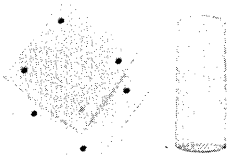
NYT-CAP — A high stability monolithic ceramic with a range of 4.7 pf to 4700 pf.: 4.7 pf to 220 pf case size 0.1″ dia. x 0.250″ long. 270 pf to 4700 pf, ±10%: 0.350″ x 0.250″ x 0.1″.

NYT-CHIP — A high stability monolithic ceramic chip capacitor. Chip dimensions are as follows: 4.7 pf to 220 pf: 0.170″ x 0.065″ x 0.070″. 270 pf to 4700 pf: 0.28″ x 0.195″ x 0.070″.



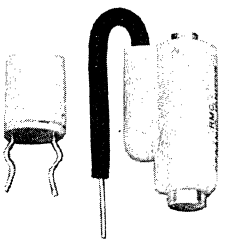
Nytronics, Inc.

RMC DISCAPS



Alumina Ceramics

RMC's expanded capabilities include the production of High Alumina substrates with a range of finishes suitable for both thick and thin film deposition. Flat plate and extruded rod shapes are available.



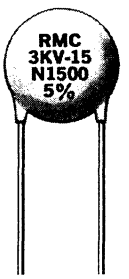
Piezoelectric Ceramics

RMC can now supply your requirements for a variety of Piezoelectric Devices. Radial mode resonators for filter applications and spark ignition devices are currently available.

Low Voltage Subminiatures

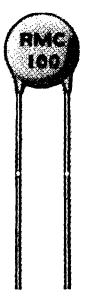
For applications requiring components with higher capacitance values at lower voltages ratings, RMC lists:

TYPES CM, SM, BT, or TA



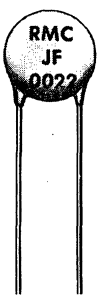
T.C. High Voltage

These components are suited to high frequency, corona free applications. Available in working voltages from 2000 to 6000 VDC in temperature coefficients of N-750, N-1500 or N-2200.



Temperature Compensating TYPE C or CG

Type C DISCAPS are designed for applications requiring a rating of 1000 volts D.C. Where a 500 volt D.C. rating is adequate. Type CG can be specified. Both types meet or exceed EIA specifications and are ideal for VHF or UHF applications.



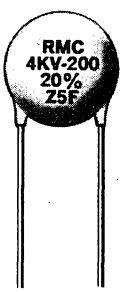
High Dielectric Constant

The industry's broadest line of high dielectric constant ceramic disc capacitors in wide capacitance ranges, select working voltages and tolerances.

Featured are:

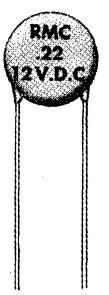
TYPES B, JL, JF, JE, JK, BA, JG, BG

Complete specifications listed in detailed RMC catalog.



High K-High Voltage

Maximum capacities combined with high voltage ratings are available in this line. Rated from 2000 to 6000 VDC in Z5F or Z5U temperature coefficients. Tolerances are ±10%, ±20%, +80-20% or GMV. **NEW! Additional ratings of 7½, 10 and 15 KV are now available for high voltage supply applications.**

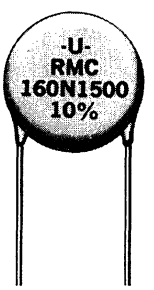


Magnacaps

Designed for application in low voltage circuits, Magnacaps combine very high capacitances with small physical sizes. These components are available in 3, 12, 16 and 25 volt ratings in wide capacity ranges.

TYPES M3, M12, M16 and M25

THE STANDARD OF PERFORMANCE THROUGHOUT THE ENTIRE ELECTRONICS INDUSTRY



Specials

Widest variety of special components for varied applications. Featured are Type U, U.L. approved parts for both "Live Bypass" and "Across-the-line" applications, TC Soldering, Sparkcaps, and Low Voltage "Chip" capacitors. For special requirements, contact RMC.

Standard Mallory components are available from authorized Mallory distributors throughout the United States.

RADIO MATERIALS COMPANY
a division of P. R. MALLORY & CO. INC.
4242 W. Bryn Mawr, Chicago, Illinois 60646; Telephone: 312-478-3600

MALLORY

MUCON® SUBminiature CERAMIC CAPACITORS

ULTRA-STABLE MU-CAPS®

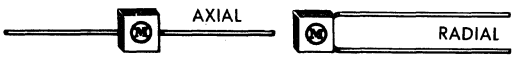
NPO
±.3%ΔC
50WVDC

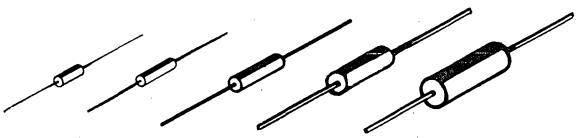
CK05 and CK06 Styles

CK05 Style to 1200 PF.
CK06 Style to 12,000 PF.

CK12 thru CK16 Styles

CK12 Style to 330 PF. . . . .160" L. x .090" Dia.
CK13 Style to 470 PF. . . . .250" L. x .090" Dia.
CK14 Style to 3,300 PF. . . . .390" L. x .140" Dia.
CK15 Style to 10,000 PF. . . . .500" L. x .250" Dia.
CK16 Style to 56,000 PF. . . . .690" L. x .350" Dia.





MU-CAPS® QPL to MIL-C-11015

CK05 and CK06

CK05 to .1 MF. at 50 WVDC
" to .01 MF. at 100 WVDC
" to .001 MF. at 200 WVDC
CK06 to 1.0 MF. at 50 WVDC
" to .1 MF. at 100 WVDC
" to .01 MF. at 200 WVDC

CK12 thru CK16

CK12 to .01 MF. . . . .160" L. x .090" Dia.
CK13 to .047 MF. . . . .250" L. x .090" Dia.
CK14 to .27 MF. . . . .390" L. x .140" Dia.
CK15 to 1.0 MF. . . . .500" L. x .250" Dia.
CK16 to 3.3 MF. . . . .690" L. x .350" Dia.

BX CHARACTERISTIC
±15% Δ C.

THINLINE

Mucon's Thinline Capacitors are made of the following 16 different ceramic bodies for a broad choice of size and electrical properties:

Temperature-Compensating Materials:	NP0	N080	N150
	N220	N330	N450
	N750	N1400	N2400
	N3300	N4700	N5600
General Purpose Materials:	LOW-VAR, STABLE-K, HIGH-K & SUPER-K for wide range of stability and capacitance.		

SPECIFICATIONS

Capacitance:
Range: TEMP.-COMP. BODIES 1/2 pf - 2200 pf; GEN. PURPOSE BODIES 50 pf - 150,000 pf
Voltages: 25 WVDC, 50WVDC, 200 WVDC and 500 WVDC
Leads: Tinned Copper, Nickel or Dumet to MIL Spec.
Shapes: Square, rectangular, single or multiple element.

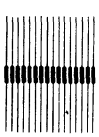
NARROW-CAPS®

NARROW-CAPS are designed for 1/10" modular spacing on printed circuits, or for cordwood applications.

SPECIFICATIONS

Capacitance:
Range: 5 pf - 100.000 pf
Voltages: 10 WVDC - 50 WVDC
Sizes: .095" max. wide x 1/4" max. long x .095" max. thick through 750 pf. Larger values 5/16" max. long.
Leads: #26 Tinned Copper, Nickel or Dumet to MIL Spec.

SLIM-CAPS®



Designed for applications which require capacitors slimmer than NARROW-CAPS. SLIM-CAPS are .065" wide x .065" thick max. Body lengths from .100"—.250" max.

SPECIFICATIONS

Capacitance
Range: 1/2 pf - 20,000 pf
Voltages: 50 WVDC
Leads: #30 Tinned Copper, Nickel or Dumet to MIL Spec.

STANDOFFS

Standoffs are furnished in the shapes shown above, using any one of the Mucon temperature-compensating bodies or general purpose bodies.

RIBBON LEADS

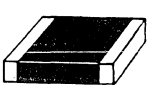
Style RLA

Size and specifications same as "Thinline" capacitors shown above, except radial and axial tinned copper ribbon leads, approximately .006" thick x 3/32" wide for units with max. size of .150" and up; .045" wide for smaller units.

CHIPS SINGLE LAYER

Sizes: .030" Sq. and up
Capacitance: SUPER-K Ceramic 150 PF. to 10,000 PF.
HIGH-K " 100 PF. to 5,000 PF.
STABLE-K " 50 PF. to 2,700 PF.
LOW-VAR " 20 PF. to 1,000 PF.
TEMP. COMP. " 1 PF. to 330 PF.
Electrodes: Normally silver. Other precious metals on request
Voltage: 50 WVDC

CHIPS MONOLITHIC MULTILAYER



Sizes: From .050" x .050" x .050" to .610" x .310" x .080"
Capacitance: STABLE-K Ceramic 10 PF. to 2 MF.
NPO " 1 PF. to .027 MF.
Electrodes: Normally silver. Other precious metals on request
Voltage: 50 WVDC

WRITE FOR FREE CATALOG LISTING COMPLETE DETAILED SPECIFICATIONS FOR ALL MUCON SUB-MINIATURE CERAMIC CAPACITORS and ELEMENTS

REPUBLIC ELECTRONICS CORP. 176 E. 7th St. PATERSON, N. J. 07524
201 - 279-0300 TWX 710-988-5908

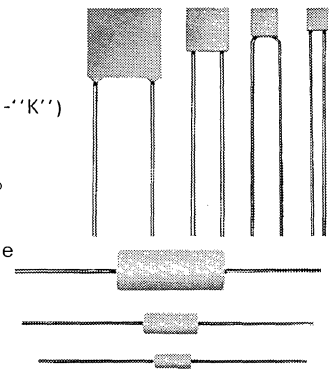
san fernando
electric manufacturing company

Specialists in capacitor design

West-Cap Division
1501 First Street
San Fernando, California 91341
Phone (213) 365-9411 TWX 910-496-1535

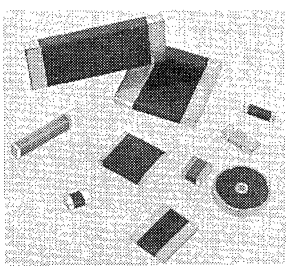
CERAMIC CAPACITORS

RECTANGULAR AND TUBULAR STANDARDS
CAPACITANCE VALUES
from 5 pf to 100 mfd
(stable-intermediate and Hi-"K")
from 1 pf to .2 mfd (NPO)
VOLTAGE: 25 to 500 VDC
TOLERANCE: down to .25%
TEMPERATURE RANGE:
-55°C to +150°C
meets or exceeds applicable portions of
MIL-C-11015
MIL-C-39014



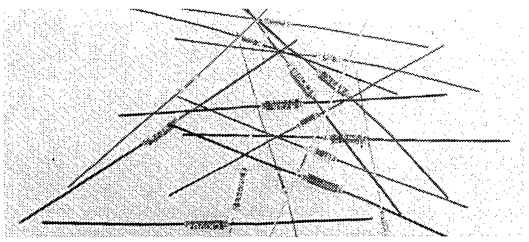
CHIPS FOR HYBRID CIRCUITRY

CAPACITANCE VALUES
from 5 pf to 2 mfd
(medium "K" dielectric)
from 1 pf to .2 mfd (NPO)
VOLTAGE: 25 to 100 VDC
TOLERANCE: down to .25%
TEMPERATURE RANGE:
-55°C to +125°C



NEPTUNE CERAMIC CAPACITORS

HERMETICALLY SEALED GLASS ENCLOSED TUBULAR
CAPACITANCE VALUES
from 10 pf to .0018 mfd (NPO)
TOLERANCE: 10% and 20% standard
TEMPERATURE RANGE: -55°C to +125°C
meets or exceeds applicable portions of
MIL-C-11015
MIL-C-39014



SUBMINIATURE RFI FILTERS
VOLTAGE RATING:
50, 100, 200 VDC—115 VAC
OPERATING CURRENT:
60 ma thru 15.0 amps
OPERATING TEMPERATURE:
-55°C to +125°C

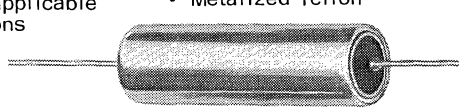
West-Cap Arizona
Subsidiary of San Fernando Electric Manufacturing Co.

2201 East Elvira Road, Tucson, Arizona 85706
TWX 910-952-1153 Data Phone (602) 294-2646

HERMETIC CAPACITORS

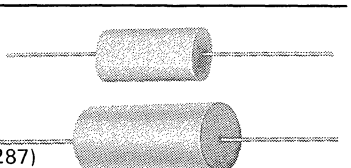
Metal Case
with compression glass seals
APPLICABLE MIL SPECIFICATIONS
MIL-C-25
MIL-C-14157C
MIL-C-18312
MIL-C-19978
Available in all capacitance values, voltages, and tolerances per applicable MIL specifications

- Paper-Foil
- Metalized Paper
- Mylar
- Metalized Mylar
- Polycarbonate
- Metalized Polycarbonate
- Polystyrene
- Metalized Polystyrene
- Teflon
- Metalized Teflon



"RAP-N-FIL" CAPACITORS

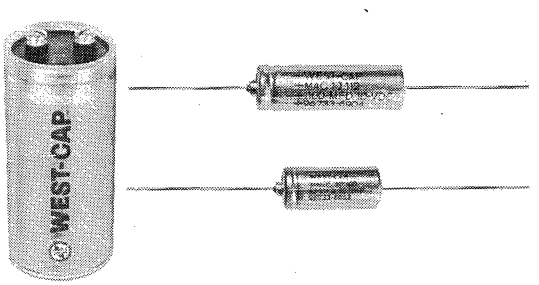
CAPACITANCE VALUES
from .001 mfd to 12 mfd
VOLTAGE: 50 to 1000 VDC
TOLERANCE: down to 1%
MYLAR: -55°C to +125°C
(CTM style meets MIL-C-27287)
POLYSTYRENE: -55°C to +85°C
METALIZED MYLAR: -55°C to +125°C
METALIZED POLYCARBONATE: -55°C to +125°C



ELECTROLYTIC CAPACITORS

SERIES MAC Axial lead
RATINGS: 2 mfd to 70,000 mfd
from 3 VDC to 150 VDC

SERIES WHC COMPUTER GRADE
RATINGS: 200 mfd to 100,000 mfd
from 5 VDC to 150 VDC. Voltages in excess of 150 VDC to 500 VDC on special order.

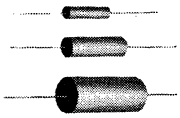


SAN FERNANDO ELECTRIC MANUFACTURING COMPANY is qualified to Military Specifications listed.

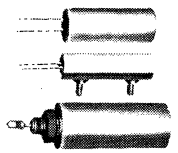
S&EI Manufacturing/Capacitors

18800 Parthenia Street, Northridge, California 91324 • (213) 349-4111 • TWX 910-493-1252

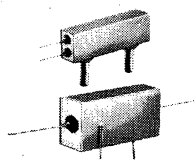
CASE STYLES → FEATURES ↓



R — *Wrap and Fill, round*



E — *Hermetically, sealed, tubular*



G* — *Hermetically, sealed, rectangular*

17 SERIES — METALIZED MYLAR

For circuits that require the ultimate electrical properties Non Polar coupled with the smallest size over a wide temp. range.

- IR: 50K Meg × MFD Min. +25° C
- DF Less Than 1% IKHZ at +25°C
- Dielectric Strength: 200% of rated VDC 1 Min. Max.
- Temperature Range: −55° C to +125° C
- Voltage versus Temp.: 100% rated Voltage to 100° C 50% derating to +125° C
- Capacity versus Temp.: −55° C to +25° C, +5% change; +25° C to +85° C, +3%, and +25° C to +105° C, +7% change
- Quality Control and Production Tests consist of 100% group A requirements of MIL C 18312 on hermetic seal style E and all tests except for moisture leak tests on styles W-U-R-N-B-D.

17R

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.17	40	.001	.001	.001	.001
.17	40	.022	0068	0033	0012
.22	40	039	027	01	0047
23	54	.12	033	027	0082
27	54	18	12	047	01
32	67	50	22	056	015
.34	83	68	33	.12	039
46	83		39	18	047
.28	97	82			
39	97	1.5	47	22	
.47	97		68	27	
41	1.17	2.0	82	33	082
.56	1.17	5.0	1.5	50	18
60	1.17			56	
65	1.68	10.0	4.0	1.0	68
89	1.68	20.0	8.0	3.0	1.5

17E

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.175	.500	.022	.0068	.0033	.001
.195	.500	.039	.0082	.0068	0049
.235	.500		.027	.01	
.195	.625	.056			.0056
.235	.625	.12	.056	.018	.01
.312	.625	.18	.12	.047	
.312	.750	.33	.18	.056	.015
.400	.750	.50	.27	.1	.033
.400	.875	.68	.39	.12	.047
400	1.125	1.5	.68		.056
.400	1.375	2.0			.1
.500	1.375	4.0	1.5	.39	.15
.562	1.375			.50	.18
.67	1.375	5.0		.56	
.562	1.875		.20	82	.39
.670	1.875	10.0	4.0	1.0	.56
.750	1.875	12.0	5.0	1.5	.82

17G

CASE TK.	SIZES WD.	LG.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.22	.34	.562	.082	.027	01	.0047
.22	.34	.687	.22	.056	.033	.018
.22	.34	.812	.33	.10	.056	027
.22	.34	.937	.50	.12	.068	033
.22	.34	1.125	.68	.18	.1	047
.31	.41	.937	.82	.27	.15	068
.31	.41	1 125	1.0	.39	.18	.1
.31	.41	1 312	1 5	50	.27	.12
.40	.57	1.125	2 0	.75	.39	.18
.40	.57	1.312	3.0	82	.56	.27
.40	.57	1.562		1 0	.68	.33
.40	.57	1.812	5 0	1.5	.82	.39
.50	.65	1.562		2 0	1 0	.50
.50	.65	1.812				.56
.50	.65	2.062	8.0		1 5	.75
.50	.65	2 312		3 0		.82
.60	.80	2 062	12.0		2 0	1 0
.60	.80	2 312	15 0	5.0		

22 SERIES — METALIZED POLYCARBONATE

For circuits that require flat T.C., low losses, small size over a wide temperature and frequency range. Used in many wave filter, discriminator and critical timing circuits.

- IR: 100K Meg × MFD Min. at +25 C
- DF less than .3% measured IKHZ at 25 C
- Dielectric Strength: Up to 200% of rated VDC Max. 1 Min.
- Temperature Range: −55° C to +105 C. When properly encased will operate to +125° C
- Temperature Coefficient: From −55 C to +25° C, 1.5% max change; +25° C to +105° C, −.7% max. change.
- QC & Production Tests consist of 100% to group A requirements MIL C 18312 on hermetic seal style E and to all except moisture leak test on styles W-U-R-N-B-D.

22R

CASE DIA.	SIZES LGTH.	MFD 50 VDC MFD	MFD 100 VDC MFD	MFD 200 VDC MFD	MFD 400 VDC MFD
.18	.40	.082	.039	.01	.0047
.21	.40	.18	.068	.022	.01
.18	.54	.22	.082	.027	.015
.24	.54	.33	.18	.056	.027
.38	.54	.56	.22	.082	.047
.24	.67		.25	.1	.056
.29	.67	.68	.27	.15	.1
.32	.67	.75	.39	.25	.12
.40	.67	1.0	.56		
.32	.83	1.5	.82	.27	.15
.39	.83	2.0	1.0	.39	.18
.41	.97		1.5	.47	.22
.48	.97			.56	.33
.38	1.16	4.0		.68	.39
.45	1.16	5.0	2.0	1.0	.5
.50	1.16	8.0	2.5	1.5	.68
.62	1.16	12.0			
.64	1.68	15.0	5.6		
.68	1.68	20.0	8.0		
1.06	1.68	50.0	12.0		
.44	1.78			2.0	.75
.675	1.78			4.0	

22E

CASE DIA.	SIZES LGTH.	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.175	.50	.033	.018		.0015	
.195	.50	.082	.039	.022	.0022	.001
.235	.50					
.195	.625	.12	.082		.01	
.235	.625	.18	.1	.033	.027	
.312	.625	.56	.12	.056	.033	.0082
.312	.750	.68	.27	.18	.056	.022
.400	.750	1.0	.50	.25	.082	.027
.40	.875	2.0	.56	.39	.1	.039
.50	.875		.68		.18	.056
.40	1.125	3.0	1.0	.47		
.50	1.125	5.0	2.0	.56	.25	.12
.562	1.125	6.8			.33	
.50	1.375	8.0	3.0	1.0	.50	.18
.562	1.375			1.5		
.670	1.375	10.0	5.0			.27
.562	1.875	15.0	6.8	2.0	.82	.33
.670	1.875	18.0	8.0	3.0		.50
.75	1.875	20.0	12.0	4.0	1.0	.56
1.0	1.875	40.0	22.0	8.0	1.5	.82

22G

CASE TK.	SIZES WD.	LG.	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.22	.34	.562	.39	.039	.015	.0063	.0047
.22	.34	.687	.56	.056	.056	.015	.01
.22	.34	.812	.82	.18	.082	.022	.015
.22	.34	.937	1.0	.39	.12	.033	.022
.22	.34	1.125			.18	.047	.027
.31	.41	.937	2.0	.68	.39	.056	.039
.31	.41	1.125	3.0	1.0	.50	.082	.056
.31	.41	1.312				.12	.068
.40	.57	1.125	5.0		.75	.18	.12
.40	.57	1.312		2.0	.82	.25	.15
.40	.57	1.562	7.0	3.0	1.0	.33	.18
.40	.57	1.812			1.5	.39	.25
.50	.65	1.562	10.0	7.0		.47	.27
.50	.65	1.812		10.0	2.0	.56	.33
.50	.65	2.062				.68	.39
.50	.65	2.312			3.0	.75	.50
.60	.80	2.062			5.0	1.0	.75

13 SERIES — POLYSTYRENE

For the instruments that require long term stability, low leakage, minimum dielectric absorption.

Used in many critical computer timing and hybrid circuits.

- Temperature Range: −55 C to +85 C
- IR: 100K Meg × MFD Min +25 C
- DF: .05% Max IKHZ at +25 C
- TC: 130 PPM / C +20 PPM
- Quality and, Production test consists of 100% to group A level of MIL C 19978 on style E and all requirements except moisture leak test on style R.

13R

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.280	.680	.001	.001	.001	.001
.280	.680	.01	.0068	.005	.0039
.312	.680	.022	.01	.0082	.0068
.312	.875	.033	.015	.012	.032
.343	.875	.039	.027	.015	.01
.375	.875	.05	.033	.022	.015
.468	.875	.082	.039	.025	
.406	1.0	.1	.047	.033	.02
.468	1.0	.12	.05	.039	.027
.437	1.25	.15	.068	.05	.033
.50	1.25	.20	.1	.068	.039
.531	1.25	.27	.15	.082	.05

13E

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD
.195	.75	.0027	.0015	
.195	.75	.0039	.0018	
.195	.75	.0082	.0033	.0015
.235	.75	.012	.0068	.0027
.312	.75	.022	.015	.01
.400	.87	.068	.033	.018
.500	1.0	.12	.068	.033
.562	1.12	.22	.1	.068
.562	1.375	.33	.15	1

*The pictorial "G" style series displayed are not standard; however depicts two popular methods of mounting features. Many mounting and terminal features can be designed and manufactured to your specifications by request to our representatives or factory direct, without delivery delay.

10 SERIES — MYLAR FOIL

For the instrument that requires high reliability, precise characteristics year after year. Used in many communication, telephone, tracking and test instrument devices.

- Temperature Range: −55° C to +125 C
- IR: 50K Meg × MFD Min. at +25° C
- Dielectric Strength: 200% of rated VDC max. 1 Min.
- DF less than .5% IKHZ at 25° C
- Temperature Coefficient:
  +5% change from −55° C to +25° C
  +5% change from +25° C to +85° C
  +9% change from +25° C to +105° C
  +14% cnange from +25° C to +125° C
- QC and Production Tests are 100% to group A of MIL C 19978 on hermetic style E and all tests except moisture leak requirement style R.

10R

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD	1000 VDC MFD
.156	.500	.001	.001			
.156	.500	.01	.0082			
.203	.500	.015	.015			
.203	.625	.022	.022	.0068		
.265	.625	.039	.027	.01		
.218	.750	.047	.03	.02	.0047	.001
.296	.750	.082	.047	.022	.0032	.0015
.312	.750		.068	.025	.01	
.281	.875	.1	.075	.027	.015	.0022
.375	.875	.15	.1	.047	.022	.01
.359	1.0	.22		.068	.027	.015
.50	1.0			.12	.068	
.406	1.125	.39	.22			
.468	1.250	.47	.33	.15	.082	.047
.625	1.250	.82	.47		.1	
.609	1.375		.56	.27	.15	

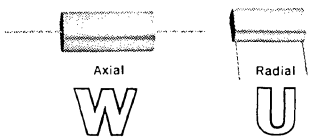
10E

CASE DIA.	SIZES LGTH.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.195	.625	.001	.001	.001	.001
.195	.625	.015	.01	.0047	.0015
.235	.625		.015	.0068	
.312	.625		.027	.015	
.312	.750	.082	.033		.0082
.312	.875	.12	.047	.027	
.400	.875	.15	.032	.047	.022
.400	1.125	.22	.15	.068	.027
.400	1.375	.33	.22	.1	.033
.500	1.375	.50	.33	.15	.068
.562	1.375	.56	.47	.22	.082
.670	1.375	.90		.27	
.670	1.875	1.0	.56		.12
.670	1.875	1.25	.82	.39	.15
.750	1.875	1.5	1.0	.56	.33
1.0	1.875	2.0	1.5	.82	.39

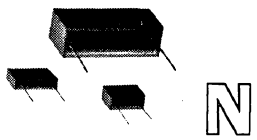
IMPORTANT NOTICE: THE NEW MINIATURE 50VDC AND 100VDC SIZES IN OUR 22 SERIES IS A MAJOR SIZE REDUCTION IN METALIZED POLYCARBONATES.

S&EI Manufacturing/Capacitors

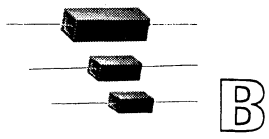
18800 Parthenia Street, Northridge, California 91324 • (213) 349-4111 • TWX 910-493-1252



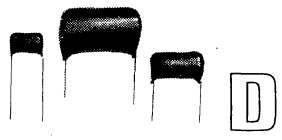
Wrap and Fill, rectangular



Molded, radial leads



Molded, axial leads.



Epoxy Dip Case

17W/17U

CASE SIZES L	T	W	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.40	.12	.22	.022	.0056	.0033	001
.40	.17	.27	.039	.027	.01	.004
.54	.17	.28	.12	.039	.018	.0082
.54	.21	.32	.18	.12	.047	.01
.67	.25	.38	.39	.18	.056	.012
.67	.30	.42	.50	.27	.032	.015
.83	.27	.38	.56	.29	.1	.033
.83	.42	.50	.68	.39	.18	.047
.97	.22	.35	.82	.47	.2	
.97	.32	.46	1.5	.68	.22	
1.17	.34	.5	2.0	.82	.33	1
1.17	.47	.65	5.0	1.5	.56	.18
1.68	.47	.56	8.0	2.0	.82	.27
1.68	.50	.65	10.0	4.0	1.0	.39
1.68	.65	.85	15.0	5.0	1.5	.82
1.68	.75	1.0	20.0	8.0	2.0	1.5

17N

CASE SIZE L	T	H	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.395	.095	.295	.039	.01	.0027	
.42	.16	.31	.047	.027	.012	.0047
.55	.16	.31	.12	.033	.022	.012
.55	.19	.38	.18	.056		
.55	.24	.38	.27	.12	.047	
.55	.30	.40	.39		.1	
.68	.19	.50	.68			
.67	.30	.50		.27		.018
.82	.30	.70			.18	.039
.88	.25	.50	1.0	.39		
1.0	.37	.50	2.0	.68	.27	.056
1.24	.40	.75	5.0	1.5	.68	.18
1.75	.57	.75	8.0	3.0	1.5	.39

17B

CASE SIZES TK	WD	LG.	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.17	.29	.42	.001	.001	.001	.001
.17	.29	.42	.047	.027	.01	.0047
.17	.29	.57	.056	.033	.012	.0062
.17	.29	.57	.12	.039	.015	.0082
.23	.36	.57	.15	.047	.018	.009
.23	.36	.57	.27	.082	.039	.01
.29	.42	.57	.39	.15	.047	
.29	.42	.67	.68	.27	.1	.015
.39	.54	.82	1.0	5	.18	.047
.39	.54	1.04	2.0	.68	.27	
.39	.54	1.19	2.5	1.0	.39	.1
.56	.72	1.24	5.4	1.5	.56	.18
.56	.72	1.75	10.0	4.0	1.0	.5

17D

CASE SIZES L	T	H	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.39	.17	.35	.022	.01	.0068	.0022
.39	.19	.38	.039	.027	.01	.0047
.52	.17	.35	.082	.047	.015	.0056
.52	.26	.45	.18	.10	.047	.01
.65	.23	.42	.22	.12	.056	.012
.65	.25	.45	.39	.15	.082	.015
.65	.35	.55	.5	.27	1	
.81	.27	.43	.56			.027
.81	.42	.60	.68	.39	.18	.047
.95	.37	.53	1.0	.56		
.95	.38	.59	1.5	.68	.22	
.95	.46	.66			.27	
1.15	.34	.55				.082
1.15	.39	.60	2.0	.75	.33	.10
1.15	.43	.65	3.0	1.0	.39	.12

22W/22U

CASE SIZES L	T	W	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD
.40	.12	.22	.047	.018	.01	.001
.40	.15	.27	.25	.039	.022	.01
.54	.13	.23	.27	.082	.027	.015
.54	.16	.28	.39	.1	.047	.027
.54	.21	.32	.50	.12	.082	.047
.67	.18	.29	.82	.15	.1	.056
.67	.22	.40	1.0	.39	.25	.12
.83	.28	.38	1.5	.56	.30	.15
.83	.32	.45	2.0	.68	.39	.18
.97	.33	.48		1.0	.47	.27
.97	.10	.55		1.2	.56	.36
1.16	.32	.43	5.0	1.5	.68	.50
1.16	437	.55	10.0	2.5	1.5	.63
1.16	.54	.66	12.0	3.0		
1.68	.51	.64	15.0	5.0		
1.68	.73	.86	30.0			

22N

CASE SIZES L	T	H	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.395	.095	.295	.068	.01	.0068	.0015	
.42	.16	.31	.075	.047	.01	.0022	
.42	.18	.31	.1		.022	.0047	.0022
.55	.16	.31		.12	.039	.018	.0047
.55	.18	.31	.22	.15	.056	.027	
.55	.185	.38		.18	.068		
.55	.24	.38	.50	.22	.082	.039	.012
.55	.30	.40	.68	.27		.047	.018
.67	.30	.45		.39	.22		.027
.67	.30	.50		.56		.068	
.82	.30	.42	1.0		.27	.1	.039
.82	.40	.50	1.5	1.0	.39	.15	.068
1.0	.37	.50	3.0	1.5	.68		.1
1.24	.40	.50	5.0	2.0	.82	.22	
1.24	.57	.75	10.0	4.0	1.5	.50	.27
1.75	.57	.75	18.0	6.8	3.0	.82	.33
1.75	.57	1.0	22.0	10.0			

22B

CASE SIZES T'HK.	WDTH	LGTH.	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.17	.29	.42	.1	.047	.022	.01	.0033
.17	.29	.57	.22	.1	.039	.022	.0068
.23	.36	.57	.33	.22	.082	.047	.01
.29	.42	.57	.68	.27	.1		.018
.29	.42	.67			.25		.027
.29	.42	.82	1.0	.75	.27	.068	
.39	.54	.82	1.5	1.0	.50	.12	.082
.39	.54	1.04	2.0		.68	.18	
.39	.54	1.19	5.0	3.0	.82	.33	.15
.56	.72	1.24	10.0	5.0	1.5	.5	.27
.56	.72	1.75	18.0	8.0	3.0	.82	.39
.56	.72	1.92	22.0				

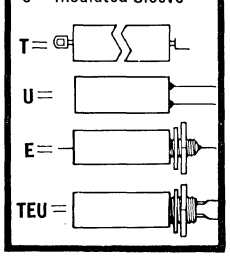
22D

CASE SIZES L	T	H	+.032 −.096 MFD	50 VDC MFD	100 VDC MFD	200 VDC MFD	400 VDC MFD	600 VDC MFD
.39	.19	.36	.068	.01	.01	.0022		0015
.39	.18	.39			.015	.0047		0022
.39	.23	.45	.1	0	.022	.01		
.52	.18	.39	.18	.12	.033			.0047
.52	.26	.45	.50	.22	.082	.027	.01	
.52	.35	.58	.68	.27		.047	.018	
.64	.35	.53			.25		.027	
.64	.49	.72		.56		.12		
.81	.35	.55	.75		.33		.039	
.81	.40	.63	1.0		.39	.15	.056	
.81	.44	.68	1.5	1.0		.18	.082	
.95	.38	.61			.47	.25		
.95	.42	.66	3.0	1.5	.56	.33		
1.15	.37	.63			.75		.1	
1.15	.43	.65	5.0	2.0	1.0	.39	.12	

ORDERING AND PART NUMBER INFORMATION

The dimensional tolerances for case styles R-W-U-D are ±.05. Styles G-B-N-E are ±.031, on length, and ±.015 for other dimensions. All units are available in any value, ranging from .001 MFD to their maximum capacity, with tolerances to ±1%. Standard tolerance is ±20%. Other types of leads, configurations, and encasements are available upon request to meet your special requirements.

***9**
Hermetic case Style Accessories
9 = Insulated Sleeve



17
Dielectric
17 = Metalized Mylar
22 = Metalized Polycarbonate
10 = Mylar Foil
13 = Polystyrene Foil

E
Case Style
E = Hermetic Rnd.
G = Hermetic Rect.
W = Wrap Fill, Oval, Axial
U = Wrap Fill, Oval, Radial
N = Molded Radial
B = Molded Axial
R = Wrap Fill, Round
D = Epoxy Dip

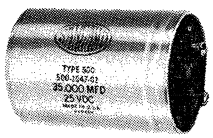
***1**
Circuits
1 = Case Floating
2 = Case ground
3 = Case ground With Lead
5 = Feed Through

B
Voltage
A = 50 VDC
B = 100 VDC
C = 200 VDC
D = 300 VDC
E = 400 VDC
F = 600 VDC
G = 1000 VDC

103
Capacitance
Expressed in MMFD
103 = .01 MFD
Last digit No Zeros

K
Tolerance
Standard ±20%
K = ±10%
J = ± 5%
H = ± 3%
G = ± 2%
F = ± 1%

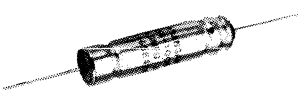
**Use these key part numbers only when ordering style E,G, hermetic seal encasements. Remaining part numbers are applicable when ordering case styles R-W-U-N-B-D.*



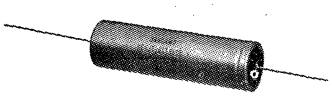
Type 500—Electrolytic Computer Grade 85° C
BULLETIN 2236

Type DCM—Electrolytic Computer Grade 65° C
BULLETIN 2231

Type 557—Electrolytic −55°C to +125°C Mil-C-39018
BULLETIN 2240



Type 556—Electrolytic Commercial Grade
BULLETIN 2239



Type 066—Electrolytic Industrial Grade
BULLETIN 2241

Type CH—Film Metallized Polyester Mil-C-18312D
BULLETIN 2426

Type CQ—Film Polycarbonate Mil-C-19978
BULLETIN 2324

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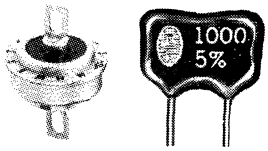
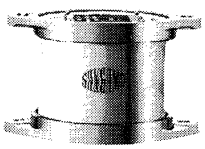


Type M—Mica Button
Type D—Mica Dipped
BULLETINS 2311, 2323, & 2312

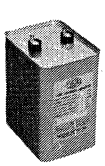
Type R—Mica Molded
BULLETIN 2320



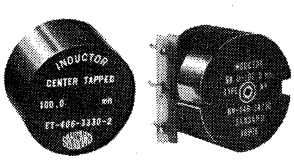
Type G—Mica Transmitting
BULLETIN 2322

Type 291—Cast Mica Transmitting
BULLETIN 2324

Type S—Paper Hermetically Sealed Mil-C-25
BULLETIN 2421



Type XFC—Paper Xenon Flash
BULLETIN 2611



Type ET & NV Inductors Fixed & Tunable
BULLETINS 2721A & 5103

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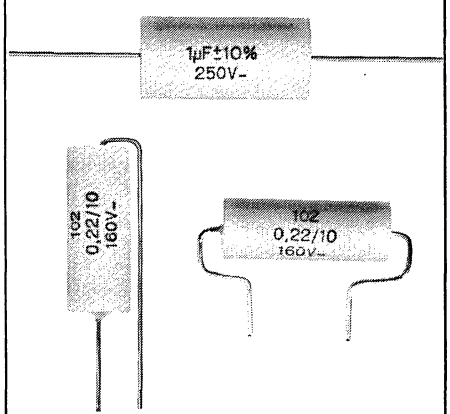
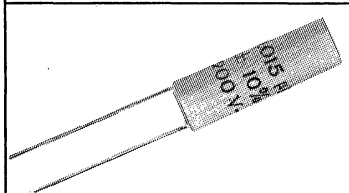
A single source for your wound capacitor needs.

Seacor offers a broad line of wound dielectric capacitors. With the aid of our engineering consultation service, you may choose the style and dielectric that are most beneficial to your design, at lowest cost. Our proven quality and reliability over the years, coupled with excellent delivery records, enhance the value of this capacitor line. The listing below is only a portion of our products. Your inquiry on your capacitor needs is welcome.



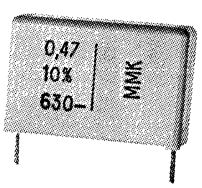
Tubular, Axial Lead

SFC	Polystyrene Foil, 63-160V, 20 PF to 10,000 PF, 1%, 2½%, 5%, 10%, 20%
102	Polyester Foil, 160-400-630-1000V, 1000 PF to 1 MF, 10%, 20%
117	Polyester Foil, 160-250-400V, 100 PF to 10,000 PF, 5%, 10%, 20%
129	Polyester Foil, 1000-1250-1500V, 1000 PF to .33 MF, 10%, 20%
105	Metallized Polyester, 100-250-400-630-1000V, 1000 PF to 10 MF, 5%, 10%, 20%
107	Metallized Polyester, 100-160-250-400V, 1000 PF to 10 MF, 2½%, 5%, 10%
108	Polycarbonate Foil, 100-160-250-400V, 100 PF to 10,000 PF, 5%, 10%, 20%
112	Metallized Polycarbonate, 100-250-400-630-1000V, 1000 PF to 10 MF, 5%, 10%, 20%
116	Polystyrene Foil, 63-100-250-630-1000V, 100 PF to .6 MF, 1¼%, 2½%, 5%, 10%



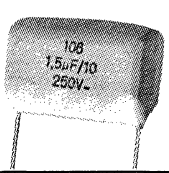
Tubular Molded Case, Radial Lead

103	Polyester Foil, 630-1000-1250-1500V, 1000 PF to .47 MF, 10%, 20%



Molded Case, Radial Lead

MMK	Metallized Polyester, 100-250-400-630V, .01 MF to 6.8 MF, 10%, 20%
120	Metallized Polyester, 63-100-250-400-630-1000V, 1000 PF to 10.0 MF, 10%, 20%
161	Metallized Polycarbonate, 63-100-250-400V, 1000 PF to 10 MF, 2½%, 5%, 10%
127	Metallized Polypropylene, 250 VAC, 4 MF to 5.4 MF, 3%, 5%, 10%



Epoxy Dipped, Radial Lead

106	Metallized Polyester, 250-400-630-1000V, 1000 PF to 2.7 MF, 10%, 20%

Tubular Axial Lead, Offset

SF	Polystyrene Foil, 25-63-160-630V, 100 PF to .1 MF, 1%, 2½%, 5%, 10%
101	Polyester Foil, 160-400-630V, 1000 PF to .47 MF, 10%, 20%
110	Polycarbonate Foil, 160-400-630V, 5 PF to .015 MF, 10%, 20%

Other dielectrics • special windings • shapes and tolerance • taped on reels available. Please inquire.

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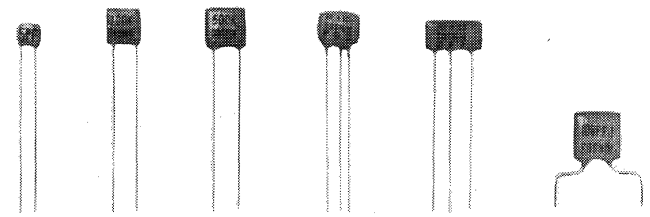
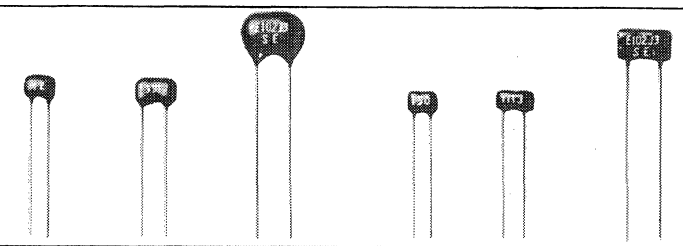


Type		Capacitance Range (PF)		tolerance	Sizes (inch)						Leads (inch)			
					L (±0.04)		T (Max)		S		L (Min)		ϕ (AWG)	
500WV	50WV	500WV	50WV		500WV	50WV	500WV	50WV	500WV	50WV	500WV	50WV	500WV	50WV
FM05	V-FM04	1~10	1~51	F.G.J.K.M	0.20	0.16	0.20	0.10	0.10±0.06	0.08±0.06	0.98	0.79	#26	#26
06	05	11~25	52~75	F.G.J.K.M	0.24	0.20	0.20	0.10	0.12±0.06	0.10±0.06	0.98	0.79	#26	#26
07	06	26~43	76~120	F.G.J.K.M	0.28	0.24	0.20	0.10	0.16±0.06	0.12±0.06	0.98	0.79	#26	#26
08	07	44~75	121~180	F.G.J.K.M	0.32	0.28	0.20	0.10	0.20±0.06	0.16±0.08	0.98	0.79	#26	#26
09	08	76~110	181~220	F.G.J.K.M	0.35	0.32	0.20	0.10	0.22±0.08	0.20±0.08	0.98	0.79	#24	#26
10	09	111~150	221~270	F.G.J.K.M	0.39	0.35	0.20	0.10	0.26±0.08	0.24±0.08	0.98	0.79	#24	#26
11	10	151~180	271~330	F.G.J.K.M	0.43	0.39	0.20	0.10	0.26±0.08	0.28±0.08	0.98	0.79	#24	#26
12	11	181~240	331~390	F.G.J.K.M	0.47	0.45	0.20	0.10	0.32±0.08	0.32±0.08	0.98	0.79	#24	#26
13		241~300		F.G.J.K.M	0.51		0.20		0.32±0.08		0.98		#24	
14		301~360		F.G.J.K.M	0.55		0.20		0.34±0.08		0.98		#24	
15		361~430		F.G.J.K.M	0.59		0.20		0.41±0.08		0.98		#22	
16		431~470		F.G.J.K.M	0.63		0.20		0.45±0.08		0.98		#22	
17		471~560		F.G.J.K.M	0.67		0.20		0.51±0.08		0.98		#22	
18		561~620		F.G.J.K.M	0.71		0.20		0.51±0.08		0.98		#22	

DIPPED MICA CAPACITORS

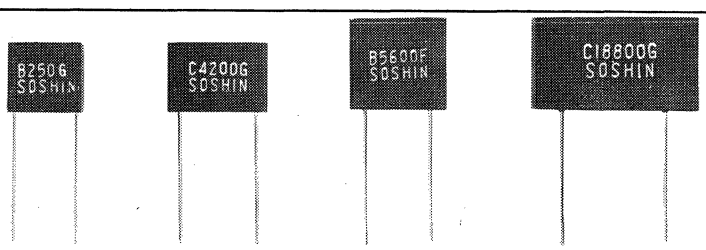
Temperature tests prove superiority: These dipped mica capacitors withstand 2000 hrs at 40°C, 90% to 95% humidity. Usable temperature range −55°C to +150°C.
Miniature type, DM05, also available.
All types meet MIL-C-5D specifications.



Type	Maximum allowable capacitance (PF)			tolerance	Sizes (inch)																		Leads		
					ONE COAT type									STANDARD type									ONE COAT STANDARD		
					500WV			300WV			100WV			500WV			300WV			100WV					
STAN-DARD type	100 WV	300 WV	500 WV		L MAX	W MAX	T MAX	L MAX	W MAX	T MAX	L MAX	W MAX	T MAX	L MAX	W MAX	T MAX	L MAX	W MAX	T MAX	L MAX	W MAX	T MAX	A 0.04	D AWG	C MIN
DM05	200	130	—	F.G.J.K.M	—	—	—	0.24	0.18	0.10	0.26	0.18	0.10	—	—	—	0.28	0.22	0.14	0.30	0.22	0.14	0.12	#26	0.98
DM10	440	390	330	F.G.J.K.M	0.30	0.20	0.10	0.30	0.20	0.10	0.30	0.20	0.10	0.34	0.22	0.14	0.34	0.22	0.14	0.34	0.22	0.14	0.16	#26	0.98
DM12	1,200	820	430	F.G.J.K.M	0.32	0.26	0.12	0.35	0.28	0.16	0.37	0.28	0.18	0.37	0.35	0.18	0.41	0.39	0.22	0.43	0.41	0.24	0.16	#24	1.38
DM15	2,000	1,200	510	F.G.J.K.M	0.41	0.26	0.14	0.41	0.26	0.14	0.43	0.28	0.16	0.47	0.39	0.22	0.49	0.41	0.24	0.51	0.43	0.26	0.24	#22	1.38
DM16	2,000	1,500	750	F.G.J.K.M	0.71	0.32	0.18	0.73	0.34	0.20	0.77	0.34	0.20	0.75	0.41	0.24	0.77	0.41	0.26	0.79	0.41	0.26	0.49	#22	1.38
DM19	10,000	6,800	5,100	F.G.J.K.M	0.61	0.45	0.20	0.65	0.47	0.24	0.63	0.47	0.28	0.69	0.59	0.30	0.71	0.59	0.32	0.71	0.59	0.34	0.37	#20	1.38
DM20	20,000	12,000	10,000	F.G.J.K.M	0.71	0.51	0.26	0.71	0.51	0.26	0.73	0.51	0.35	0.77	0.61	0.39	0.79	0.63	0.41	0.81	0.63	0.47	0.43	#20	1.38
DM30	30,000	24,000	22,000	F.G.J.K.M	0.75	0.77	0.28	0.77	0.81	0.28	0.81	0.81	0.32	0.87	0.91	0.35	0.87	0.91	0.39	0.87	0.91	0.49	0.43	#18	1.38
DM40	40,000	30,000	27,000	F.G.J.K.M	0.98	0.67	0.32	0.98	0.67	0.32	1.0	0.69	0.34	1.04	0.75	0.41	1.04	0.75	0.41	1.06	0.79	0.43	0.63	#18	1.38
DM42	90,000	75,000	62,000	F.G.J.K.M	—	—	—	—	—	—	—	—	—	1.50	0.98	0.47	1.54	1.02	0.51	1.57	1.06	0.51	1.04	#18	1.38

MC CAPACITORS

A combination silvered mica capacitor and temperature-compensating ceramic capacitor with the best characteristics of both, temperature coefficient to 0.05μF. Stable over long periods, small with excellent space factor.
High Q, value small dissipation factor.
Excellent moisture resistance.



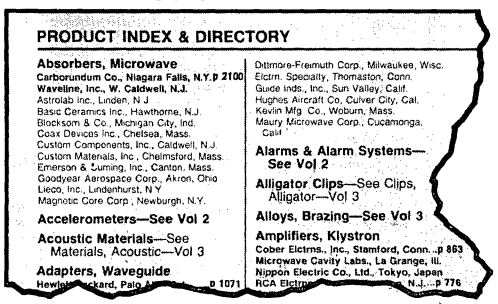
Type	Size (inch)				
	W	H	T	F (MAX)	d (AWG)
MC-1	0.59	0.59	0.28	0.39	#21
MC-2	0.83	0.59	0.41	0.49	#21
MC-3	0.83	0.79	0.41	0.49	#20
MC-4	1.18	0.79	0.59	0.79	#20

SOSHIN ELECTRIC CO., LTD.
1-18-18 Nakamagome, Ohta-ku, Tokyo, Japan. TELEX: 246-6377

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo A... p 1071
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electm. Specialty, Thomaston, Conn.
Gudo Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn...p 863
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electr... N.J....p 776

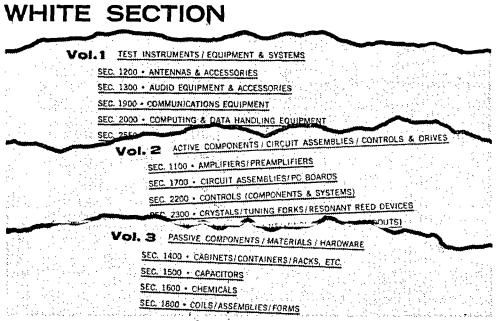
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2... • ...
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
...OUTS)
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

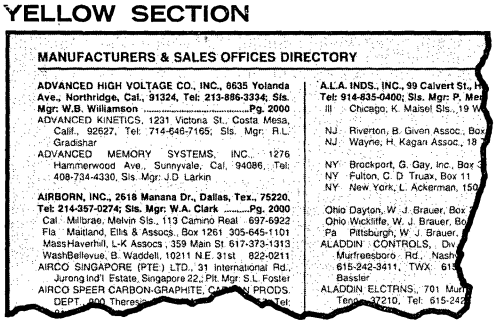
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

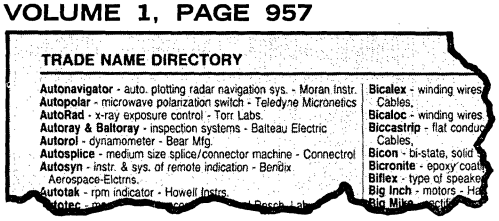
ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal. Milbrae, Melvin Sls., 113 Camino Real 697-6922
Fla. Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St 617-373-1313
Wash Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22,; Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, G... PRODS. DEPT., ...Tel:
A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill. Chicago, K. Maisel Sls., 19 W...
NJ. Riverton, B. Given Assoc., Box...
NJ. Wayne, H. Kagan Assoc., 18...
NY. Brockport, G. Gay, Inc., Box...
NY. Fulton, C. D. Truax, Box 11...
NY. New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa. Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn. 37210, Tel: 615-24...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
...
Bicalex - winding wires... Cables,
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

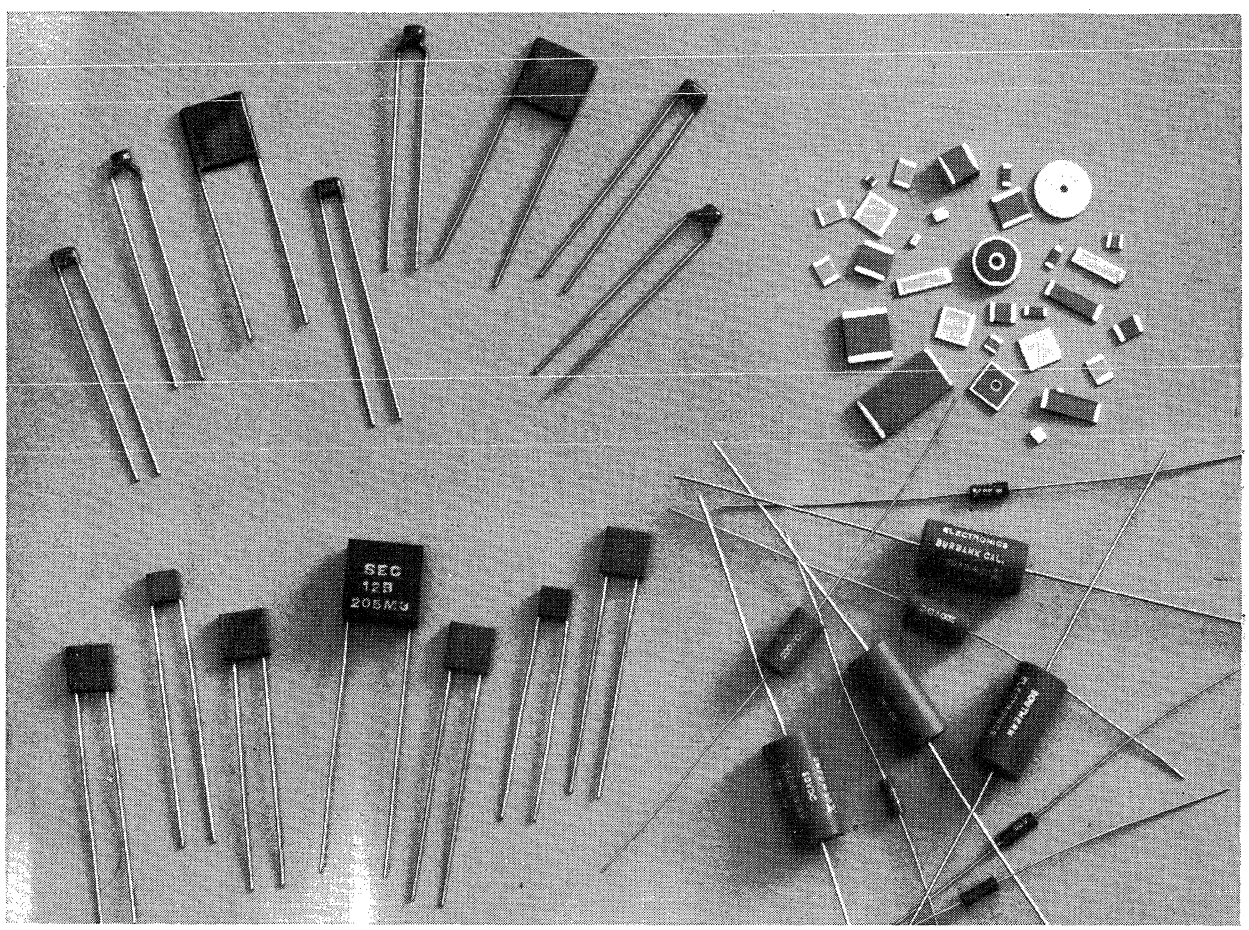
if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

Ceramic Capacitors

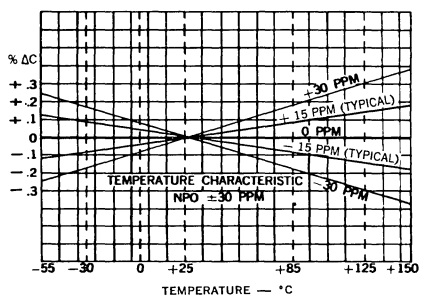
Southern Electronics ceramic capacitors consist of alternate layers of high permittivity ceramic and noble metal electrodes fired together to form a monolithic structure. Unique processing techniques permit the volume production of extremely thin sections of ceramic. These thin sections together with the external parallel connection of the individual sections increases the volumetric efficiency of these devices by a factor of approximately 100 compared to conventional "single-sheet" ceramic structures.

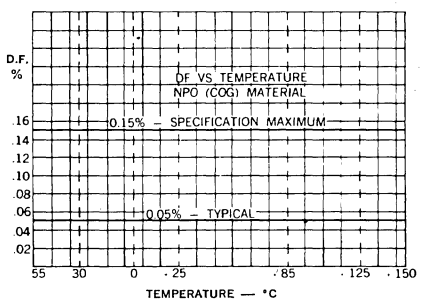


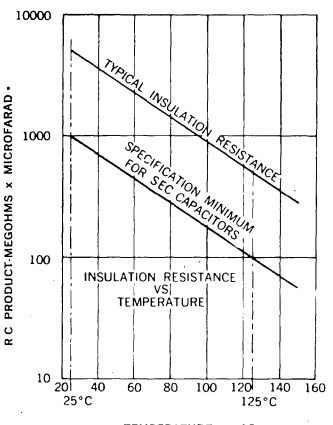
SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

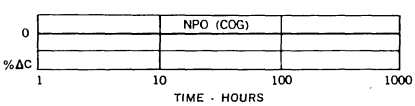
Performance Data

NPO (COG) Ceramic SEC's NPO Ceramic Formulation is a highly stable non-ferroelectric composition which exhibits high Q, I.R. and negligible changes in capacitance over a wide range of temperatures, frequencies and bias voltages. Ideally suited for tuned circuits, timing circuits, and fast rise time applications.

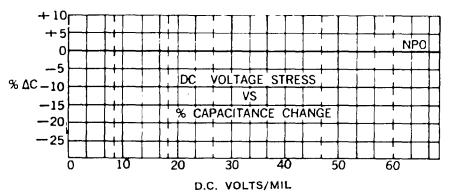




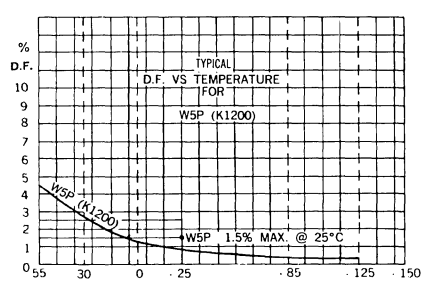


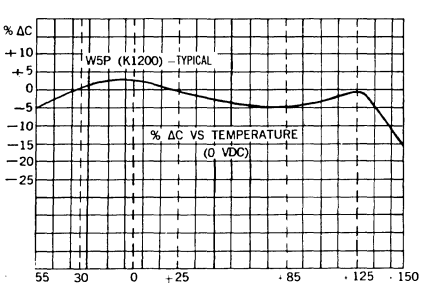


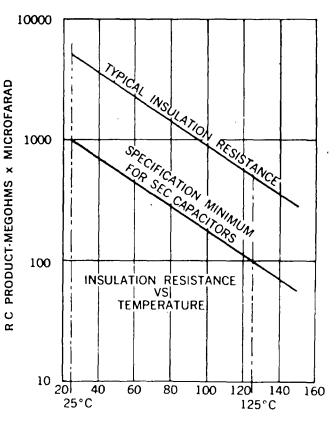
TYPICAL CAPACITANCE AGING % ΔC VS TIME

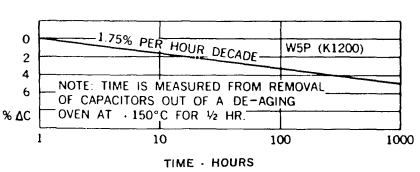


K1200 (W5P) Ceramic SEC's K1200 material is a ferroelectric dielectric system with a K of approximately 1200 at 25°C. It offers the advantage of approximately 40 times the volumetric efficiency of the NPO material, and exhibits moderate changes in capacitance and D.F. with temperature, frequency and bias voltages. Suited for by-pass, coupling, filtering and general circuitry.

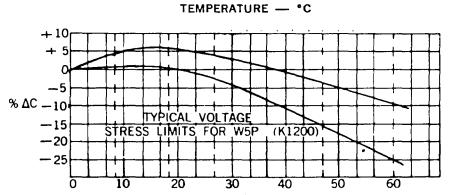








TYPICAL CAPACITANCE AGING % ΔC VS TIME



SOUTHERN ELECTRONICS CORPORATION

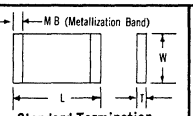
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

NPO "Chip" Capacitors

PART NUMBER CODE:

SEC 0805 CN 101 K A (*)

- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Electrode Material



Standard Termination, Pd Silver

Optional:
G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel

Specifications:

Temperature range: −55°C to +150°C
Test frequency: 100 pf and less −1 MHz, over 100 pf −1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25%	below 10 pf: 1R2 = 1.2pf
D = ±.5%	"R" signifies decimal point.
F = ±1%	10 pf and above:
G = ±2%	101 = 100 pf
J = ±5%	1st two digits are significant factors &
K = ±10%	3rd digit signifies number of zeroes.
M = ±20%	
Note: Minimum Tolerance ±.5 pf	

Dimensions and Availability

SEC STYLE	0405	0805	1005	1505	1706	1211	2908
L ± .01	.045	.075	.095	.150	.170	.120	.290
W ± .01	.040	.050	.05	.05	.065	.110	.080
T (max)	.040	.050	.06	.06	.060	.065	.065
MB (min)	.005	.015	.015	.015	.015	.015	.015

Capacitance in Pf	Capacitance Code	WVDC Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200
1.0 thru 82	1R0 thru 820																												
100	101																												
120	121																												
150	151																												
180	181																												
220	221																												
270	271																												
330	331																												
390	391																												
470	471																												
560	561																												
680	681																												
820	821																												
1000	102																												
1200	122																												
1500	152																												
1800	182																												
2200	222																												
2700	272																												
3300	332																												
3900	392																												
4700	472																												
5600	562																												
6800	682																												
8200	822																												
10000	103																												

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

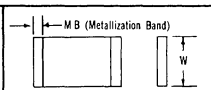
SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

NPO "Chip" Capacitors

PART NUMBER CODE:

SEC 0805 CN 101 K A (*)

- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Electrode Material



Standard Termination, Pd Silver

Optional:
G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel

Specifications:
Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25% D = ±.5% F = ± 1% G = ± 2% J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability

SEC STYLE	3909	2221	3914	3032	5918	3942	5929
L ± .01	.390	.220	.390	.300	.590	.390	.590
W ± .01	.090	.210	.140	.320	.180	.420	.290
T (max)	.070	.065	.070	.065	.070	.065	.070
MB (min)	.015	.015	.015	.015	.015	.015	.015

Capacitance in pf	Capacitance Code	WVDC: Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200
1000	102																												
1200	122																												
1500	152																												
1800	182																												
2200	222																												
2700	272																												
3300	332																												
3900	392																												
4700	472																												
5600	562																												
6800	682																												
8200	822																												
.01 uf	103																												
.012 uf	123																												
.015 uf	153																												
.018 uf	183																												
.022 uf	223																												
.027 uf	273																												
.033 uf	333																												
.039 uf	393																												
.047 uf	473																												
.056 uf	563																												
.068 uf	683																												
.082 uf	823																												
.10 uf	104																												

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

SOUTHERN ELECTRONICS CORPORATION

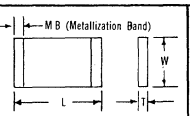
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

K1200 (W5P) "Chip" Capacitors

PART NUMBER CODE:

SEC 0805 BX 102 K A (*)

- Style — K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Electrode Material



Standard Termination, Pd Silver

Optional:
G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel

Specifications:
Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability

SEC STYLE	0405	0805	1005	1505	1706	1211	2908
L ± .01	.045	.075	.095	.150	.170	.120	.290
W ± .01	.040	.050	.05	.05	.065	.110	.080
T (max)	.040	.050	.06	.06	.060	.065	.065
MB (min)	.005	.015	.015	.015	.015	.015	.015

Capacitance in uf	Capacitance Code	0405 WVDC Z 25	A 50	B 100	C 200	0805 WVDC Z 25	A 50	B 100	C 200	1005 WVDC Z 25	A 50	B 100	C 200	1505 WVDC Z 25	A 50	B 100	C 200	1706 WVDC Z 25	A 50	B 100	C 200	1211 WVDC Z 25	A 50	B 100	C 200	2908 WVDC Z 25	A 50	B 100	C 200
100 thru 150 pf	101 thru 151																												
180 thru 820 pf	181 thru 821																												
1000 thru 4700 pf	102 thru 472																												
5600 pf	562																												
6800 pf	682																												
8200 pf	822																												
.01	103																												
.012	123																												
.015	153																												
.018	183																												
.022	223																												
.027	273																												
.033	333																												
.039	393																												
.047	473																												
.056	563																												
.068	683																												
.082	823																												
.10	104																												
.12	124																												
.15	154																												
.18	184																												
.22	224																												
.27	274																												
.33	334																												
.39	394																												
.47	474																												

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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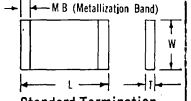
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

K1200 (W5P) "Chip" Capacitors

PART NUMBER CODE:

SEC 0805 BX 101 K A (*)

- Style
- K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Electrode Material



Standard Termination, Pd Silver

Optional:
G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel

Specifications:
Temperature range: −55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ±5% K = ±10% M = ±20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1 R2 = 1.2 pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability

SEC STYLE	3909	2221	3914	3032	5918	3942	5929
L ± .01	.390	.220	.390	.300	.590	.390	.590
W ± .01	.090	.210	.140	.320	.180	.420	.290
T (max)	.070	.065	.070	.065	.070	.065	.070
MB (min)	.015	.015	.015	.015	.015	.015	.015

Capacitance in uf	Capacitance Code	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200
.01 thru .039	103 thru 393																												
.047	473																												
.056	563																												
.068	683																												
.082	823																												
.10	104																												
.12	124																												
.15	154																												
.18	184																												
.22	224																												
.27	274																												
.33	334																												
.39	394																												
.47	474																												
.56	564																												
.68	684																												
.82	824																												
1.0	105																												
1.2	125																												
1.5	155																												
1.8	185																												
2.2	225																												
2.7	275																												
3.3	335																												
3.9	395																												
4.7	475																												
5.6	565																												

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

SOUTHERN ELECTRONICS CORPORATION

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PHONE: (213) 846-9302
TWX 910-498-2207

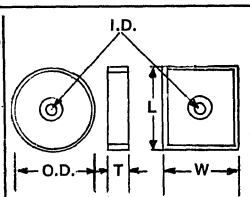
Feed-Thru "Chip" Capacitors

PART NUMBER CODE:

SEC 1300 FT 102 K A (*)

- Style
- Type
- Capacitance
- Tolerance
- Voltage
- Optional Electrode Material

*Standard — Palladium Silver
Optional: G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel



*M.B. = Width of Metalized Band

Specifications:

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ±5% K = ±10% M = ±20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1 R2 = 1.2 pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability

STYLE	1300	1700	2600	3200	3500	4500	6000	1515	2424	3535	5050
O.D. (±.01)	.130	.175	.265	.325	.355	.450	.600	—	—	—	—
L (±.01)	—	—	—	—	—	—	—	.150	.245	.355	.500
W (±.01)	—	—	—	—	—	—	—	.150	.245	.355	.500
T (Max.)	.060	.080	.090	.090	.090	.100	.100	.060	.080	.090	.100
I.D.	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040	.040
M.B. (Min.)	.015	.015	.015	.015	.015	.015	.015	.015	.015	.015	.015

Capacitance in uf	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200
1pf to .01																																								
.012																																								
.015																																								
.018																																								
.022																																								
.027																																								
.033																																								
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.82																																								
1.0																																								
1.2																																								
1.5																																								
1.8																																								

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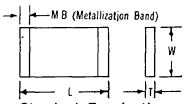
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

Hi-Voltage "Chip" Capacitors

PART NUMBER CODE:

SEC HV 101 K A (*)
- Style
- HV Ceramic
- Capacitance
- Tolerance
- **Voltage
- Optional Electrode Material

** G = 1000VDC
J = 2000VDC
L = 3000VDC
M = 4000VDC



Standard Termination, Silver

Optional:
G = Gold
P = Palladium Gold
T = Tinned Silver
N = Nickel

Specifications:

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 1.2 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ±5% K = ±10% M = ±20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1 R2 = 1.2 pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability

STYLE	1515				1818				1919				1925				3232				4039				4339				5339			
L (±.01)	.150				.180				.190				.190				.325				.405				.435				.535			
W (±.01)	.150				.180				.190				.250				.325				.395				.395				.395			
T (Max.)	.100				.100				.100				.100				.100				.100				.100				.100			
M.B. (Min.)	.015				.015				.015				.015				.015				.015				.015				.015			
Capacitance in pf	WVDC				WVDC				WVDC				WVDC				WVDC				WVDC				WVDC				WVDC			
	G	J	L	M	G	J	L	M	G	J	L	M	G	J	L	M	G	J	L	M	G	J	L	M	G	J	L	M	G	J	L	M
1 to 330																																
390																																
470																																
560																																
680																																
820																																
1000																																
1200																																
1500																																
1800																																
2200																																
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150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

Radial Lead NPO (COG) Capacitors

PART NUMBER CODE:

SEC 04 CN 101 K A (*)

- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

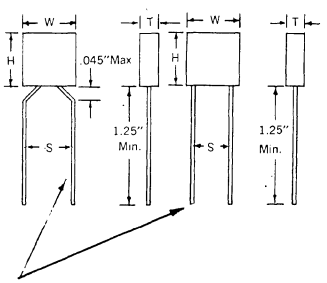
Specifications:

Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25%	below 10 pf:
D = ± .5%	1R2 = 1.2pf
F = ± 1%	"R" signifies
G = ± 2%	decimal point.
J = ± 5%	10 pf and above:
K = ± 10%	101 = 100 pf
M = ± 20%	1st two digits are significant factors & 3rd digit signifies number of zeroes.
Note: Minimum Tolerance ±.5 pf	

TYPE SEC 05



.025 Dia (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

Dimensions and Availability

STYLE	SEC 04	SEC 05	SEC 06	SEC 07	SEC 08	SEC 09	SEC 10	SEC 11
H ±.010	.145	.190	.290	.290	.395	.395	.495	.495
W ±.010	.145	.190	.290	.290	.395	.395	.495	.495
T ±.010	.095	.090	.090	.145	.095	.145	.095	.145
S ±.015	.100	.200	.200	.200	.300	.300	.400	.400

Capacity pf	W V D C (Z 25 | A 50 | B 100 | C 200)
1.0 to 47	
56	
68	
82	
100	
120	
150	
180	
220	
270	
330	
390	
470	
560	
680	
820	
1000	
1200	
1500	
1800	
2200	
2700	
3300	
3900	
4700	
5600	
6800	
8200	
.01 uf	
.012 uf	
.015 uf	
.018 uf	
.022 uf	
.027 uf	
.033 uf	
.039 uf	
.047 uf	
.056 uf	
.068 uf	
.082 uf	
.10 uf	

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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PHONE: (213) 846-9302
TWX 910-498-2207

Radial Lead K1200 (W5P) Capacitors

PART NUMBER CODE:

SEC 04 BX 103 K A (*)

- Style
- K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

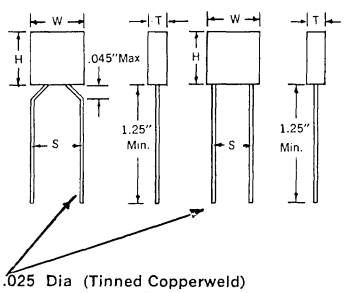
Specifications:

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever ever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

TYPE SEC 05



.025 Dia (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

Dimensions and Availability

STYLE	SEC 04	SEC 05	SEC 06	SEC 07	SEC 08	SEC 09	SEC 10	SEC 11
H ±.010	.145	.190	.290	.290	.395	.395	.495	.495
W ±.010	.145	.190	.290	.290	.395	.395	.495	.495
T ±.010	.095	.090	.090	.145	.095	.145	.095	.145
S ±.015	.100	.200	.200	.200	.300	.300	.400	.400

Capacity uf	WVDC Z 25	A 50	B 100	C 200
1.0 to 3900pf				
4700pf				
5600pf				
6800pf				
8200pf				
.010				
.012				
.015				
.018				
.022				
.027				
.033				
.039				
.047				
.056				
.068				
.082				
.10				
.12				
.15				
.18				
.22				
.27				
.33				
.39				
.47				
.56				
.68				
.82				
1.0				
1.2				
1.5				
1.8				
2.2				
2.7				
3.3				
3.9				
4.7				
5.6				
6.8				

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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PHONE: (213) 846-9302
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Axial Lead Tubular NPO (COG) Capacitors

PART NUMBER CODE:

SEC 50 CN 101 K A (*)

- SEC 50 — Style
- CN — NPO Ceramic
- 101 — Capacitance
- K — Tolerance
- A — Voltage
- (*) — Optional Lead Material

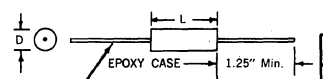
Specifications:

Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25%	below 10 pf:
D = ± .5%	1R2 = 1.2pf
F = ± 1%	"R" signifies
G = ± 2%	decimal point.
J = ± 5%	10 pf and above:
K = ± 10%	101 = 100 pf
M = ± 20%	1st two digits are significant factors & 3rd digit signifies number of zeroes.
Note: Minimum Tolerance ±.5 pf	

Dimensions and Availability



E (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

STYLE	SEC 50	SEC 51	SEC 52	SEC 53	SEC 54
L	.160 ±010	.185 ±010	.250 ±010	.390 ±010	.490 ±010
D	.09 ±010	.09 ±010	.09 ±010	.140 ±010	.190 ±010
E	#26 AWG	#26 AWG	#26 AWG	#22 AWG	#22 AWG

Capacitance pf	SEC 50 WVDC Z 25	A 50	B 100	C 200	SEC 51 WVDC Z 25	A 50	B 100	C 200	SEC 52 WVDC Z 25	A 50	B 100	C 200	SEC 53 WVDC Z 25	A 50	B 100	C 200	SEC 54 WVDC Z 25	A 50	B 100	C 200
1.0 to 100	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
120	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
180	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
220	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
270	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
330	■	■			■	■	■		■	■	■	■	■	■	■	■	■	■	■	■
390	■	■			■	■	■		■	■	■	■	■	■	■	■	■	■	■	■
470	■				■	■			■	■	■	■	■	■	■	■	■	■	■	■
560	■				■	■			■	■	■		■	■	■	■	■	■	■	■
680									■	■	■		■	■	■	■	■	■	■	■
820									■	■			■	■	■	■	■	■	■	■
1000									■	■			■	■	■	■	■	■	■	■
1200									■				■	■	■	■	■	■	■	■
1500									■				■	■	■	■	■	■	■	■
1800													■	■	■	■	■	■	■	■
2200													■	■	■	■	■	■	■	■
2700													■	■	■	■	■	■	■	■
3300													■	■	■	■	■	■	■	■
3900													■	■	■		■	■	■	■
4700													■	■	■		■	■	■	■
5600													■	■			■	■	■	■
6800													■	■			■	■	■	■
8200													■				■	■	■	■
.01 uf																	■	■	■	
.012 uf																	■	■	■	
.015 uf																	■	■		
.018 uf																	■	■		
.022 uf																	■			
.027 uf																	■			

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

SOUTHERN ELECTRONICS CORPORATION
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PHONE: (213) 846-9302
TWX 910-498-2207

Axial Lead Tubular NPO (COG) Capacitors

PART NUMBER CODE:

SEC 50 CN 101 K A (*)

- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

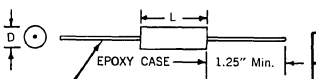
Specifications:

Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25%	below 10 pf:
D = ± .5%	1R2 = 1.2pf
F = ± 1%	"R" signifies
G = ± 2%	decimal point.
J = ± 5%	10 pf and above:
K = ± 10%	101 = 100 pf
M = ± 20%	1st two digits are
Note: Minimum Tolerance ±.5 pf	significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability



E (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

STYLE	SEC 55	SEC 56	SEC 57	SEC 58	SEC 59
L	.500 ±.020	.690 ±.030	.690 ±.030	.690 ±.030	.690 ±.030
D	.250 ±.015	.300 ±.020	.350 ±.020	.400 ±.020	.500 ±.020
E	#22 AWG	#22 AWG	#22 AWG	#22 AWG	#22 AWG

Capacitance pf	WVDC Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200
1.0 to 1800																				
2200																				
2700																				
3300																				
3900																				
4700																				
5600																				
6800																				
8200																				
.010 uf																				
.012 uf																				
.015 uf																				
.018 uf																				
.022 uf																				
.027 uf																				
.033 uf																				
.039 uf																				
.047 uf																				
.056 uf																				
.068 uf																				
.082 uf																				
.10 uf																				
.12 uf																				
.15 uf																				
.18 uf																				
.22 uf																				
.27 uf																				
.33 uf																				
.39 uf																				

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

Axial Lead Tubular K1200 (W5P) Capacitors

PART NUMBER CODE:

SEC 50 BX 101 K A (*)

- Style
- K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

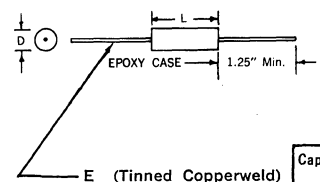
Specifications:

Temperature range: −55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability



Optional: E (Tinned Copperweld)
D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

STYLE	SEC 50	SEC 51	SEC 52	SEC 53	SEC 54
L	.160 ±010	.185 ±010	.250 ±010	.390 ±010	.490 ±010
D	.09 ±010	.09 ±010	.09 ±010	.140 ±010	.190 ±010
E	#26 AWG	#26 AWG	#26 AWG	#22 AWG	#22 AWG

Capacitance uf	SEC 50 WVDC Z 25	A 50	B 100	C 200	SEC 51 WVDC Z 25	A 50	B 100	C 200	SEC 52 WVDC Z 25	A 50	B 100	C 200	SEC 53 WVDC Z 25	A 50	B 100	C 200	SEC 54 WVDC Z 25	A 50	B 100	C 200
1 to 6800pf																				
8200 pf																				
.010																				
.012																				
.015																				
.018																				
.022																				
.027																				
.033																				
.039																				
.047																				
.056																				
.068																				
.082																				
.10																				
.12																				
.15																				
.18																				
.22																				
.27																				
.33																				
.39																				
.47																				
.56																				
.68																				
.82																				
1.0																				
1.2																				
1.5																				
1.8																				

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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Axial Lead Tubular K1200 (W5P) Capacitors

PART NUMBER CODE:

SEC 50 BX 101 K A (*)

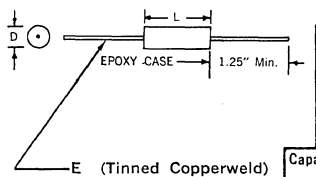
- Style
- K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

Specifications:

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE	
TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability



E (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

STYLE	SEC 55	SEC 56	SEC 57	SEC 58	SEC 59
L	.500 ±.020	.690 ±.030	.690 ±.030	.690 ±.030	.690 ±.030
D	.250 ±.015	.300 ±.020	.350 ±.020	.400 ±.020	.500 ±.020
E	#22 AWG	#22 AWG	#22 AWG	#22 AWG	#22 AWG

Capacitance uf	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200
1.0pf to .082																				
.10																				
.12																				
.15																				
.18																				
.22																				
.27																				
.33																				
.39																				
.47																				
.56																				
.68																				
.82																				
1.0																				
1.2																				
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1.8																				
2.2																				
2.7																				
3.3																				
3.9																				
4.7																				
5.6																				
6.8																				
8.2																				
10.0																				
12.0																				
15.0																				
18.0																				
22.0																				

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

SOUTHERN ELECTRONICS CORPORATION
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TWX 910-498-2207

HERMETIC SEAL (GLASS)
Axial Lead Tubular NPO (COG) Capacitors

PART NUMBER CODE:

SEC 87 CN 101 K A (*)
- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

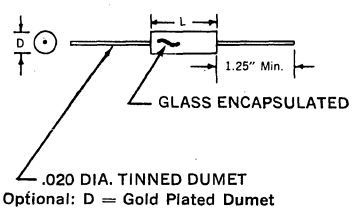
Specifications:

Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25% D = ± .5% F = ± 1% G = ± 2% J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

Dimensions and Availability



SEC Type	SEC 87	SEC 88
L	$.275^{+.015}_{-.030}$	.390 ±.015
D	.090 ±.010	.145 ±.015

Capacitance in Pf	Capacitance Code	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200
1.0 to 47	1R0 to 470								
56	560								
68	680								
82	820								
100	101								
120	121								
150	151								
180	181								
220	221								
270	271								
330	331								
390	391								
470	471								
560	561								
680	681								
820	821								
1000	102								
1200	122								
1500	152								
1800	182								
2200	222								
2700	272								
3300	332								
3900	392								
4700	472								

SOUTHERN ELECTRONICS CORPORATION
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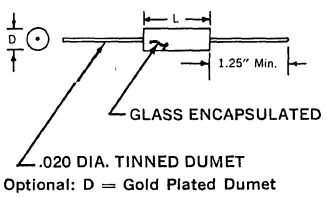
TWX 910-498-2207

HERMETIC SEAL (GLASS)
Axial Lead Tubular K1200 (W5P) Capacitors

SEC 87 BX 101 K A (*)
Style
K1200 Ceramic
Capacitance
Tolerance
Voltage
Optional Lead Material

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.



Optional: D = Gold Plated Dumet

SEC Type	SEC 87	SEC 88
L	.275 $^{+.015}_{-.030}$	.390 ±.015
D	.090 ±.010	.145 ±.015

Capacitance pf	Capacitance Code	WVDC Z 25	A 50	B 100	C 200	WVDC Z 25	A 50	B 100	C 200
1.0 to 1800	1R0 thru 182								
2200	222								
2700	272								
3300	332								
3900	392								
4700	472								
5600	562								
6800	682								
8200	822								
.010 uf	103								
.012 uf	123								
.015 uf	153								
.018 uf	183								
.022 uf	223								
.027 uf	273								
.033 uf	333								
.039 uf	393								
.047 uf	473								
.056 uf	563								
.068 uf	683								
.082 uf	823								
.10 uf	104								
.12 uf	124								
.15 uf	154								
.18 uf	184								

SOUTHERN ELECTRONICS CORPORATION

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PHONE: (213) 846-9302
TWX 910-498-2207

Radial Lead "Dipped" (NPO)

PART NUMBER CODE:

SEC104 CN 103 K A (*)

- Style
- NPO Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

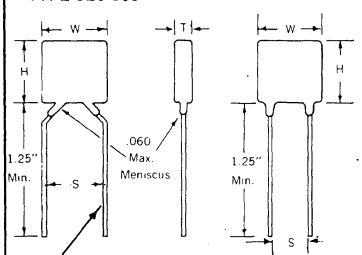
Specifications:

Temperature range: —55°C to +150°C
Test frequency: 100 pf and less —1 MHz, over 100 pf —1 KHz
Temperature coefficient: 0±30 ppm/°C (EIA char. COG)
Dissipation factor: 0.15% max
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less @ 25°C

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
C = ±.25%	below 10 pf:
D = ± .5%	1R2 = 1.2pf
F = ± 1%	"R" signifies
G = ± 2%	decimal point.
J = ± 5%	10 pf and above:
K = ± 10%	101 = 100 pf
M = ± 20%	1st two digits are significant factors &
Note: Minimum Tolerance ±.5 pf	3rd digit signifies number of zeroes.

TYPE SEC 105



.025 Dia (Tinned Copperweld)
Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

Dimensions and Availability

STYLE	SEC 104	SEC 105	SEC 106	SEC 107	SEC 108	SEC 109	SEC 110	SEC 111
H (max)	.140	.180	.28	.28	.38	.38	.48	.48
W (max)	.140	.180	.28	.28	.38	.38	.48	.48
T (max)	.08	.08	.08	.13	.08	.13	.09	.13
S ±.020	.100	.200	.200	.200	.300	.300	.400	.400

Capacity pf	W V D C																							
	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200	Z 25	A 50	B 100	C 200
1.0 to 47																								
56																								
68																								
82																								
100																								
120																								
150																								
180																								
220																								
270																								
330																								
390																								
470																								
560																								
680																								
820																								
1000																								
1200																								
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5600																								
6800																								
8200																								
.01 uf																								
.012 uf																								
.015 uf																								
.018 uf																								
.022 uf																								
.027 uf																								
.033 uf																								
.039 uf																								
.047 uf																								
.056 uf																								
.068 uf																								
.082 uf																								
.10 uf																								

NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

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Radial Lead "Dipped" (K1200)

PART NUMBER CODE:

SEC 104 BX 103 K A (*)

- Style
- K1200 Ceramic
- Capacitance
- Tolerance
- Voltage
- Optional Lead Material

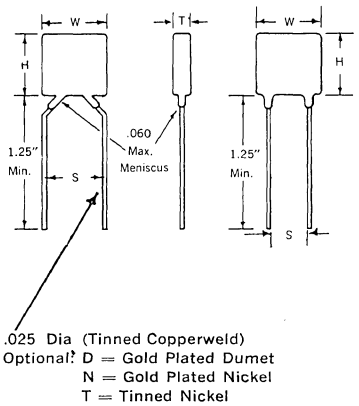
Specifications:

Temperature range: —55°C to +125°C
Temperature characteristics: W5P (±10%)
Dissipation factor: 1.5% max. @ 1 KHz, 25°C
Insulation resistance: 100 K megohms or 1000 ohm-farads, whichever is less, @ 25°C
Test Voltage: 2.5 x rated WVDC (min.)

CAPACITANCE CODE

TOLERANCE CODE	CAPACITANCE CODE EXAMPLE
J = ± 5% K = ± 10% M = ± 20% Note: Minimum Tolerance ±.5 pf	below 10 pf: 1R2 = 1.2pf "R" signifies decimal point. 10 pf and above: 101 = 100 pf 1st two digits are significant factors & 3rd digit signifies number of zeroes.

TYPE SEC 105



Optional: D = Gold Plated Dumet
N = Gold Plated Nickel
T = Tinned Nickel

Dimensions and Availability

STYLE	SEC 104	SEC 105	SEC 106	SEC 107	SEC 108	SEC 109	SEC 110	SEC 111
H (max)	.140	.180	.28	.28	.38	.38	.48	.48
W (max)	.140	.180	.28	.28	.38	.38	.48	.48
T (max)	.08	.08	.08	.13	.08	.13	.09	.13
S ±.020	.100	.200	.200	.200	.300	.300	.400	.400

Capacity µf	SEC 104 WVDC Z 25	A 50	B 100	C 200	SEC 105 WVDC Z 25	A 50	B 100	C 200	SEC 106 WVDC Z 25	A 50	B 100	C 200	SEC 107 WVDC Z 25	A 50	B 100	C 200	SEC 108 WVDC Z 25	A 50	B 100	C 200	SEC 109 WVDC Z 25	A 50	B 100	C 200	SEC 110 WVDC Z 25	A 50	B 100	C 200	SEC 111 WVDC Z 25	A 50	B 100	C 200
1.0 to 3900pf																																
4700pf																																
5600pf																																
6800pf																																
8200pf																																
.010																																
.012																																
.015																																
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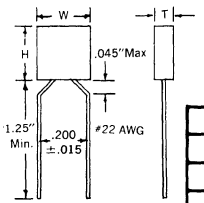
NOTE: Case sizes shown are at recommended voltage and temperature stress levels. For smaller case sizes at higher stress levels, contact factory.

SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

MIL-C-11015 MIL. SPEC. Capacitors

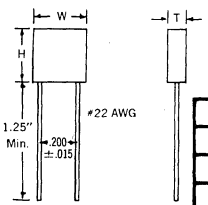
The parts described on this page are designed, manufactured and tested to meet the requirements of Mil-C-11015. Order by applicable Mil part number listed below.

Dimensions and Availability



MIL TYPE	CKO5
H ±.010	.190
W ±.010	.190
T ±.010	.090

Capacitance in pf	MIL DESIGNATION	Tolerance K±10% M±20%	50V	100V	200V
10	CKO5BX 100	K, M			
12	CKO5BX 120	K			
15	CKO5BX 150	K, M			
18	CKO5BX 180	K			
22	CKO5BX 220	K, M			
27	CKO5BX 270	K			
33	CKO5BX 330	K, M			
39	CKO5BX 390	K			
47	CKO5BX 470	K, M			
56	CKO5BX 560	K			
68	CKO5BX 680	K, M			
82	CKO5BX 820	K			
100	CKO5BX 101	K, M			
120	CKO5BX 121	K			
150	CKO5BX 151	K, M			
180	CKO5BX 181	K			
220	CKO5BX 221	K, M			
270	CKO5BX 271	K			
330	CKO5BX 331	K, M			
390	CKO5BX 391	K			
470	CKO5BX 471	K, M			
560	CKO5BX 561	K			
680	CKO5BX 681	K, M			
820	CKO5BX 821	K			
1000	CKO5BX 102	K, M			
1200	CKO5BX 122	K			
1500	CKO5BX 152	K, M			
1800	CKO5BX 182	K			
2200	CKO5BX 222	K, M			
2700	CKO5BX 272	K			
3300	CKO5BX 332	K, M			
3900	CKO5BX 392	K			
4700	CKO5BX 472	K, M			
5600	CKO5BX 562	K			
6800	CKO5BX 682	K, M			
8200	CKO5BX 822	K			
.01 uf	CKO5BX 103	K, M			
.012 uf	CKO5BX 123	K			
.015 uf	CKO5BX 153	K, M			
.018 uf	CKO5BX 183	K			
.022 uf	CKO5BX 223	K, M			
.027 uf	CKO5BX 273	K			
.033 uf	CKO5BX 333	K, M			
.039 uf	CKO5BX 393	K			
.047 uf	CKO5BX 473	K, M			
.056 uf	CKO5BX 563	K			
.068 uf	CKO5BX 683	K, M			
.082 uf	CKO5BX 823	K			
.10 uf	CKO5BX 104	K, M			



MIL TYPE	CKO6
H ±.010	.290
W ±.010	.290
T ±.010	.090

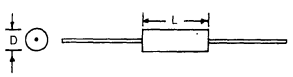
Capacitance in pf	MIL DESIGNATION	Tolerance K±10% M±20%	50V	100V	200V
.0012	CKO6BX 122	K			
.0015	CKO6BX 152	K, M			
.0018	CKO6BX 182	K			
.0022	CKO6BX 222	K, M			
.0027	CKO6BX 272	K			
.0033	CKO6BX 332	K, M			
.0039	CKO6BX 392	K			
.0047	CKO6BX 472	K, M			
.0056	CKO6BX 562	K			
.0068	CKO6BX 682	K, M			
.0082	CKO6BX 822	K			
.01 uf	CKO6BX 103	K, M			
.012 uf	CKO6BX 123	K			
.015 uf	CKO6BX 153	K, M			
.018 uf	CKO6BX 183	K			
.022 uf	CKO6BX 223	K, M			
.027 uf	CKO6BX 273	K			
.033 uf	CKO6BX 333	K, M			
.039 uf	CKO6BX 393	K			
.047 uf	CKO6BX 473	K, M			
.056 uf	CKO6BX 563	K			
.068 uf	CKO6BX 683	K, M			
.082 uf	CKO6BX 823	K			
.1 uf	CKO6BX 104	K, M			
.12 uf	CKO6BX 124	K			
.15 uf	CKO6BX 154	K, M			
.18 uf	CKO6BX 184	K			
.22 uf	CKO6BX 224	K, M			
.27 uf	CKO6BX 274	K			
.33 uf	CKO6BX 334	K, M			
.39 uf	CKO6BX 394	K			
.47 uf	CKO6BX 474	K, M			
.56 uf	CKO6BX 564	K			
.68 uf	CKO6BX 684	K, M			
.82 uf	CKO6BX 824	K			
1.0 uf	CKO6BX 105	K, M			

SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

MIL-C-11015 MIL. SPEC. Capacitors

The parts described on this page are designed, manufactured and tested to meet the requirements of Mil-C-11015. Order by applicable Mil part number listed below.

Dimensions and Availability



MIL Type	CK12	CK13	CK14	CK15	CK16
L	.160 ±.010	.250 ±.010	.390 ±.010	.500 ±.020	.690 ±.030
D	.090 ±.010	.090 ±.010	.140 ±.010	.250 ±.015	.350 ±.020

Capacitance in pf	MIL Designation	Tolerance	WVDC 50	WVDC 100
10	CK12BX 100	K, M		
12	CK12BX 120	K		
15	CK12BX 150	K, M		
18	CK12BX 180	K		
22	CK12BX 220	K, M		
27	CK12BX 270	K		
33	CK12BX 330	K, M		
39	CK12BX 390	K		
47	CK12BX 470	K, M		
56	CK12BX 560	K		
68	CK12BX 680	K, M		
82	CK12BX 820	K		
100	CK12BX 101	K, M		
120	CK12BX 121	K		
150	CK12BX 151	K, M		
180	CK12BX 181	K		
220	CK12BX 221	K, M		
270	CK12BX 271	K		
330	CK12BX 331	K, M		
390	CK12BX 391	K		
470	CK12BX 471	K, M		
560	CK12BX 561	K		
680	CK12BX 681	K, M		
820	CK12BX 821	K		
1000	CK12BX 102	K, M		
1200	CK12BX 122	K		
1500	CK12BX 152	K, M		
1800	CK12BX 182	K		
2700	CK12BX 272	K		
3300	CK12BX 332	K, M		
3900	CK12BX 392	K		
4700	CK12BX 472	K, M		
5600	CK12BX 562	K		
6800	CK12BX 682	K, M		
8200	CK12BX 822	K		
10,000	CK12BX 103	K, M		

Capacitance in uf	MIL Designation	Tolerance	WVDC 50	WVDC 100
5600 pf	CK13BX 562	K		
6800 pf	CK13BX 682	K, M		
8200 pf	CK13BX 822	K		
.01 uf	CK13BX 103	K, M		
.012	CK13BX 123	K		
.015	CK13BX 153	K, M		
.018	CK13BX 183	K		
.022	CK13BX 223	K, M		
.027	CK13BR 273	K		
.033	CK13BR 333	K, M		
.039	CK13BR 393	K		
.047	CK13BR 473	K, M		
.012	CK14BX 123	K		
.015	CK14BX 153	K, M		
.018	CK14BX 183	K		
.022	CK14BX 223	K, M		
.027	CK14BX 273	K		
.033	CK14BX 333	K, M		
.039	CK14BX 393	K		
.047	CK14BX 473	K, M		
.056	CK14BR 563	K		
.068	CK14BR 683	K, M		
.082	CK14BR 823	K		
.10	CK14BR 104	K, M		
.12	CK14BR 124	K		
.15	CK14BR 154	K, M		
.18	CK14BR 184	K		
.22	CK14BR 224	K, M		
.27	CK14BR 274	K		
.10	CK15BX 104	K, M		
.12	CK15BR 124	K		
.15	CK15BR 154	K, M		
.18	CK15BR 184	K		
.22	CK15BR 224	K, M		
.27	CK15BR 274	K		
.33	CK15BR 334	K, M		
.47	CK15BR 474	K, M		
1.0	CK15BR 105	K, M		
.47	CK16BR 474	K, M		
1.0	CK16BR 105	K, M		
2.2	CK16BR 225	K, M		
3.3	CK16BR 335	K, M		

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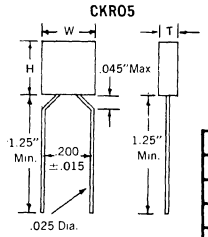
MIL-C-39014/B MIL. SPEC. Capacitors

The parts described on this page are designed, manufactured and tested to meet the requirements of Mil-C-39014/B. Order by applicable Mil part number listed below.

Dimensions and Availability

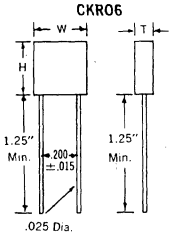
CKRO5



ML TYPE	CKRO5
H ±.010	.190
W ±.010	.190
T ±.010	.090

Capacitance in pf	MIL DESIGNATION	Tolerance K±10% M±20%	50V	100V	200V
10	CKRO5BX 100	K, M			
12	CKRO5BX 120	K			
15	CKRO5BX 150	K, M			
18	CKRO5BX 180	K			
22	CKRO5BX 220	K, M			
27	CKRO5BX 270	K			
33	CKRO5BX 330	K, M			
39	CKRO5BX 390	K			
47	CKRO5BX 470	K, M			
56	CKRO5BX 560	K			
68	CKRO5BX 680	K, M			
82	CKRO5BX 820	K			
100	CKRO5BX 101	K, M			
120	CKRO5BX 121	K			
150	CKRO5BX 151	K, M			
180	CKRO5BX 181	K			
220	CKRO5BX 221	K, M			
270	CKRO5BX 271	K			
330	CKRO5BX 331	K, M			
390	CKRO5BX 391	K			
470	CKRO5BX 471	K, M			
560	CKRO5BX 561	K			
680	CKRO5BX 681	K, M			
820	CKRO5BX 821	K			
1000	CKRO5BX 102	K, M			
1200	CKRO5BX 122	K			
1500	CKRO5BX 152	K, M			
1800	CKRO5BX 182	K			
2200	CKRO5BX 222	K, M			
2700	CKRO5BX 272	K			
3300	CKRO5BX 332	K, M			
3900	CKRO5BX 392	K			
4700	CKRO5BX 472	K, M			
5600	CKRO5BX 562	K			
6800	CKRO5BX 682	K, M			
8200	CKRO5BX 822	K			
.01 uf	CKRO5BX 103	K, M			
.012 uf	CKRO5BX 123	K			
.015 uf	CKRO5BX 153	K, M			
.018 uf	CKRO5BX 183	K			
.022 uf	CKRO5BX 223	K, M			
.027 uf	CKRO5BX 273	K			
.033 uf	CKRO5BX 333	K, M			
.039 uf	CKRO5BX 393	K			
.047 uf	CKRO5BX 473	K, M			
.056 uf	CKRO5BX 563	K			
.068 uf	CKRO5BX 683	K, M			
.082 uf	CKRO5BX 823	K			
.10 uf	CKRO5BX 104	K, M			

CKRO6



ML TYPE	CKRO6
H ±.010	.290
W ±.010	.290
T ±.010	.090

Capacitance in pf	MIL DESIGNATION	Tolerance K±10% M±20%	50V	100V	200V
.0012	CKRO6BX 122	K			
.0015	CKRO6BX 152	K, M			
.0018	CKRO6BX 182	K			
.0022	CKRO6BX 222	K, M			
.0027	CKRO6BX 272	K			
.0033	CKRO6BX 332	K, M			
.0039	CKRO6BX 392	K			
.0047	CKRO6BX 472	K, M			
.0056	CKRO6BX 562	K			
.0068	CKRO6BX 682	K, M			
.0082	CKRO6BX 822	K			
.01 uf	CKRO6BX 103	K, M			
.012 uf	CKRO6BX 123	K			
.015 uf	CKRO6BX 153	K, M			
.018 uf	CKRO6BX 183	K			
.022 uf	CKRO6BX 223	K, M			
.027 uf	CKRO6BX 273	K			
.033 uf	CKRO6BX 333	K, M			
.039 uf	CKRO6BX 393	K			
.047 uf	CKRO6BX 473	K, M			
.056 uf	CKRO6BX 563	K			
.068 uf	CKRO6BX 683	K, M			
.082 uf	CKRO6BX 823	K			
.1 uf	CKRO6BX 104	K, M			
.12 uf	CKRO6BX 124	K			
.15 uf	CKRO6BX 154	K, M			
.18 uf	CKRO6BX 184	K			
.22 uf	CKRO6BX 224	K, M			
.27 uf	CKRO6BX 274	K			
.33 uf	CKRO6BX 334	K, M			
.39 uf	CKRO6BX 394	K			
.47 uf	CKRO6BX 474	K, M			
.56 uf	CKRO6BX 564	K			
.68 uf	CKRO6BX 684	K, M			
.82 uf	CKRO6BX 824	K			
1.0 uf	CKRO6BX 105	K, M			

NOTE: To complete the MIL Part Number, add the correct symbols for desired tolerance and for desired failure rate level per the following chart:

Failure Rate Level	
Symbol	%/1000 hr.
L	2.0
M	1.0
P	0.1
R	0.01
S	0.001

SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
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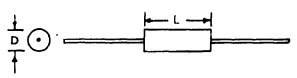
TWX 910-498-2207

MIL-C-39014/B MIL. SPEC. Capacitors

The parts described on this page are designed, manufactured and tested to meet the requirements of Mil-C-39014/B. Order by applicable Mil part number listed below.



MIL Type	CKR11	CKR12	CKR14	CKR15	CKR16
L	.160 ±.010	.250 ±.010	.390 ± .010	.500 ±.020	.690 ±.030
D	.090 ±.010	.090 ±.010	.140 ± .010	.250 ±.015	.350 ±.020

Capacitance in pf	MIL Designation	Tolerance	WVDC 50	WVDC 100
10	CKR11BX 100	K, M		
12	CKR11BX 120	K		
15	CKR11BX 150	K, M		
18	CKR11BX 180	K		
22	CKR11BX 220	K, M		
27	CKR11BX 270	K		
33	CKR11BX 330	K, M		
39	CKR11BX 390	K		
47	CKR11BX 470	K, M		
56	CKR11BX 560	K		
68	CKR11BX 680	K, M		
82	CKR11BX 820	K		
100	CKR11BX 101	K, M		
120	CKR11BX 121	K		
150	CKR11BX 151	K, M		
180	CKR11BX 181	K		
220	CKR11BX 221	K, M		
270	CKR11BX 271	K		
330	CKR11BX 331	K, M		
390	CKR11BX 391	K		
470	CKR11BX 471	K, M		
560	CKR11BX 561	K		
680	CKR11BX 681	K, M		
820	CKR11BX 821	K		
1000	CKR11BX 102	K, M		
1200	CKR11BX 122	K		
1500	CKR11BX 152	K, M		
1800	CKR11BX 182	K		
2200	CKR11BX 222	K, M		
2700	CKR11BX 272	K		
3300	CKR11BX 332	K, M		
3900	CKR11BX 392	K		
4700	CKR11BX 472	K, M		
6800	CKR11BX 682	K, M		
8200	CKR11BX 822	K		
10,000	CKR11BX 103	K, M		
5600	CKR12BX 562	K		
6800	CKR12BX 682	K, M		
8200	CKR12BX 822	K		
.01 uf	CKR12BX 103	K, M		
.012uf	CKR12BX 123	K		
.015uf	CKR12BX 153	K, M		
.018uf	CKR12BX 183	K		
.022uf	CKR12BX 223	K, M		
.027uf	CKR12BX 273	K		
.033uf	CKR12BX 333	K, M		
.039uf	CKR12BX 393	K		
.047uf	CKR12BX 473	K, M		

Capacitance in uf	MIL Designation	Tolerance	WVDC 50	WVDC 100
.012	CKR14BX 123	K		
.015	CKR14BX 153	K, M		
.018	CKR14BX 183	K		
.022	CKR14BX 223	K, M		
.027	CKR14BX 273	K		
.033	CKR14BX 333	K, M		
.039	CKR14BX 393	K		
.047	CKR14BX 473	K, M		
.056	CKR14BX 563	K		
.068	CKR14BX 683	K, M		
.082	CKR14BX 823	K		
.10	CKR14BX 104	K, M		
.056	CKR14BR 563	K		
.068	CKR14BR 683	K, M		
.082	CKR14BR 823	K		
.10	CKR14BR 104	K, M		
.12	CKR14BR 124	K		
.15	CKR14BR 154	K, M		
.18	CKR14BR 184	K		
.22	CKR14BR 224	K, M		
.27	CKR14BR 274	K		
.056	CKR15BX 563	K		
.068	CKR15BX 683	K, M		
.082	CKR15BX 823	K		
.10	CKR15BX 104	K, M		
.12	CKR15BR 124	K		
.15	CKR15BR 154	K, M		
.18	CKR15BR 184	K		
.22	CKR15BR 224	K, M		
.27	CKR15BR 274	K		
.33	CKR15BR 334	K, M		
.47	CKR15BR 474	K, M		
.68	CKR15BR 684	K, M		
1.0	CKR15BR 105	K, M		
.47	CKR16BR 474	K, M		
.68	CKR16BR 684	K, M		
1.0	CKR16BR 105	K, M		
2.2	CKR16BR 225	K, M		
3.3	CKR16BR 335	K, M		

NOTE: To complete the MIL Part Number, add the correct symbols for desired tolerance and for desired failure rate level per the following chart:

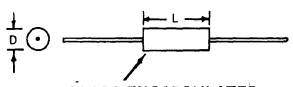
Failure Rate Level	
Symbol	%/1000 hr.
L	2.0
M	1.0
P	0.1
R	0.01
S	0.001

SOUTHERN ELECTRONICS CORPORATION
150 WEST CYPRESS AVE., BURBANK, CALIFORNIA 91502
PHONE: (213) 846-9302
TWX 910-498-2207

MIL-C-39014/B MIL. SPEC. Capacitors (HERMETIC SEALED)

The parts described on this page are designed, manufactured and tested to meet the requirements of Mil-C-39014/B. Order by applicable Mil part number listed below.

Dimensions and Availability



GLASS ENCAPSULATED

MIL Type	CKR17	CKR18
L	.275 $\pm\frac{.015}{.030}$	.390 ±.015
D	.090 $\pm\frac{.015}{.030}$	.145 ±.015

NOTE: To complete the MIL Part Number, add the correct symbols for desired tolerance and for desired failure rate level per the following chart:

Failure Rate Level	
Symbol	%/1000 hr.
M	1.0
P	0.1
R	0.01
S	0.001

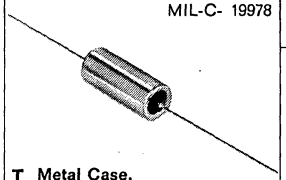
Capacitance pf	MIL Designation	Tolerance	WVDC 100
10	CKR17BX 100	K, M	
15	CKR17BX 150	K, M	
22	CKR17BX 220	K, M	
33	CKR17BX 330	K, M	
47	CKR17BX 470	K, M	
68	CKR17BX 680	K, M	
100	CKR17BX 101	K, M	
150	CKR17BX 151	K, M	
220	CKR17BX 221	K, M	
330	CKR17BX 331	K, M	
470	CKR17BX 471	K, M	
680	CKR17BX 681	K, M	
1000	CKR17BX 102	K, M	
1500	CKR17BX 152	K, M	
2200	CKR17BX 222	K, M	
2700	CKR17BX 272	K	
3300	CKR17BX 332	K, M	
3900	CKR17BX 392	K	
4700	CKR17BX 472	K, M	
5600	CKR17BX 562	K	
6800	CKR17BX 682	K, M	
8200	CKR17BX 822	K	
.01 uf	CKR17BX 103	K, M	
.015 uf	CKR18BX 153	K, M	
.022 uf	CKR18BX 223	K, M	
.027 uf	CKR18BX 273	K	
.033 uf	CKR18BX 333	K, M	
.039 uf	CKR18BX 393	K	
.047 uf	CKR18BX 473	K, M	
.056 uf	CKR18BX 563	K	
.068 uf	CKR18BX 683	K, M	
.082 uf	CKR18BX 823	K	
.10 uf	CKR18BX 104	K, M	

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

TYPE P Polystyrene Capacitors

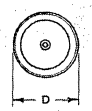
Available to MIL-C- 19978



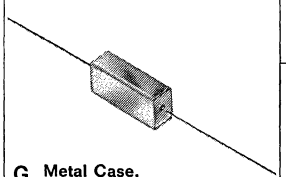
T Metal Case, Hermetically Sealed, Tubular

MFD	100 VDC D x L	MFD	200/400 VDC D x L	MFD	600 VDC D x L
.001	.175 x 3/4	.001	.175 x 3/4	.001	.235 x 3/4
.0047	.175 x 3/4	.0047	.235 x 3/4	.0047	.312 x 13/16
.01	.235 x 3/4	.01	.312 x 13/16	.01	.400 x 1-1/16
.047	.400 x 13/16	.047	.562 x 1-1/16	.047	.562 x 1-9/16
.10	.400 x 1-1/16	.10	.562 x 1-5/16	.10	.750 x 1-13/16
.47	.670 x 1-13/16	.47	1.00 x 1-13/16	.47	—
1.0	1.00 x 1-13/16	1.0	—	1.0	—

STYLE T



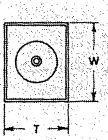
L = Length



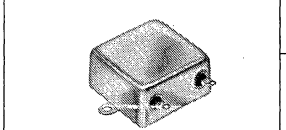
G Metal Case, Hermetically Sealed, Rectangular Tube

MFD	100 V T x W x L	MFD	200/400 V T x W x L	MFD	600 V T x W x L
.001	.22 x .34 x .82	.001	.22 x .34 x .82	.001	.22 x .34 x .82
.0047	.22 x .34 x .82	.0047	.22 x .34 x .82	.0047	.22 x .34 x .94
.01	.22 x .34 x .82	.01	.22 x .34 x .94	.01	.31 x .41 x 1.12
.047	.31 x .41 x .94	.047	.40 x .57 x 1.12	.047	.40 x .57 x 1.81
.10	.40 x .57 x 1.12	.10	.40 x .57 x 1.81	.10	.60 x .80 x 1.81
.47	.50 x .65 x 1.81	.47	—	.47	—
1.0	.60 x .80 x 2.06	1.0	—	1.0	—

STYLE G



L = Length

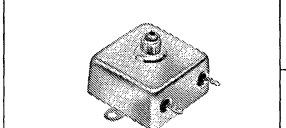


B Metal Case, Hermetically Sealed, Bathtub

MFD	100 V L x W x T	MFD	200V-400V L x W x T	MFD	600 V L x W x T
.047	1-1/8 x 1 x 1/2	.047	1-1/8 x 1 x 1/2	.047	1-1/8 x 1 x 1/2
.10	1-1/8 x 1 x 1/2	.10	1-1/8 x 1 x 11/16	.10	1-3/4 x 7/8 x 11/16
.47	1-1/8 x 1 x 11/16	.47	1-3/4 x 1-1/4 x 1	.47	2 x 2 x 1
1.0	1-3/4 x 1-1/4 x 7/8	1.0	2 x 2 x 1	1.0	2 x 2 x 1-3/4
2.2	2 x 1-3/4 x 7/8	2.2	3-1/16 x 2-7/8 x 1-1/8	2.2	3-1/16 x 2-7/8 x 2-1/18
4.7	2 x 2 x 1-1/2	4.7	3-1/16 x 2-7/8 x 2-1/8	4.7	3-1/16 x 4-7/16 x 2-1/8
10.0	3-1/16 x 2-7/8 x 1-1/2	10.0	3-1/16 x 4-7/16 x 2-1/8	10.0	—

STYLE B

L = Length



A Metal Case, Hermetically Sealed, Adjustable

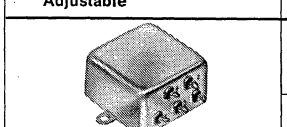
MFD	100/400 VDC L x W x T
.047	1-1/8 x 1 x 1/2
.10	1-1/8 x 1 x 11/16
.47	2 x 1-3/4 x 7/8
1.0	2 x 2 x 1
4.7	3-1/16 x 2-7/8 x 2-1/8
10.0	3-1/16 x 4-7/16 x 2-1/8

NOTES

1. 0° to + 65°C Temperature Range.
2. Adjustment Range of ±1-1/2% from nominal.
3. .01% Long Term Drift at controlled Temperature.
4. .005% Voltage coefficient available on request.

STYLE A

L = Length



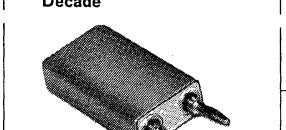
D Metal Case, Hermetically Sealed, Decade

MFD	Decade Range	100/400 VDC L x W x T
	.001 —.01	1-3/4 x 1-1/4 x 7/8
	.01 —.10	1-3/4 x 1-1/4 x 7/8
	.10 —1.0	2 x 2 x 1-1/2
	1.0 —10.0	5 x 4-1/4 x 4-3/8

NOTES
ALSO AVAILABLE SWITCH MOUNTED FOR PANEL ASSEMBLY

STYLE D

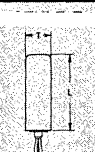
L = Length



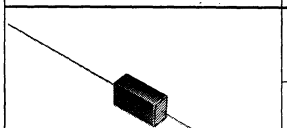
P Metal Case, Hermetically Sealed, Plug-in

MFD	100 V W x T x L	MFD	200/400 V W x T x L
.047	1-5/16 x 5/8 x 1-1/4	.047	1-5/16 x 5/8 x 1-1/4
.10	1-5/16 x 5/8 x 1-1/4	.10	1-5/16 x 5/8 x 1-1/4
.47	1-5/16 x 5/8 x 1-1/2	.47	1-5/16 x 5/8 x 2-1/4
1.0	1-5/16 x 5/8 x 2	1.0	1.6 x 1 x 2-1/2
2.0	1.6 x 1 x 2-1/2	2.0	—

NOTES
STANDARD BANANA PLUG MOUNTING ON ¾" CENTERS



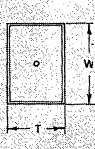
W = Width



E Rectangular Epoxy Case, Axial Lead

MFD	100 VDC T x W x L	MFD	200/400 VDC T x W x L	MFD	600 VDC T x W x L
.001	.17 x .29 x .67	.001	.17 x .29 x .67	.001	.17 x .29 x .67
.0047	.17 x .29 x .67	.0047	.23 x .36 x .67	.0047	.29 x .42 x .67
.01	.17 x .29 x .67	.01	.29 x .42 x .67	.01	.39 x .54 x .82
.047	.29 x .42 x .67	.047	.39 x .54 x 1.04	.047	.56 x .72 x 1.24
.10	.39 x .54 x .82	.10	.56 x .72 x 1.24	.10	.56 x .72 x 1.75
.47	.56 x .72 x 1.46	.47	—	.47	—

STYLE E

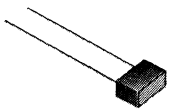


L = Length

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

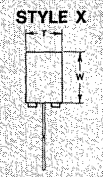
TYPE P Polystyrene Capacitors



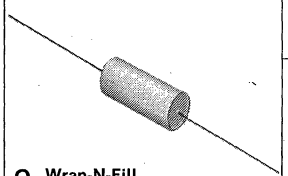
X Rectangular Epoxy Case, Radial Lead

MFD	100 VDC T x W x L	MFD	200/400 VDC T x W x L	MFD	600 VDC T x W x L
.001	.30 x .44 x .67	.001	.30 x .44 x .67	.001	.30 x .44 x .67
.0047	.30 x .44 x .67	.0047	.30 x .44 x .67	.0047	.30 x .44 x .67
.01	.30 x .44 x .67	.01	.30 x .44 x .67	.01	.40 x .56 x .82
.047	.30 x .44 x .67	.047	.40 x .56 x 1.04	.047	.57 x .74 x 1.24
.10	.40 x .56 x .82	.10	.57 x .74 x 1.24	.10	.57 x .74 x 1.75
.47	.57 x .74 x 1.50	.47	—	.47	—

STYLE X



L = Length

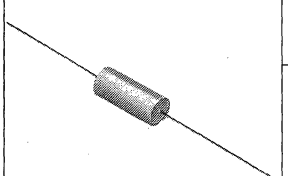


O Wrap-N-Fill, Oval Shape, Axial Lead

MFD	100 V T x W x L	MFD	200-400 V T x W x L	MFD	600 V T x W x L
.001	.10 x .22 x .75	.001	.10 x .22 x .75*	.001	.10 x .22 x .75
.0047	.10 x .22 x .75	.0047	.10 x .22 x .75	.0047	.20 x .33 x .75
.01	.10 x .22 x .75	.01	.20 x .33 x .75	.01	.23 x .39 x .87
.047	.20 x .33 x .75	.047	.31 x .47 x 1.00	.047	.40 x .56 x 1.25
.10	.30 x .46 x .87	.10	.41 x .57 x 1.25	.10	.48 x .64 x 1.75
.47	.48 x .65 x 1.50	.47	.74 x .94 x 2.00	.47	.80 x 1.00 x 2.50
1.0	.73 x .90 x 1.75	1.0	—	1.0	—

STYLE O

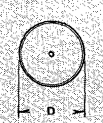
L = Length



R Wrap-N-Fill, Round Shape, Axial Lead

MFD	100 V D x L	MFD	200/400 V D x L	MFD	600 V D x L
.001	.18 x .75	.001	.18 x .75	.001	.18 x .75
.0047	.18 x .75	.0047	.18 x .75	.0047	.29 x .75
.01	.18 x .75	.01	.29 x .75	.01	.32 x .87
.047	.29 x .75	.047	.43 x 1.00	.047	.52 x 1.25
.10	.42 x .87	.10	.53 x 1.25	.10	.60 x 1.75
.47	.59 x 1.50	.47	.87 x 2.00	.47	.93 x 2.50
1.0	.84 x 1.75	1.0	—	1.0	—

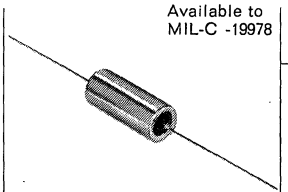
STYLE R



L = Length

TYPE L Polycarbonate Capacitors

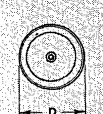
Available to MIL-C -19978



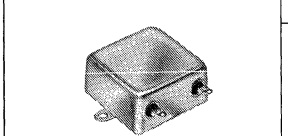
T Metal Case, Hermetically Sealed, Tubular

MFD	30 V D x L	MFD	100 V D x L	MFD	200 V D x L
.001	.175 x 3/4	.001	.235 x 3/4	.001	.175 x 3/4
.0047	.175 x 3/4	.0047	.400 x 7/8	.0047	.312 x 7/8
.01	.235 x 3/4	.01	.175 x 3/4	.01	.312 x 7/8
.047	.312 x 7/8	.047	.195 x 3/4	.047	.400 x 1-1/8
.10	.400 x 7/8	.10	.400 x 1-1/8	.10	.562 x 1-1/8
.47	.562 x 1-3/8	.47	.750 x 1-7/8	.47	1.00 x 1-7/8
1.0	.670 x 1-5/8	1.0	1.00 x 1-7/8	1.0	—

STYLE T



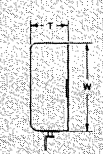
L = Length



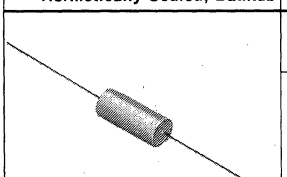
B Metal Case, Hermetically Sealed, Bathtub

MFD	30 VDC L x W x T	MFD	100 VDC L x W x T	MFD	200 VDC L x W x T
.10	1-1/8 x 1 x 1/2	.10	1-1/8 x 1 x 1/2	.10	1-1/8 x 1 x 1/2
.47	1-1/8 x 1 x 1/2	.47	1-3/4 x 1 x 7/8	.47	1-3/4 x 1-1/4 x 7/8
1.0	1-3/4 x 7/8 x 11/16	1.0	1-3/4 x 1-1/4 x 1-1/8	1.0	2 x 2 x 1
4.7	2 x 2 x 1	4.7	3-1/16 x 2-7/8 x 1-1/8	4.7	3-1/16 x 2-7/8 x 1-7/8
10.0	2 x 2 x 1-3/4	10.0	3-1/16 x 2-7/8 x 2-1/8	10.0	3-1/16 x 4-7/16 x 2-1/8

STYLE B



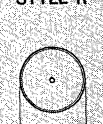
L = Length



R Wrap-N-Fill, Round Shape, Axial Lead

MFD	30 V D x L	MFD	100 V D x L	MFD	200 V D x L
.001	.20 x .63	.001	.20 x .63	.001	.20 x .63
.0047	.20 x .63	.0047	.21 x .63	.0047	.20 x .75
.01	.20 x .63	.01	.21 x .75	.01	.25 x .75
.047	.25 x .75	.047	.35 x .88	.047	.36 x 1.13
.1	.29 x .88	.1	.40 x 1.13	.1	.46 x 1.25
.47	.49 x 1.18	.47	.65 x 1.50	.47	.80 x 2.00
1.0	.57 x 1.50	1.0	.83 x 2.00	1.0	1.0 x 2.25

STYLE R



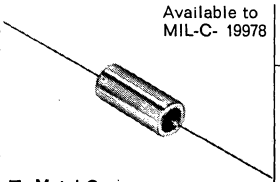
L = Length

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

TYPE M Mylar Capacitors

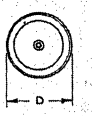
Available to MIL-C- 19978



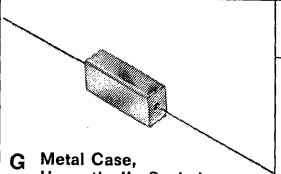
T Metal Case, Hermetically Sealed, Tubular

MFD	100 V D x L	MFD	200 V D x L	MFD	400 V D x L
.0047	.175 x 1/2	.0047	.195 x 1/2	.0047	.235 x 5/8
.01	.235 x 1/2	.01	.235 x 5/8	.01	.235 x 3/4
.047	.312 x 13/16	.047	.312 x 13/16	.047	.400 x 13/16
.10	.400 x 13/16	.10	.400 x 1-1/16	.10	.500 x 1-1/16
.47	.500 x 1-3/8	.47	.560 x 1-5/8	.47	.670 x 1-7/8
1.0	.560 x 1-7/8	1.0	.750 x 1-7/8	1.0	1.0 x 1-7/8
2.0	.750 x 1-7/8	2.0	1.0 x 2-1/8	2.0	—

STYLE T



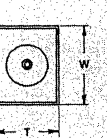
L = Length



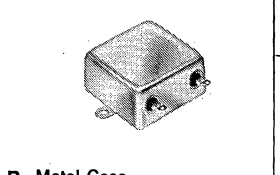
G Metal Case, Hermetically Sealed, Rectangular Tube

MFD	100 V T x W x L	MFD	200 V T x W x L	MFD	400 V T x W x L
.0047	.22 x .34 x 9/16	.0047	.22 x .34 x 9/16	.0047	.22 x .34 x 9/16
.01	.22 x .34 x 9/16	.01	.22 x .34 x 9/16	.01	.22 x .34 x 11/16
.047	.22 x .34 x 11/16	.047	.31 x .41 x 13/16	.047	.31 x .41 x 13/16
.10	.31 x .41 x 13/16	.10	.31 x .41 x 1-1/8	.10	.40 x .57 x 1-1/8
.47	.40 x .57 x 1-5/16	.47	.40 x .57 x 1-9/16	.47	.50 x .65 x 1-13/16
1.0	.40 x .57 x 1-13/16	1.0	.60 x .80 x 1-13/16	1.0	.60 x .80 x 2-5/16
2.0	.60 x .80 x 1-13/16	2.0	—	2.0	—

STYLE G



L = Length

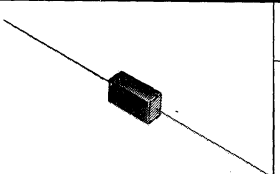


B Metal Case, Hermetically Sealed, Bathtub

MFD	100 V L x W x T	MFD	200 V L x W x T	MFD	400 V L x W x T
.47	1-1/8 x 1 x 1/2	.47	1-1/8 x 1 x 1/2	.47	1-1/8 x 1 x 11/16
1.0	1-1/8 x 1 x 11/16	1.0	1-3/4 x 7/8 x 11/16	1.0	1-3/4 x 1 x 7/8
4.7	1-3/4 x 1-1/4 x 1-1/8	4.7	2 x 1-3/4 x 7/8	4.7	2 x 2 x 1-1/2
10.0	2 x 2 x 1	10.0	2 x 2 x 1-1/2	10.0	3-1/16 x 2-7/8 x 1-1/2
27.0	3-1/16 x 2-7/8 x 1-1/8	27.0	3-1/16 x 2-7/8 x 2-1/8	27.0	3-1/16 x 4-7/16 x 2-1/8
47.0	3-1/16 x 2-7/8 x 2-1/8	47.0	3-1/16 x 4-7/16 x 2-1/8	47.0	—
82.0	3-1/16 x 4-7/16 x 2-1/8	82.0	—	82.0	—

STYLE B

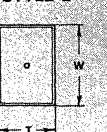
L = Length



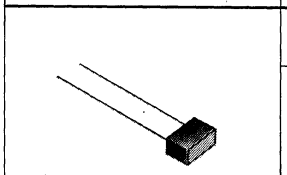
E Rectangular Epoxy Case, Axial Lead

MFD	100 V T x W x L	MFD	200 V T x W x L	MFD	400 V T x W x L
.0047	.17 x .29 x .42	.0047	.17 x .29 x .42	.0047	.17 x .29 x .55
.01	.17 x .29 x .42	.01	.17 x .29 x .55	.01	.23 x .36 x .55
.047	.22 x .36 x .55	.047	.29 x .42 x .57	.047	.29 x .42 x .82
.10	.29 x .42 x .67	.10	.39 x .54 x .82	.10	.39 x .54 x 1.00
.47	.39 x .54 x 1.24	.47	.56 x .72 x 1.24	.47	.56 x .72 x 1.50
1.0	.56 x .72 x 1.24	1.0	.56 x .72 x 1.75	1.0	—
2.0	.56 x .72 x 1.75	2.0	—	2.0	—

STYLE E



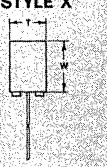
L = Length



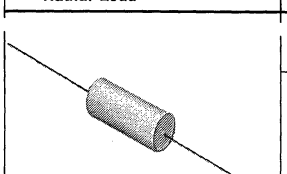
X Rectangular Epoxy Case, Radial Lead

MFD	100 V T x W x L	MFD	200 V T x W x L	MFD	400 V T x W x L
.0047	.18 x .31 x .42	.0047	.18 x .31 x .42	.0047	.18 x .31 x .55
.01	.18 x .31 x .42	.01	.18 x .31 x .42	.01	.24 x .38 x .55
.047	.24 x .38 x .55	.047	.30 x .44 x .55	.047	.30 x .44 x .82
.10	.30 x .44 x .67	.10	.40 x .56 x .82	.10	.40 x .56 x 1.04
.47	.40 x .56 x 1.24	.47	.57 x .74 x 1.24	.47	.57 x .74 x 1.50
1.0	.57 x .74 x 1.24	1.0	.57 x .74 x 1.75	1.0	—
2.0	.57 x .74 x 1.75	2.0	—	2.0	—

STYLE X



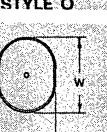
L = Length



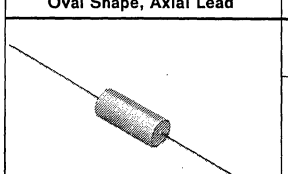
O Wrap-N-Fill, Oval Shape, Axial Lead

MFD	100 V T x W x L	MFD	200 V T x W x L	MFD	400 V T x W x L
.0047	.10 x .23 x .44	.0047	.10 x .23 x .44	.0047	.10 x .23 x .56
.01	.10 x .23 x .44	.01	.10 x .23 x .56	.01	.13 x .26 x .56
.047	.19 x .32 x .56	.047	.24 x .37 x .56	.047	.24 x .37 x .81
.10	.21 x .34 x .69	.10	.25 x .42 x .81	.10	.27 x .44 x 1.00
.47	.31 x .48 x 1.25	.47	.43 x .60 x 1.25	.47	.51 x .68 x 1.50
1.0	.47 x .64 x 1.25	1.0	.50 x .67 x 1.75	1.0	.67 x .84 x 1.75
2.0	.54 x .71 x 1.75	2.0	—	2.0	—

STYLE O



L = Length



R Wrap-N-Fill, Round Shape, Axial Lead

MFD	100 V D x L	MFD	200 V D x L	MFD	400 V D x L
.0047	.18 x .44	.0047	.18 x .44	.0047	.18 x .56
.01	.18 x .44	.01	.18 x .56	.01	.21 x .56
.047	.27 x .56	.047	.32 x .56	.047	.32 x .81
.10	.29 x .69	.10	.36 x .81	.10	.38 x 1.00
.47	.42 x 1.25	.47	.54 x 1.25	.47	.62 x 1.50
1.0	.58 x 1.25	1.0	.61 x 1.75	1.0	.78 x 1.75
2.0	.65 x 1.75	2.0	—	2.0	—

STYLE R

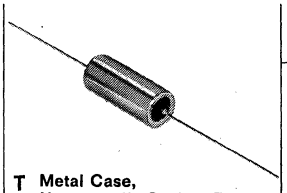
L = Length

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

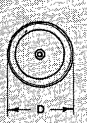
TYPE R Metallized Mylar Capacitors

T Metal Case, Hermetically Sealed, Tubular



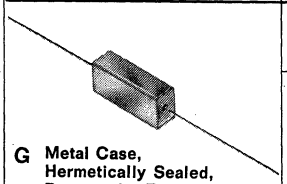
MFD	50 V D x L	MFD	100 V D x L	MFD	200 V D x L
.01	.175 x 9/16	.01	.175 x 9/16	.01	.195 x 9/16
.047	.195 x 9/16	.047	.235 x 9/16	.047	.235 x 13/16
.10	.235 x 11/16	.10	.235 x 11/16	.10	.312 x 13/16
.47	.312 x 13/16	.47	.400 x 13/16	.47	.400 x 1-1/16
1.0	.400 x 13/16	1.0	.400 x 15/16	1.0	.500 x 1-3/8
4.7	.560 x 1-3/8	4.7	.560 x 1-5/8	4.7	1.00 x 1-7/8
10.0	.670 x 1-5/8	10.0	.750 x 1-7/8	10.0	1.00 x 2-5/8

STYLE T



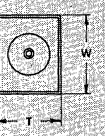
L = Length

G Metal Case, Hermetically Sealed, Rectangular Tube



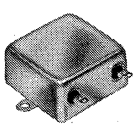
MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.22 x .34 x 9/16	.01	.22 x .34 x 9/16	.01	.22 x .34 x 9/16
.047	.22 x .34 x 9/16	.047	.22 x .34 x 9/16	.047	.22 x .34 x 11/16
.10	.22 x .34 x 9/16	.10	.22 x .34 x 11/16	.10	.22 x .34 x 13/16
.47	.22 x .34 x 13/16	.47	.31 x .41 x 13/16	.47	.40 x .57 x 1-1/8
1.0	.31 x .41 x 13/16	1.0	.31 x .41 x 1-1/8	1.0	.40 x .57 x 1-9/16
4.7	.40 x .57 x 1-9/16	4.7	.40 x .57 x 1-13/16	4.7	.60 x .80 x 2-1/16

STYLE G



L = Length

B Metal Case, Hermetically Sealed, Bathtub

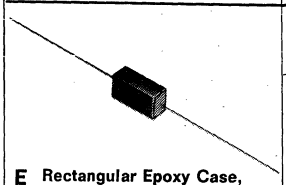


MFD	200 V L x W x T	MFD	400 V L x W x T	MFD	600 V L x W x T
.47	1-1/8 x 1 x 1/2	.47	1-1/8 x 1 x 1/2	.47	1-1/8 x 1 x 1/2
1.0	1-1/8 x 1 x 1/2	1.0	1-1/8 x 1 x 1/2	1.0	1-3/4 x 7/8 x 11/16
4.7	1-3/4 x 1 x 3/4	4.7	1-3/4 x 1-1/4 x 7/8	4.7	2 x 2 x 1-1/8
10.0	1-3/4 x 1-1/4 x 1	10.0	2 x 1-3/4 x 1	10.0	3-1/16 x 2-7/8 x 1-1/8
22.0	1-3/4 x 1-1/4 x 1-1/8	22.0	2 x 2 x 1-1/2	22.0	3-1/16 x 2-7/8 x 1-7/8
47.0	3-1/16 x 2-7/8 x 1-3/8	47.0	3-1/16 x 2-7/8 x 1-1/8	47.0	—
100.0	3-1/16 x 2-7/8 x 2-1/8	100.0	3-1/16 x 4-7/16 x 2-1/8	100.0	—

STYLE B

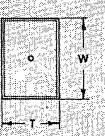
L = Length

E Rectangular Epoxy Case, Axial Lead



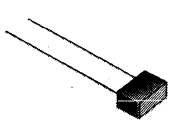
MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.17 x .29 x .42	.01	.17 x .29 x .42	.01	.17 x .29 x .42
.047	.17 x .29 x .42	.047	.17 x .29 x .55	.047	.23 x .36 x .55
.10	.17 x .29 x .55	.10	.17 x .29 x .55	.10	.29 x .42 x .57
.47	.29 x .42 x .57	.47	.29 x .42 x .82	.47	.39 x .54 x .82
1.0	.29 x .42 x .82	1.0	.39 x .54 x .82	1.0	.39 x .54 x 1.24
4.7	.56 x .72 x 1.24	4.7	.56 x .72 x 1.50	4.7	—

STYLE E



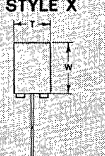
L = Length

X Rectangular Epoxy Case, Radial Lead



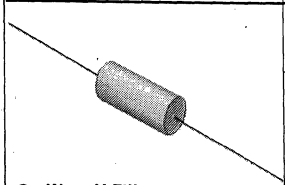
MFD	50 VDC T x W x L	MFD	100 VDC T x W x L	MFD	200 VDC T x W x L
.01	.18 x .31 x .42	.01	.18 x .31 x .42	.01	.18 x .31 x .42
.047	.18 x .31 x .42	.047	.18 x .31 x .55	.047	.24 x .38 x .55
.10	.18 x .31 x .55	.10	.18 x .31 x .55	.10	.30 x .44 x .55
.47	.30 x .44 x .55	.47	.30 x .44 x .82	.47	.40 x .56 x .82
1.0	.30 x .44 x .82	1.0	.40 x .56 x .82	1.0	.40 x .56 x 1.24
4.7	.57 x .74 x 1.24	4.7	.57 x .74 x 1.50	4.7	—

STYLE X



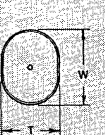
L = Length

O Wrap-N-Fill, Oval Shape, Axial Lead



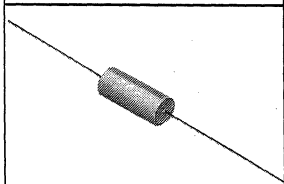
MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.10 x .23 x .40	.01	.10 x .23 x .40	.01	.10 x .23 x .40
.047	.10 x .23 x .40	.047	.10 x .23 x .53	.047	.12 x .25 x .53
.10	.10 x .23 x .53	.10	.11 x .24 x .53	.10	.19 x .32 x .53
.47	.22 x .35 x .53	.47	.19 x .32 x .78	.47	.31 x .48 x .78
1.0	.24 x .37 x .78	1.0	.28 x .45 x .78	1.0	.32 x .49 x 1.20
4.7	.38 x .55 x 1.20	4.7	.40 x .57 x 1.50	4.7	.73 x .90 x 1.75
10.0	.49 x .66 x 1.50	10.0	.55 x .72 x 1.75	10.0	1.02 x 1.19 x 1.75

STYLE O



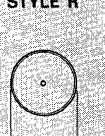
L = Length

R Wrap-N-Fill, Round Shape, Axial Lead



MFD	50 V D x L	MFD	100 V D x L	MFD	200 V D x L
.01	.18 x .40	.01	.18 x .40	.01	.18 x .40
.047	.18 x .40	.047	.18 x .53	.047	.20 x .53
.10	.18 x .53	.10	.19 x .53	.10	.27 x .53
.47	.30 x .53	.47	.27 x .78	.47	.36 x .78
1.0	.32 x .78	1.0	.39 x .78	1.0	.43 x 1.20
4.7	.49 x 1.20	4.7	.51 x 1.50	4.7	.84 x 1.75
10.0	.60 x 1.50	10.0	.66 x 1.75	10.0	1.13 x 1.75

STYLE R

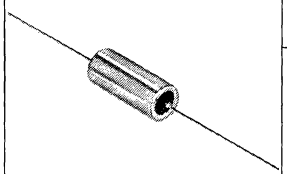


L = Length

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

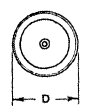
TYPE B Metallized Polycarbonate Capacitors



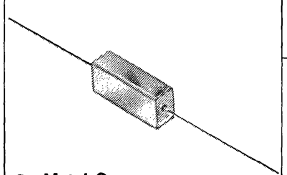
T Metal Case, Hermetically Sealed, Tubular

MFD	50 V D x L	MFD	100 V D x L	MFD	200 V D x L
.01	.175 x 9/16	.01	.175 x 9/16	.01	.195 x 9/16
.047	.175 x 9/16	.047	.235 x 9/16	.047	.235 x 13/16
.10	.235 x 9/16	.10	.235 x 11/16	.10	.312 x 13/16
.47	.235 x 9/16	.47	.400 x 13/16	.47	.500 x 1-1/8
1.0	.312 x 13/16	1.0	.400 x 1-1/16	1.0	.560 x 1-3/8
4.7	.500 x 1-1/8	4.7	.560 x 1-7/8	4.7	1.00 x 1-7/8

STYLE T



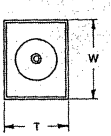
L = Length



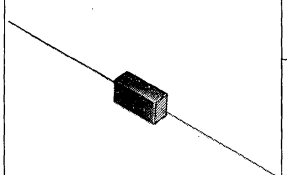
G Metal Case, Hermetically Sealed, Rectangular Tube

MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.22 x .34 x 9/16	.01	.22 x .34 x 9/16	.01	.22 x .34 x 9/16
.047	.22 x .34 x 9/16	.047	.22 x .34 x 9/16	.047	.22 x .34 x 11/16
.10	.22 x .34 x 9/16	.10	.22 x .34 x 11/16	.10	.22 x .34 x 13/16
.47	.22 x .34 x 11/16	.47	.31 x .41 x 13/16	.47	.40 x .57 x 1-1/8
1.0	.31 x .41 x 13/16	1.0	.40 x .57 x 1-1/8	1.0	.40 x .57 x 1-5/16
4.7	.40 x .57 x 1-1/8	4.7	.50 x .65 x 1-13/16	4.7	.60 x .80 x 2-5/16

STYLE G



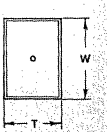
L = Length



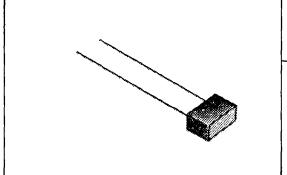
E Rectangular Epoxy Case, Axial Lead

MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.17 x .29 x .42	.01	.17 x .29 x .42	.01	.17 x .29 x .42
.047	.17 x .29 x .42	.047	.17 x .29 x .42	.047	.23 x .36 x .55
.10	.17 x .29 x .42	.10	.23 x .36 x .55	.10	.29 x .42 x .57
.47	.23 x .36 x .55	.47	.29 x .42 x .82	.47	.39 x .54 x .82
1.0	.29 x .42 x .67	1.0	.39 x .54 x 1.00	1.0	.56 x .72 x 1.24
4.7	.39 x .54 x 1.24	4.7	.56 x .72 x 1.50	4.7	—

STYLE E



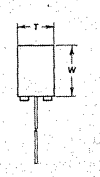
L = Length



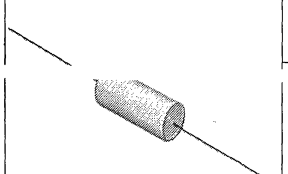
X Rectangular Epoxy Case, Radial Lead

MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.01	.18 x .31 x .42	.01	.18 x .31 x .42	.01	.18 x .31 x .42
.047	.18 x .31 x .42	.047	.18 x .31 x .42	.047	.24 x .38 x .55
.10	.18 x .31 x .42	.10	.24 x .38 x .55	.10	.30 x .44 x .55
.47	.24 x .38 x .55	.47	.30 x .44 x .82	.47	.40 x .56 x .82
1.0	.30 x .44 x .67	1.0	.40 x .56 x 1.04	1.0	.57 x .74 x 1.24
4.7	.40 x .56 x 1.25	4.7	.57 x .74 x 1.50	4.7	—

STYLE X



L = Length

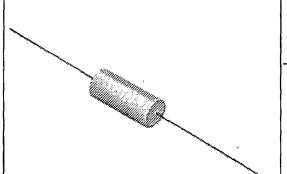


O Wrap-N-Fill, Oval Shape, Axial Lead

MFD	50 V T x W x L	MFD	100 V T x W x L	MFD	200 V T x W x L
.047	.11 x .24 x .40	.047	.12 x .25 x .40	.047	.14 x .27 x .53
.10	.12 x .25 x .40	.10	.13 x .36 x .53	.10	.22 x .35 x .53
.47	.19 x .32 x .53	.47	.21 x .34 x .81	.47	.35 x .52 x .81
1.0	.21 x .34 x .68	1.0	.26 x .43 x 1.00	1.0	.35 x .52 x 1.25
4.7	.29 x .46 x 1.25	4.7	.45 x .62 x 1.50	4.7	.67 x .84 x 1.75

STYLE O

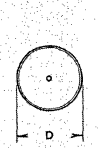
L = Length



R Wrap-N-Fill, Round Shape, Axial Lead

MFD	50 V D x L	MFD	100 V D x L	MFD	200 V D x L
.01	.18 x .40	.01	.18 x .40	.01	.18 x .40
.047	.19 x .40	.047	.20 x .40	.047	.22 x .53
.10	.20 x .40	.10	.21 x .53	.10	.30 x .53
.47	.27 x .53	.47	.29 x .81	.47	.46 x .81
1.0	.29 x .68	1.0	.37 x 1.00	1.0	.46 x 1.25
4.7	.38 x 1.25	4.7	.56 x 1.50	4.7	.78 x 1.75

STYLE R

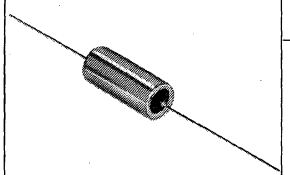


L = Length

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
Phone (213) 846-9302
TWX: 910-498-2207

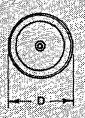
TYPE G Metallized Teflon Capacitors



T Metal Case, Hermetically Sealed, Tubular

MFD	50 V D x L	MFD	100 V D x L	MFD	200 V D x L
.001	.235 x 11/16	.001	.235 x 11/16	.001	.235 x 11/16
.0047	.235 x 11/16	.0047	.235 x 11/16	.0047	.235 x 13/16
.01	.235 x 11/16	.01	.235 x 11/16	.01	.235 x 13/16
.047	.312 x 11/16	.047	.400 x 13/16	.047	.400 x 1-1/16
.10	.312 x 15/16	.10	.400 x 1-1/16	.10	.500 x 1-1/8
.47	.562 x 1-1/8	.47	.670 x 1-3/8	.47	.670 x 1-7/8
1.0	.670 x 1-3/8	1.0	.670 x 1-7/8	1.0	1.00 x 1-7/8
2.0	.670 x 1-7/8	2.0	1.00 x 1-7/8	2.0	—

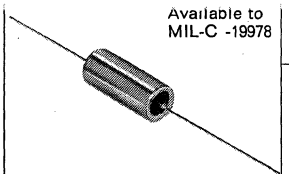
STYLE T



L = Length

TYPE T Teflon Capacitors

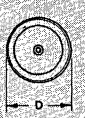
Available to MIL-C -19978



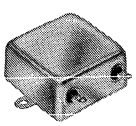
T Metal Case, Hermetically Sealed, Tubular

MFD	200 V D x L	MFD	400 V D x L	MFD	600 V D x L
.001	.235 x 13/16	.001	.235 x 13/16	.001	.235 x 13/16
.0047	.235 x 13/16	.0047	.312 x 13/16	.0047	.312 x 13/16
.01	.312 x 13/16	.01	.400 x 13/16	.01	.400 x 1-1/8
.047	.400 x 1-1/8	.047	.562 x 1-1/8	.047	.560 x 1-3/8
.10	.562 x 1-1/8	.10	.562 x 1-5/8	.10	.670 x 1-7/8
.47	.750 x 2-1/8	.47	1.00 x 2-1/8	.47	1.00 x 2-5/8
1.0	1.00 x 2-5/8	1.0	—	1.0	—

STYLE T



L = Length



B Metal Case, Hermetically Sealed, Bathtub

MFD	200 V L x W x T	MFD	400 V L x W x T	MFD	600 V L x W x T
.01	1-1/8 x 1 x 1/2	.01	1-1/8 x 1 x 1/2	.01	1-1/8 x 1 x 1/2
.047	1-1/8 x 1 x 1/2	.047	1-1/8 x 1 x 1/2	.047	1-1/8 x 1 x 11/16
.10	1-1/8 x 1 x 1/2	.10	1-1/8 x 1 x 11/16	.10	1-3/4 x 7/8 x 11/16
.47	1-3/4 x 1 x 7/8	.47	1-3/4 x 1-1/4 x 1-1/8	.47	2 x 1-3/4 x 7/8
1.0	2 x 1-3/4 x 7/8	1.0	2 x 2 x 1	1.0	2 x 2 x 1-1/4
2.0	2 x 2 x 1-1/8	2.0	2 x 2 x 1-1/2	2.0	—
3.0	2 x 2 x 1-3/4	3.0	—	3.0	—

STYLE B

L = Length

General Electrical Specifications

Type P POLYSTYRENE

Operating Temperature: −55°C to +85°C ■ **Insulation Resistance (25°C):** 1,000,000 meg x mfd; need not exceed 2,000,000 megohms ■ **Dissipation Factor:** 0.02% ■ **Temperature Coefficient:** −100 ppm/°C typical ■ **Test Voltage:** 200% of rated voltage.

Type M MYLAR

Operating Temperature: −55°C to +85°C; to +125°C with 50% voltage derating ■ **Insulation Resistance:** 100,000 meg x mfd; need not exceed 200,000 megohms ■ **Dissipation Factor:** 0.3% typical ■ △ **Capacitance vs. Temperature:** −5% at −55°C; +3% at +85°C; +15% at +125°C ■ **Test Voltage:** 200% of rated voltage.

Type R METALLIZED MYLAR

Operating Temperature: −55°C to +85°C; to +125°C with 50% voltage derating ■ **Insulation Resistance (25°C):** 50,000 meg x mfd; need not exceed 100,000 megohms ■ **Dissipation Factor(25°C):** 0.5% typical (1% max.) ■ △ **Capacitance vs. Temperature:** −5% at −55°C; +3% at +85°C; +15% at +125°C ■ **Test Voltage:** 150% of rated voltage.

Type L POLYCARBONATE

Operating Temperature: −55°C to +125°C ■ **Insulation Resistance (25°C):** 300,000 meg x mfd; need not exceed 600,000 megohms ■ **Dissipation Factor (25°C):** 0.1% typical (0.15% max.) ■ △ **Capacitance vs. Temperature:** −1.5% at −55°C; ±1% at +125°C ■ **Test Voltage:** 200% of rated voltage.

Type B METALLIZED POLYCARBONATE

Operating Temperature: −55°C to +125°C ■ **Insulation Resistance (25°C):** 100,000 meg x mfd; need not exceed 200,000 megohms ■ **Dissipation Factor (25°C):** 0.2% typical (0.3% max.) ■ △ **Capacitance vs. Temperature:** −1.5% at −55°C; ±1% at +125°C ■ **Test Voltage:** 150% of rated voltage.

Type T TEFLON

Operating Temperature: −55°C to +160°C; to +200°C on request ■ **Insulation Resistance (25°C):** 1,000,000 meg x mfd; need not exceed 2,000,000 megohms ■ **Dissipation Factor (25°C):** 0.01% ■ **Temperature Coefficient:** −200 ppm/°C typical ■ **Test Voltage:** 200% of rated voltage.

Type G METALLIZED TEFLON

Operating Temperature: −55°C to +140°C; to +200°C on request ■ **Insulation Resistance (25°C):** 500,000 meg x mfd; need not exceed 1,000,000 megohms ■ **Dissipation Factor (25°C):** 0.1% typical (0.2% max.) ■ **Temperature Coefficient:** −50 ppm/°C typical ■ **Test Voltage:** 150% of rated voltage.

SOUTHERN ELECTRONICS CORPORATION

150 West Cypress
Burbank, California 91502
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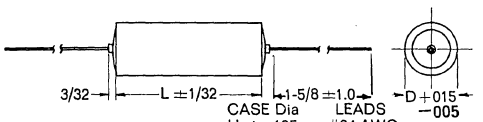
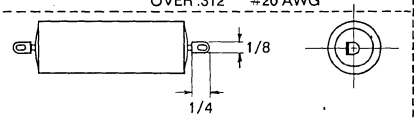
TWX: 910-498-2207

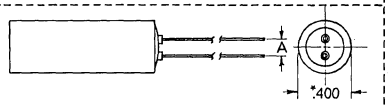


CASE Dia	LEADS
Up to .195	#24 AWG
UP to .312	#22 AWG
OVER .312	#20 AWG

STYLE T (BASIC)

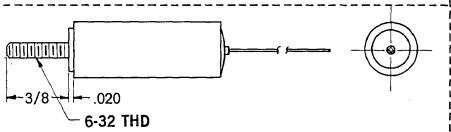


OPTION T

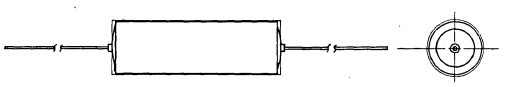


CASE DIA.	A
.400	.125 ±005
OVER .400	.156 ±005

OPTION A *MIN. DIA .400

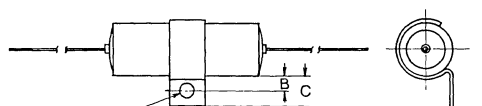


OPTION M *MIN. Dia .235



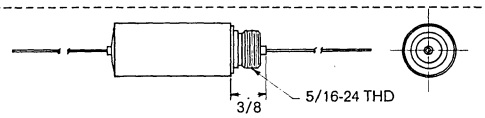
INSULATING SLEEVE
Add .015 to Dia & Add 1/16 to length

OPTION S



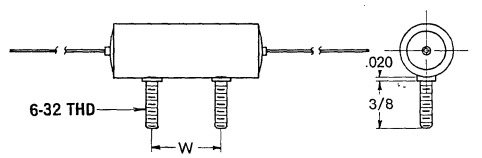
CASE DIA	W ±1/64	A±.005	B ± 1/32	C ±1/16
Up to .400	1/4	.144	.187	5/16
Over .400	1/2	.156	.250	7/16

OPTION L



*MINIMUM DIA = .400
*SUPPLIED WITH LOCK WASHER AND NUT

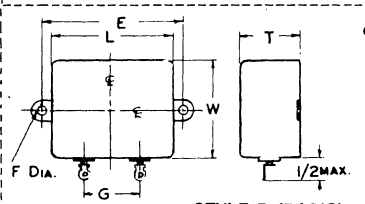
OPTION D



CASE LENGTH	W
1-1/8	5/8
1-3/8	3/4
1-5/8	7/8
1-7/8	1-1/8
2-1/8	1-1/4
2-3/8	1-3/8
2-5/8	1-7/8

OPTION P

MIN DIA = .400
MIN LENGTH 1-1/16



CASE SIZE	TOL.
L	± 1/32
W	± 1/32
H	± 1/32
E	± .010
F	± .010
G	± 1/32

STYLE B (BASIC)

Part Number Code P T C 104 K * 1 * L * 6

- Dielectric
- Case style
- Voltage
- Capacitance in Mmfd (First 2 digits are significant figures, last digit indicates number of zeros)
- Capacitance tolerance
- Circuit (Omit for Standard)
- Terminal and Mounting Accessories (Omit for Standard)
- Lead Material (Omit for Standard)

*Optional

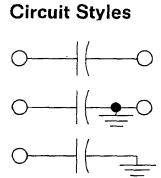
Voltage Code

Z	=	30VDC
A	=	50VDC
B	=	100VDC
C	=	200VDC
E	=	400VDC
F	=	600VDC
G	=	1000VDC

Tolerance Code

A	= ±.1%	G	= ±2%
B	= ±.25%	J	= ±5%
D	= ±.5%	K	= ±10%
F	= ±1%	M	= ±20%

Circuit Styles



Standard (Omit Symbol)
1 (Deduct 1/16" from L Dim. Style T & G)
2 (Deduct 1/16" from L Dim. Style T & G)

Dielectric Code

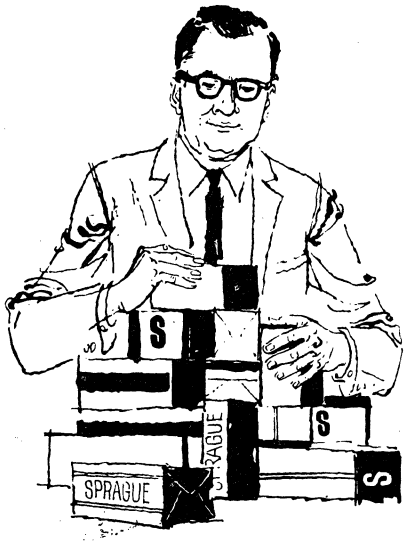
- P = Polystyrene
- M = Mylar
- L = Polycarbonate
- T = Teflon
- R = Metalized Mylar
- B = Metalized Polycarbonate
- G = Metalized Teflon

Case Code

- T = Hermetically Sealed, Tubular
- B = Hermetically Sealed, Bathtub
- G = Hermetically Sealed, Rectangular Tube
- P = Hermetically Sealed, Plug-in
- A = Hermetically Sealed, Adjustable
- D = Hermetically Sealed, Decade
- E = Epoxy Case, Axial Lead
- X = Epoxy Case, Radial Lead
- O = Wrap-N-Fill, Oval Shape
- R = Wrap-N-Fill, Round Shape

Lead Type

Standard — Tinned Copper Weld (Omit Symbol)
4 — Tinned Copper
5 — Tinned Nickel
6 — Gold Plated Nickel
7 — Gold Plated Dumet



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6S-1105

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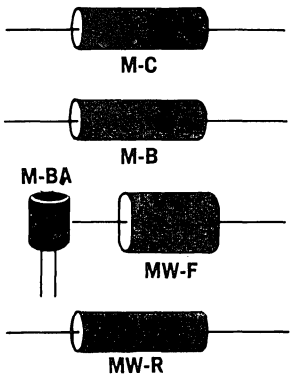
CAPACITORS

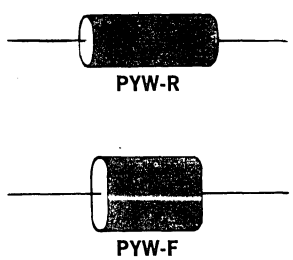
Standard CONDENSER CORPORATION

POLYESTER FILM



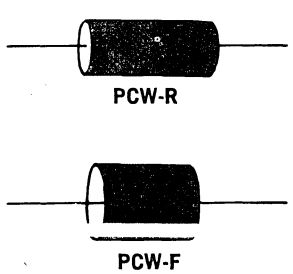
Type M-C (Ceramic case), Types M-B and MB-A (Phenolic case), Polyester Film Dielectric. Operating temperature: −55°C to +85°C without derating. Values to 1.00 MFD from 200 to 600 V.D.C. Types MW-R and MW-F, Polyester Tape Wrap, thermosetting resin end seals. Operating temperature: −55°C to +100°C without derating. In capacities up to 10.0 MFD, Type MW-R from 50 to 600 V.D.C., Type MW-F from 100 to 600 V.D.C. All types extended foil construction. With humidity-resistant synthetic resin end seals. Capacity tolerance ±20%. Closer tolerances available on request.

POLYSTYRENE FILM



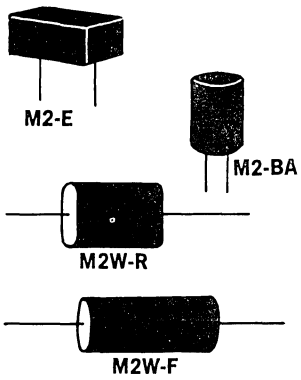
Extended foil construction, Polyester film wrapped, thermosetting resin end fill. Types PYW-R and PYW-F values up to 3.0 MFD from 50 to 600 V.D.C. Operating temperature: −55°C to +85°C without voltage derating. Dissipation factor: .1%. Temperature coefficient: −120 ±50 PPM/°CQ: 2500 or better at 1 Megahertz. Insulation Resistance: 100,000 Megohms X Microfarads at 25°C, 50,000 Megohms X Microfarads at 85°C. Dielectric Absorption: less than .05% when tested at 25°C.

POLYCARBONATE AND FOIL



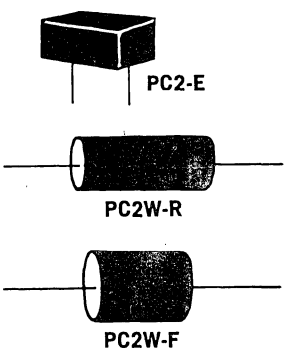
Types PCW-R and PCW-F (wrap and fill), values to 10.0 MFD from 50 to 200 V.D.C. Operating temperature: −55°C to +125°C without voltage derating. Dissipation Factor: shall be 0.5% or less when measured at 25°C and 1 KHz. Insulation Resistance: minimum shall be 50,000 Megohm-Microfarad when measured at 25°C, 500 Megohm-Microfarad when measured at 125°C. Dielectric Absorption: less than .2%. (Typical Applications: communication and precision test equipment, computers, timing circuits, navigation, aircraft and other precision circuits where low dielectric absorption, excellent retrace are a factor.)

METALIZED POLYESTER FILM



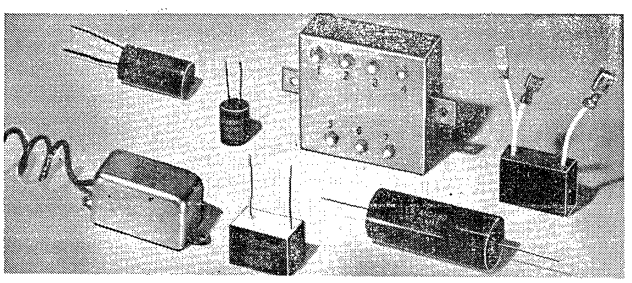
Thermosetting resin filled, radial leads. Type M2-E (Rectangular Epoxy Case) available in up to 5.0 MFD from 50 to 100 V.D.C. Type M2-BA (Round Phenolic Case) values up to 10.0 MFD from 50 to 200 V.D.C. Types M2W-R and M2W-F, Polyester Tape Wrap, thermosetting resin end seals. Available in values from .01 up to 20.0 MFD from 100 to 600 V.D.C. Operating temperature: −55°C to 100°C without derating. +100°C to +125°C with 50% voltage derating. Capacity tolerance: ±20% is standard. ±10%, ±5%, ±3%, ±2% and ±1% are also available.

METALIZED POLYCARBONATE



Type PC2-E (Rectangular Epoxy Case, radial leads), available in up to 5.0 MFD from 50 to 100 V.D.C. Types PC2W-R and PC2W-F (wrap and fill), values up to 20 MFD from 100 to 600 V.D.C. Operating temperature: −55°C to +125°C without voltage derating. Dissipation Factor: shall be 0.5% or less when measured at 25°C and 1 KHz. Units larger than 1.0 MFD shall be measured at 60 Hz. Temperature Coefficient: 50 PPM/°C or less over a temperature range of 25°C to 85°C. Insulation Resistance: minimum shall be 50,000 Megohm-Microfarad when measured at 25°C, 500 Megohm-Microfarad when measured at 125°C. Dielectric Absorption: less than .2%.

R-C NETWORKS



Custom made. For RFI suppression, arc suppression, relay contact protectors, noise filters, spark suppression. Available in any size, power rating, combination or configuration. For example: Capacitor Section can be Mylar, Metalized Mylar, Polystyrene, Polycarbonate . . . any voltage or tolerance. Resistor Section can be Composition, Wire-wound, Metal Film, Deposited Carbon . . . in any wattage or tolerance. Total Networks available in tolerances as close as ±1%. Manufactured under rigid Quality Control to meet specific requirements.

Standard CONDENSER CORPORATION

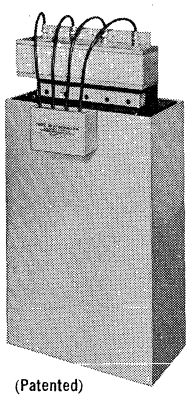
1065 W. Addison Street, Chicago, Illinois 60613 • (312)-327-5440

HIGH-VOLTAGE FAST-DISCHARGE CAPACITORS

Developed in response to customers' inquiries, these capacitors meet exacting requirements in energy discharge applications.

PULSE LASER CAPACITOR
(Patented)

Model ESC-302: 0.01μf, 20kv, 3 nanohenries; life: 10^8 shots at a repetition of 100 pps. Size: 4½" dia x 3" high.

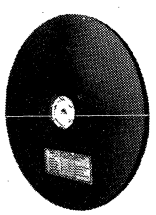


LOW INDUCTANCE CAPACITOR & SWITCH

- Available from 4.5μf-60μf at 10-25 kV.
- Maximum self inductance: 5 nanohenries.

(Patented)

Series ESC-248A heavy duty energy storage capacitors, shown with mating discharge switch Model SBG-5.



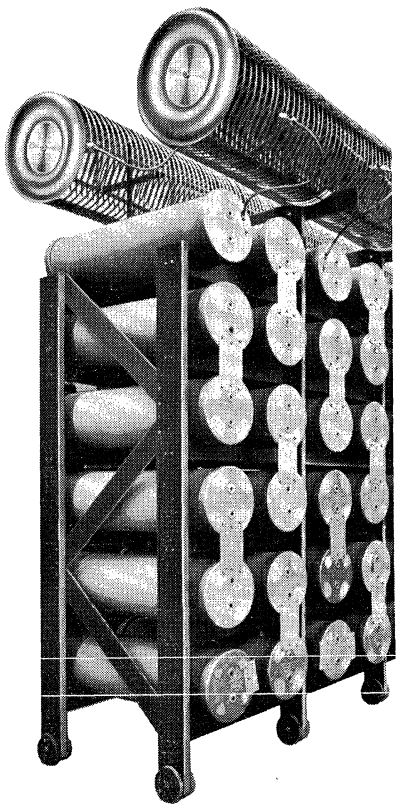
COAXIAL-DISC CAPACITOR
(Patented)

Model ESC-247D
- 0.5μf, 20kV, 1 nanohenry.

Famous low inductance energy storage capacitors all have maximum inductance of one nanohenry, are available with values of 0.001μf to 0.5μf at 20kV. Ideal for dye laser and flash lamp applications—in use throughout the world.

PULSE-FORMING NETWORKS

...from the smallest to the largest



Model PCE-1: Pulse-forming networks installed at Griffis AFB. Peak charge voltage: 252kv; peak power: 180 megawatts; PRF: 180 pps; ripple: less than 1%.

TOBE DEUTSCHMANN pulse-forming networks range from miniature units to high-power installations like the one shown above. This unit, designed and built to a rigid performance specification, is more than 8 feet high, 5 feet wide, and 22 feet long.

Whatever your requirements for PFN's, low-Z pulse lines, or pulse capacitors, we can design and build reliable units to satisfy your need.

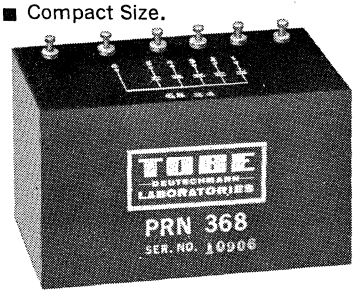
MICAP™

MICA-PAPER

CAPACITORS

rated for high-voltage pulse & dc applications feature:

- High Reliability.
- Encapsulated Construction.
- Extremely Low Dissipation Factor.
- Close Tolerance Matching Between Sections.
- Compact Size.

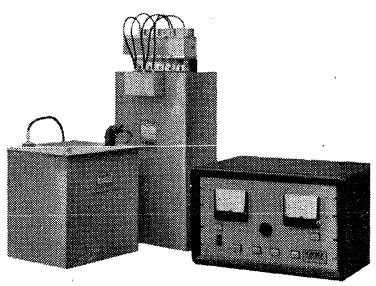


Size 4½" x 2 9/16" x 2¼" high.

Developed for airborne radar modulators, TDL mica-paper capacitors are available as multiple section E-line pulse networks with internal or external coil. Prototype quantities to your specifications can be supplied on short delivery.

NEED A COMPLETE

DISCHARGE SYSTEM?



Fast discharge pulse energy system, Model ESB-118. Rated: 3000J, 20kV, and 0.5 megampere peak current. In addition to catalog systems, custom equipment is available.

Our units have proved their reliability worldwide in both research and industrial installations. For high voltage capacitors, discharge switches, pulse networks, pulse capacitors, write or call . . .

TOBE
DEUTSCHMANN LABORATORIES

SPECIALISTS IN THE PRODUCTION OF HIGH TRANSIENT-CURRENT DEVICES

BOX 74 • CANTON, MASSACHUSETTS 02021 / TEL 617 828-3366

MINIATURE CERAMIC CAPACITORS

USCC

CENTRALAB
Electronics Division
GLOBE-UNION INC.

GENERAL SPECIFICATIONS

W Dielectric Characteristics:

Dissipation Factor:	Less than 2.5% at 1 KHz
Insulation Resistance:	100,000 megohms or 1000 megohm-microfarads, whichever is less at 25°C
Temperature Coefficient:	±15%, —55 to +125°C
Dielectric Strength:	2.5 x rated voltage, (250 VDC for C19 Series)

Meets or exceeds applicable requirements of MIL-C-11015 and MIL-C-39014.

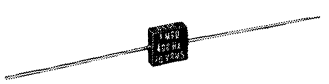
NPO Dielectric Characteristics:

Dissipation Factor:	Less than .15% at 1 MHz
Insulation Resistance:	100,000 megohms or 1000 megohm-microfarads, whichever is less at 25°C
Temperature Coefficient:	0 ±30 PPM/°C, —55 to +125°C
Dielectric Strength:	2.5 x rated voltage

Meets or exceeds applicable requirements of MIL-C-20.

LEADED TYPES

Series	Capacitance	Voltage	Dielectric
TUBULAR / EPOXY CASE / AXIAL LEADS			
C10	1.0 pF-3.0 Mfd	50/100/200 VDC	W
C33 — High Stability	.5 pF-.1 Mfd	50/100/200 VDC	NPO
C22	10 pF-.22 Mfd	50/100 VDC	W
RECTANGULAR / EPOXY COATED / AXIAL LEADS			
C31	1.0 pF-1.0 Mfd	50/100/200 VDC	W
C38 — High Stability	5.6 pF-.01 Mfd	50/100/200 VDC	NPO
RECTANGULAR / EPOXY CASE / AXIAL LEADS			
C19 — High Current	.01 Mfd-10 Mfd	400 and 1200 Hz at 70 VRMS	W
RECTANGULAR / EPOXY CASE / RADIAL LEADS			
C12	1.0 pF-10 Mfd	50/100/200 VDC	W
C37 — High Stability	5.0 pF-.10 Mfd	50/100/200 VDC	NPO



Capacitance tolerances available: W — ±5, 10, 20%; NPO — ±1, 2, 3, 5, 10, 20% and 0.5 pF (1 pF to 10 pF)
To order specify: Series, Capacitance, Tolerance and Voltage (Frequency for C19)

CERAMOLITHIC® CHIPS
(Maximum Capacitance)

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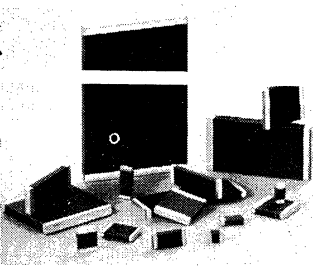
U. S. Capacitor Corporation

USCC SIZE	L	W	T MAX	W DIELECTRIC 50VDC	W DIELECTRIC 100VDC	W DIELECTRIC 200VDC	NPO DIELECTRIC 50VDC	NPO DIELECTRIC 100VDC	NPO DIELECTRIC 200VDC
CA	.075±.010	.035±.010	.040	.01Mfd	3300	470pF	180	100	56pF
BC	.080±.010	.050±.010	.045	.015	6800	1500	470	270	150
BF	.100±.010	.050±.010	.060	.022	.01Mfd	2200	820	470	270
FH	.125±.010	.095±.010	.065	.10	.033	6800	2700	1800	1200
BI	.150±.010	.050±.010	.060	.047	.018	3900	1500	820	560
CJ	.170±.010	.065±.010	.065	.10	.039	.012Mfd	2700	1500	1000
HJ	.175±.010	.125±.010	.065	.18	.082	.018	6800	3900	2200
DJ	.180±.010	.080±.010	.065	.12	.047	.01	3900	2200	1500
NJ	.190±.010	.065±.010	.065	.10	.039	6800pF	2700	1800	1000
LL	.225±.015	.210±.015	.065	.47	.22	.047Mfd	.015Mfd	.01Mfd	5600
FP	.350±.015	.095±.010	.070	.22	.10	.027	.01	5600pF	3300
TOLERANCES AVAILABLE:				±5, 10, 20%			±1, 2, 3, 5, 10, 20% and 0.5pF (1pF to 10pF)		



Terminations available: Silver, Palladium Silver, Gold and Palladium Gold
To order specify: Size, Capacitance, Voltage, Capacitance Tolerance and Dielectric

See Volume II, Section 2700 for USCC/CENTRALAB EMI/RFI Filters

U.S. CAPACITOR CORP•M/S #20•2151 N. LINCOLN ST. BURBANK, CALIF. 91504•(213) 843-4278 TWX: 910-498-2222

HUMISEAL COATINGS

GENERAL CHART

Listed in this General Chart of Properties are ten of the most frequently used HumiSeal Protective Coatings and their principal properties. These have been tabulated in order to facilitate comparison of their characteristics and selection of the most suitable type for a specific application. In addition to these HumiSeal types we manufacture a variety of coatings for special purposes, including high temperature applications. Should none of the coatings listed in this chart fulfill your requirements, we suggest that you contact us for recommendations.

	PROPERTIES OF LIQUID HumiSeal										THERMAL PROPERTIES		
HumiSeal Type[1]	Specific Weight (lbs. per gallon)[2]	Solids Content (% by weight)[3]	Viscosity, with catalyst when applicable (centistokes)[4]	Flash Point (°F)[5]	Drying Time for Handling[6]	Recommended Curing Conditions	Time Required to Reach Optimum Properties	Pot Life, at Room Temperature	Shelf Life, at Room Temperature	Coverage per gallon (in sq. ft.) After One Dip	Continuous Use Temperature Range (°F)	Thermal Shock Test[7]	Solderability[8]
1B12	7.3	20	30	40	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	1 year	1 year	550	−75°F to +280°F	Passes	Good
1B15	7.6	35	470	30	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	1 year	1 year	450	−75°F to +270°F	Passes	Good
1B31	7.6	35	160	30	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	1 year	1 year	450	−75°F to +270°F	Passes	Good
1A20	8.5	50	120	90	60 min.	24 hrs. at room temp.	1 week	6 mos.	6 mos.	375	−70°F to +250°F	Passes	Excellent
1A27	8.0	50	5000	100	15 min.	24 hrs. at room temp.	1 week	1 year	1 year	450	−90°F to +250°F	Passes	Excellent
1A33	7.7	44	160	30	15 min.	24 hrs. at room temp.	1 week	1 year	1 year	300	−90°F to +250°F	Passes	Excellent
2A56	7.8	36	<20	70	60 min.	24 hrs. at room temp. or 2 hrs at 170°F	1 week	4 hrs.	6 mos.	650	−70°F to +250°F	Passes	Excellent
2B13	7.5	42	50	40	30 min.	90 min. at 200°F	1 week	24 hrs.	1 year	480	−70°F to +270°F	Passes	Poor
2A51	9.2	100	6000	non flammable	2 hrs.	24 hrs. at room temp. or 2 hrs. at 200°F	1 week	6 hrs.	6 mos.	200	−70°F to +250°F	Passes	Poor
2A53	7.8	54	300	70	30 min.	2 hrs. at 200°F	1 week	24 hrs.	1 year	400	−70°F to +250°F	Passes	Poor

HumiSeal TYPES LISTED IN BOLD PRINT COMPLY WITH THE REQUIREMENTS OF MIL-I-46058B

All technical data in this bulletin are based on test results using the stated standards and are believed to be correct. However, since the end use of HumiSeal materials (and the manner of storing and handling them) is beyond our control, we make no warranty — expressed or implied — as to the fitness of use, results to be obtained from or effects of use with respect to these materials. Their use shall be solely by the judgment of and at the risk of the end-user notwithstanding any statement contained in this bulletin.

1. The first digit in the type number specifies whether the product is a one-, or a two-component system.
2. Fed-Std 141a, Method 4184.
3. Fed-Std 141a, Method 4044.
4. Fed-Std 141a, Method 4287.
5. Fed-Std 141a, Method 4291.
6. Fed-Std 141a, Method 4061.
7. Mil-I-46058B.
8. Visual evaluation for ease of soldering with an 85 watt iron through a 2 mil film.
9. Fluorescent or color coding dye may be added if required.
10. Fed-Std 141a, Method 2121.
11. Fed-Std 406, Method 7031, Procedure A.
12. Fed-Std 141a, Method 6303.
13. ASTM-D150-65T, at 1 MHz and 25°C.
14. Mil-I-46058B. Insulation resistance during 10th cycle, at 65°C and 98% RH.

FOR ELECTRONICS

OF PROPERTIES

HumiSeal Protective Coatings are available in one-quart or one-gallon cans, five-gallon pails, or fifty-five gallon drums. HumiSeal types 1B15 and 1A27 are also available in 16-ounce aerosol containers. All HumiSeal types listed in this chart may be applied by dip, brush or spray. Our recommended techniques for the proper application of coatings and the preparation of the substrates are described in our booklet titled "How to Use Protective Coatings Efficiently" which will be mailed to you on request (Ask for Bulletin No. 79).

PROPERTIES OF CURED HumiSeal COATING

PHYSICAL PROPERTIES							ELECTRICAL PROPERTIES					CHEMICAL PROPERTIES			
Color[9]	Specific Gravity	Average Build After One Dip (mils)[10]	Water Absorption (%)[11]	Flexibility[7]	Adhesion[12]	Mar Resistance[12]	Dielectric Constant[13]	Dissipation Factor[13]	Dielectric Strength (volts)[7]	Insulation Resistance (teraohms)[7]	Moisture Resistance (gigaohms)[14]	Main Constituent	Fungus Resistance[7]	Resistance to Solvents	HumiSeal Type[1]
Water Clear	1.05	0.5	.18	Very Good	Excellent	Very Good	2.8	.010	6000	250	30	Acrylic	Excellent	Very Good	**1B12**
Water Clear	1.05	2	.20	Fair	Excellent	Fair	2.3	.010	8000	350	40	Acrylic	Excellent	Fair	**1B15**
Water Clear	1.06	2	.20	Excellent	Excellent	Very Good	2.5	.010	7500	800	60	Acrylic	Excellent	Good	**1B31**
Water Clear	1.05	2	.30	Excellent	Very Good	Excellent	3.5	.028	8000	300	48	Polyurethane	Excellent	Excellent	**1A20**
Green Tinge	1.05	5	.31	Excellent	Excellent	Fair	3.6	.020	7500	200	12	Polyurethane	Fair	Good	**1A27**
Yellow Tinge	1.05	2	.31	Excellent	Excellent	Fair	3.6	.030	7500	200	16	Polyurethane	Excellent	Good	**1A33**
Pink Tinge	1.09	0.5	.30	Excellent	Excellent	Good	3.6	.024	3500	300	56	Polyurethane	Excellent	Excellent	**2A56**
Yellow Tinge	1.06	2	.20	Excellent	Excellent	Excellent	3.0	.030	8000	300	33	Epoxy	Excellent	Excellent	**2B13**
Yellow Tinge	1.10	15	.31	Fair	Good	Good	3.0	.030	6000	400	6	Epoxy	Excellent	Good	**2A51**
Yellow Tinge	0.95	1	.30	Excellent	Excellent	Excellent	3.0	.030	8000	200	28	Epoxy	Excellent	Excellent	**2A53**

HUMISEAL DIVISION
COLUMBIA TECHNICAL CORPORATION
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micro-circuits

ELECTRICALLY CONDUCTIVE SHIELDING, RESISTOR, AND ANTI-STATIC COATINGS

For Research and Production in: Electronics, Medicine, Aerospace, Electro-Mechanics, Communications

CONDUCTIVE COATINGS SELECTOR TABLE

Conductive Paint Catalog Numbers. See Descriptions Below	MOST FREQUENT USES							
	Static Shield	RF Shield	Aircraft Precipitation Static	High Voltage Stress Relief	Resistors Conductors 0-10 megs	Resistors 10 megs to 50,000 megs	Contacts Conductors Grounds	Sensors: Proximity, Bending, Moisture, Cracking, Timing, etc.
SC12, 13, 15	√	√			√		√	√
SC17	√	√			√		√	√
RS14	√	√			√		√	√
RS17	√				√		√	√
RSE22	√				√		√	√
RSE100			√	√				
RS110			√	√				
RA-2			√					
R-Series				√	√			√
UHR-Series				√		√		

DESCRIPTIONS OF PAINTS LISTED ABOVE

NOTES ON DESCRIPTIONS OF PAINTS: Most of the coatings have been in use (with continuing improvement) for 5 to 20 years. They have many uses which are far removed from the uses which are mentioned. The indicated resistance per square is our production test value. Resistances obtained by the user may be varied by changing the thickness, by absorption into the substrate, by partial dissolving into undercoats or overcoats, etc. Resistance per square is the resistance measured between two opposite sides of a square area of the paint painted between parallel electrodes of substantially zero resistance. If paint thickness remains constant then resistance is independent of dimensions and a 1" square will have the same resistance as a 1 mile square.

We recommend a phone call to discuss proposed applications. The price given is for the smallest stock container and is included only for convenience in ordering experimental quantities. Prices in larger production quantities is substantially lower in all cases. These paints are usually available in production quantities on one or two day notice. We also have or can make a wide range of other conductive coatings.

SC12, SC13, AND SC15 AIR DRYING SILVER MICROPAINTS. These are highly conductive coatings for "wires," electromagnetic shielding, "soldering" fine wires, contacts on magnetic tape, coating of experimental parts of paper, plastic, wood, etc. to simulate metal parts, and a wide variety of other uses. They have been used by magicians and to indicate the fracture of rocks. Resistance of SC12 is less than 0.2 ohms per square. SC13 is more flexible but less conductive. Good adhesion. Stand 500°F. but soften below this. SC15 dries more slowly than SC12 and is suggested for ruling pen and silk screen application. 1/16 oz. SC12 — $2.51, 1 oz. SC12 or SC13 — $7.72, 1 oz. SC15 — $8.33. Solvent SL14 for SC12 and SC13. Solvent SL-2 for SC15.

SC17 FLEXIBLE SILVER MICROPAINT. Very flexible. May be stretched up to 150%. For use on polyethylene, rubber, etc. where there are adhesion and flexibility problems. Has been used for skin contacts in medical tests but we have a superior substitute for this application. Imparts excellent rust-preventive conductive surface on steel for RF gaskets, door closures, etc. Prevents RF leakage at microwave plumbing joints simply by painting over the joints (SC13 is used for the same purpose). Resistance about 0.5 ohm per square or less as applied. Rises to about 10 ohms when stretched 100%. Brush or spray application. 5 oz. — $21.26. Solvent — SL14.

RS14 SHIELDING MICROPAINT. Combines very low cost and a resistance 10 to 20 times lower than any other carbon-pigmented conductive paint known to us. A reasonably heavy spray-applied coat has a resistance of about 5 ohms per square. Higher resistances may be obtained by thinning with solvent and by applying thinner coats. In one application RS14 was substituted for vacuum metallizing for grounding and shielding in a plastic microphone part. Cost dropped from 5¢ down to 1.5¢. Has limitations of poor adhesion to metal and ceramic surfaces and only moderate abrasion resistance. On the inside of wood TV cabinets it has stood tests involving 100% humidity (wet) at 200+°F. for three weeks without change in resistance except across cracks which appeared in the grain. Should be sprayed if possible rather than brushed because of fast drying. 1 Quart — **$6.50.** Solvent SL11.

RS17 FLEXIBLE SHIELDING MICROPAINT (formerly RS17B). Good adhesion to polyethylene, rubber, etc. Good weather resistance and rust preventive characteristics. Will stretch 30-50%. Uses are somewhat similar to those of SC17 but are determined by its higher resistance of 150 ohms per square or lower and very much lower cost. Spray or brush. 1 quart — $14.10. Solvent SL14.

RSE22 EPOXY SHIELDING MICROPAINT. Very good adhesion, abrasion resistance, and chemical resistance. Appears to be unaffected by continuous immersion in 10% salt solution at 200°F. Has many applications in forming ground surfaces, shielding, conductive corrosion protection, etc. 200 ohms per square or less. Curing agent (supplied) is mixed in before use. Pot life is 4 to 8 hours. Brush, spray, or dip. 1 Pint — $15.10. Solvents are SE100 (spray) or SE200 (brush).

RS110 AND RSE100 AIRCRAFT ANTI-STATIC MICROPAINTS (RAIN-EROSION-RESISTANT). Both coatings have a unique formulation which yields optimum anti-static characteristics under a wide range of application conditions and techniques. They may be depended upon to perform satisfactorily even when no equipment is available to test them after application. RS110 is a lacquer-base coating. Chief advantage is fast application and drying without curing agents. However customers have reported the service life to be in excess of 2000 hours without apparent loss of effectiveness on slow speed aircraft. RSE100 is an epoxy coating with very important advantages over neoprene anti-static coatings: Requires only two coats, no special primers, easily recoated and repaired. In accelerated laboratory tests under both dry and salt spray conditions RSE100 abrasion resistance equalled or exceeded that of neoprene anti-static coatings. 1 Pint RS110 — $9.60. Solvent SL14. 1 Pint RSE100 — $15.10. Solvent SE100.

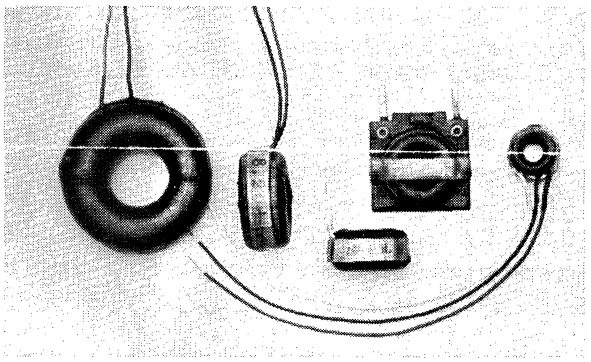
RA-2 ADDITIVE. This is added to commercially available decorative aircraft coatings. It permits decorative coatings to be applied over the black anti-static coatings on radomes and antenna covers without loss of anti-static effectiveness and without static puncture damage to the decorative coatings. RA-2 Additive is being used by U. S. and foreign air lines, aircraft manufacturers, and aircraft electronic manufacturers. Amount for 1 pint of decorative coating — $5.80.

R-SERIES RESISTANCE MICROPAINTS. This is a series of five carefully adjusted resistance paints. It has been estimated that about 4000 1/4-watt resistors can be painted from one 25 cc (1 oz.) bottle. The stock numbers follow: The number following the stock number is the resistance in ohms per square: R01 — 125 ohms (per sq.), R11 — 500 ohms, R21 — 12,500 ohms, R31 — 0.31 megs, R41 — 3.1 megs. The paints may be mixed for intermediate values. By varying the ratio of length to width each stock paint will yield resistors varying from about 1/5th of the indicated value to about 5 or more times the indicated value. Maximum operating temperature is about 250°F. but they will stand much higher temperatures briefly. Brush, spray, ruling pen. 25 cc bottle — $6.50. Solvent — SL14.

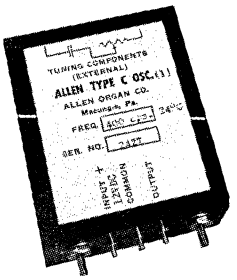
UHR-SERIES (ULTRA HIGH RESISTANCE) MICROPAINTS. These seven paints continue above the R-Series in resistance values. Use where a high meg resistor or a slow electrical leak is needed. May be applied with moderate precision with a ruling pen or artists brush. Can replace very expensive high meg resistors in non-critical applications for a fraction of a cent per resistor. Also used to equalize voltage gradients in high voltage insulators, etc. Made with a highly stable, moisture-resistant binder. 25 cc bottle — $15.60. Solvent SL14.

micro-circuits co., inc.

DEPT: EEM1 • NEW BUFFALO, MICHIGAN 49117 • USA
PHONE: (616) 469-2727



tOrOids OSCILLATORS



ALWAYS IN STOCK
AT ALLEN ELECTRONICS.

Allen Electronics Division manufactures these components in quantity, under the most rigid quality controls, including thorough inspection and testing, for use in the world's finest electronic organs. For this reason we constantly maintain a complete inventory, which is also available to you who desire the added benefits of lower-than-competitive prices and immediate out-of-stock delivery.

TOROIDS

Available from stock. They have been used successfully in such areas as: telemetry, sound and intercommunication systems; geophysical applications; mobile communications; filters; oscillators; and test equipment.

CENTER-TAPPED															NO-CENTER-TAP					
Inductance		Q	Core	O.D.	Price	Inductance		Q	Core	O.D.	Price	Inductance		Q	Core	O.D.	Price	Inductance		Q	Core	O.D.	Price
58.2	Hy.	50	P	1-5/8"	4.93	1.29	Hy.	33	P	1-1/4"	2.60	100	M.H.	10.5	P	1"	2.16	10	M.H.	5.7	I	1"	1.11
47.0	Hy.	50	P	1-5/8"	4.93	1.18	Hy.	34	P	1-1/8"	2.41	91	M.H.	10.5	P	1"	2.16	20	M.H.	6.1	I	1"	1.11
43.0	Hy.	50	P	1-5/8"	4.93	1.03	Hy.	31.5	P	1-1/8"	2.41	82	M.H.	10	P	1"	2.16	30	M.H.	6.7	I	1"	1.11
37.6	Hy.	50	P	1-5/8"	4.93	927	M.H.	31	P	1-1/8"	2.41	78	M.H.	10	P	1"	2.16	35	M.H.	7.2	I	1"	1.11
35.4	Hy.	50	P	1-5/8"	4.93	856	M.H.	30	P	1-1/8"	2.41	70	M.H.	9.3	P	1"	2.16	40	M.H.	7.6	I	1"	1.11
25.6	Hy.	60	P	1-1/4"	3.66	804	M.H.	29	P	1-1/8"	2.41	65	M.H.	9.0	P	1"	2.16	50	M.H.	8.9	I	1"	1.11
23.2	Hy.	55	P	1-1/4"	3.66	738	M.H.	28.75	P	1-1/8"	2.41	60	M.H.	8.7	P	1"	2.16	75	M.H.	5.7	I	1"	1.17
21.2	Hy.	55	P	1-1/4"	3.66	694	M.H.	27	P	1-1/8"	2.41	56	M.H.	8.3	P	1"	2.16	100	M.H.	6.4	I	1"	1.17
19.3	Hy.	55	P	1-1/4"	3.66	642	M.H.	27.25	P	1-1/8"	2.41	53	M.H.	8.1	P	1"	2.16	150	M.H.	7.5	I	1"	1.17
17.8	Hy.	52	P	1-1/4"	3.66	590	M.H.	26	P	1-1/8"	2.41	50	M.H.	7.8	P	1"	2.16	200	M.H.	8.4	I	1"	1.17
16.7	Hy.	46	P	1-1/4"	3.02	545	M.H.	24	P	1-1/8"	2.41	46	M.H.	7.5	P	1"	2.16	250	M.H.	9	I	1"	1.17
15.6	Hy.	48	P	1-1/4"	3.02	494	M.H.	23	P	1-1/8"	2.41	43	M.H.	7.2	P	1"	2.16	300	M.H.	9.8	I	1"	1.17
13.5	Hy.	45	P	1-1/4"	3.02	457	M.H.	21	P	1"	2.16	39	M.H.	7.0	P	1"	2.16	400	M.H.	11	I	1"	1.17
12.2	Hy.	42	P	1-1/4"	3.02	426	M.H.	20.7	P	1"	2.16	37	M.H.	6.7	P	1"	2.16	500	M.H.	23	P	1-1/8"	2.38
10.5	Hy.	41	P	1-1/4"	3.02	394	M.H.	20	P	1"	2.16	34	M.H.	6.5	P	1"	2.16	600	M.H.	25	P	1-1/8"	2.38
9.59	Hy.	35	P	1-1/4"	3.02	362	M.H.	19	P	1"	2.16	31	M.H.	6.2	P	1"	2.16	800	M.H.	29	P	1-1/8"	2.38
8.95	Hy.	34	P	1-1/4"	3.02	334	M.H.	18.5	P	1"	2.16	29	M.H.	4.6	P	11/16"	3.50	1	Hy.	18.6	F	1-1/16"	1.92
8.20	Hy.	33	P	1-1/4"	3.02	317	M.H.	17.5	P	1"	2.16	27	M.H.	4.6	P	11/16"	3.50	1.2	Hy.	16.1	F	1-1/16"	1.92
7.88	Hy.	32	P	1-1/4"	3.02	286	M.H.	17	P	1"	2.16	25	M.H.	4.5	P	11/16"	3.50	1.5	Hy.	15	F	1-1/16"	1.92
7.07	Hy.	30.5	P	1-1/4"	3.02	266	M.H.	16.5	P	1"	2.16	22	M.H.	4.1	P	11/16"	3.50	2	Hy.	16.5	F	1-1/16"	1.92
6.88	Hy.	29	P	1-1/4"	3.02	248	M.H.	16	P	1"	2.16	20	M.H.	3.9	P	11/16"	3.50	2.5	Hy.	24.3	F	1-1/16"	1.92
3.11	Hy.	50	P	1-1/4"	2.60	232	M.H.	15.5	P	1"	2.16	19	M.H.	3.8	P	11/16"	3.50	3	Hy.	26.2	F	1-1/16"	1.92
2.91	Hy.	48	P	1-1/4"	2.60	206	M.H.	15	P	1"	2.17	17	M.H.	3.7	P	11/16"	3.50	4	Hy.	25.7	F	1-1/16"	1.92
2.64	Hy.	46	P	1-1/4"	2.60	196	M.H.	14.5	P	1"	2.16	15	M.H.	3.6	P	11/16"	3.50	5	Hy.	18.8	F	1-1/16"	1.92
2.42	Hy.	43.5	P	1-1/4"	2.60	184	M.H.	14	P	1"	2.16	14	M.H.	3.3	P	11/16"	3.50	8	Hy.	35	F	1-1/16"	1.92
2.27	Hy.	43	P	1-1/4"	2.60	167	M.H.	13.5	P	1"	2.16	12	M.H.	3.1	P	11/16"	3.50			(±10%)			
2.19	Hy.	40	P	1-1/4"	2.60	157	M.H.	13	P	1"	2.16	11	M.H.	2.9	P	11/16"	3.50						
1.98	Hy.	41	P	1-1/4"	2.60	147	M.H.	12.5	P	1"	2.16	10	M.H.	2.8	P	11/16"	3.50						
1.81	Hy.	38	P	1-1/4"	2.60	138	M.H.	12	P	1"	2.16	9	M.H.	2.7	P	11/16"	3.50						
1.66	Hy.	37	P	1-1/4"	2.60	126	M.H.	11.5	P	1"	2.16	8	M.H.	2.6	P	11/16"	3.50						
1.48	Hy.	36	P	1-1/4"	2.60	110	M.H.	11	P	1"	2.16	7	M.H.	2.5	P	11/16"	3.50						
1.43	Hy.	36	P	1-1/4"	2.60	106	M.H.	11	P	1"	2.16	6	M.H.	2.4	P	11/16"	3.50						

CORE DETAILS
P = Permalloy
F = Ferrite
I = Powdered Iron

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1 — 24 . . . . . LIST
25 — 99 . . . . . LESS 15%
100 — 249 . . . . . LESS 20%
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58.2 Hy. to 10.5 Hy. Tolerance ± 5%
Ferrite Core — Inductance Tolerance ± 5%

OSCILLATORS

TYPE "C" AUDIO OSCILLATOR

This compact unit is designed for applications that have moderate requirements for stability in respect to temperature and frequency drift. The transistorized package is completely encapsulated and provides a construction that is extremely rugged.

SPECIFICATIONS

Frequency — Any frequency from 15 Hz. to 10 kHz.
Frequency Accuracy — ± .2% of specified frequency with 12V. D.C. input, resistive load of 200K ohms and 24° C. ambient.
Frequency Drift — Approximately 1% from -20°C. to +45°C. Less than 0.3% with input voltages from 10 to 14V. D.C.
Frequency Adjustment Range (using external components) — ± 2.0% (see arrangements two and three below)
Input Voltage — 5 to 15V. D.C.
Input Current — Does not exceed 5 ma. @12V. D.C.
Output Voltage — Proportional to input voltage. Typically 1.5 to 2.0V. RMS with 12V. D.C. input and load resistance of 200K ohms.
Output Wave Shape — Sinusoidal. Total distortion approximately 2.0% with 12V. D.C. input.
Dimensions — 15 — 249 cps. 4 3/8" x 2 13/16" x 1½"
250 — 10,000 cps. 3 9/16" x 2½" x 1 1/8"

The Type "C" oscillators can be produced in the following arrangements:

1. Any specific frequency in the range at an ambient temperature of 24° C. and with no provision for frequency adjustment.
2. Provision for frequency adjustment of ±2% of a specified frequency by means of an externally connected capacitor (Type "C"). A capacitor will be furnished which will provide the specified frequency at 24° C. ambient.
3. Provision for continuously variable frequency adjustment of ± 2% of a specified frequency by means of an externally connected variable resistance and a fixed capacitor. External components not furnished but component values are specified. This feature is very convenient when a "front panel" fine adjustment of frequency is desirable.

PRICE — Order by specifying type, frequency and arrangement number.

Frequency	Price
15 — 20 Hz.	$39.20
21 — 100 Hz.	$26.50
101 — 500 Hz.	$21.20
501 — 10,000 Hz.	$26.50

QUANTITY DISCOUNT
Discount is applicable for quantities of one frequency only.

Quantity	Discount
1 — 10	Net
11 — 50	Less 15%
51 — 99	Less 20%
100 — up	Less 25%

TYPE "P" SINE WAVE OSCILLATOR

A plug-in unit with a standard octal tube base type connector. A knurled thumbscrew type adjustment on top of the unit provides for variable, fine adjustment of frequency. . . cent of the specified frequency.

SPECIFICATIONS

Frequency — Any frequency from 20Hz. to 200 kHz.
Frequency Drift — Approximately 1% from -20° C. to +45°C. Less than 0.3% with input voltages from 10 to 14V. D.C.
Input Voltage — 5 to 15V. D.C.
Input Current — Does not exceed 5 ma. @ 12V. D.C.
Output Voltage — Proportional to input voltage. Typically 1.5 to 2.0V. RMS, with 12V. D.C. input and load resistance of 200K ohms.
Output Wave Shape — Sinusoidal. Total distortion approximately 2.0% with 12V. D.C. input.
Dimensions — Mounting area — 2 3/16" square. Overall height — 4 3/4" max. Height above octal mounting socket — 4" max.

PRICE — $35.00. Order by specifying type and frequency.
QUANTITY DISCOUNT—Same discount schedule as Type "C"

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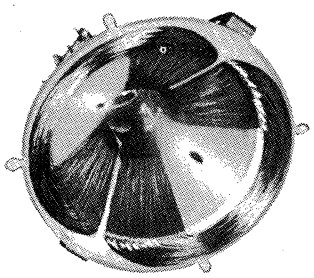
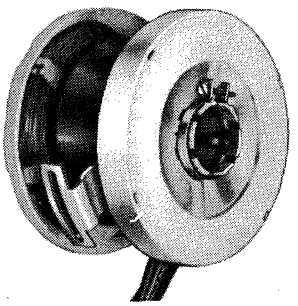
Amperex Video Display Devices

MAGNETIC DEFLECTION YOKES



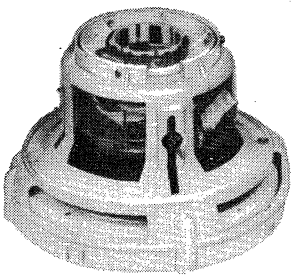
SERIES AT1040

Amperex B & W Line Deflection Yokes has been designed for use with 90° and 110° picture tubes having a neck diameter of 28mm. They employ saddle shaped line coils and toroidal frame coils with coinciding deflection centers. They have been designed for operation with tube-equipped or transistor-equipped TV.



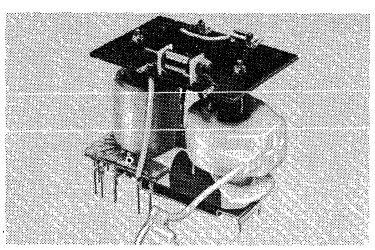
SERIES AT1055

Amperex Color Line of Deflection Yokes consists of two major groups. Variations of our **Compact** color deflection yoke AT1055 Series can be used on 14-25 inch 90° shadow mask color CRTS. This yoke employs saddle horizontal and vertical coils isolated by means of non-flammable polypropylene shell-liners. The horizontal and vertical coils are connected in series, but can be parallel connected upon request.



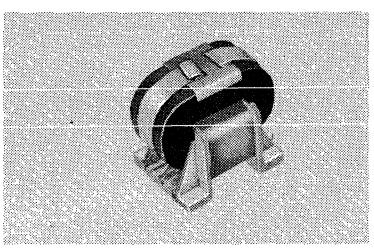
SERIES AT1022

Amperex Second Major Line of Color Deflection Yokes is our AT1022 Series. This professional series is aimed at monitor manufacturers requiring a high quality product. Designed for 90° shadow mask color CRT sizes 18-25" offering very tight tolerances. This yoke is designed to be rotated and oriented within its own mechanical housing.



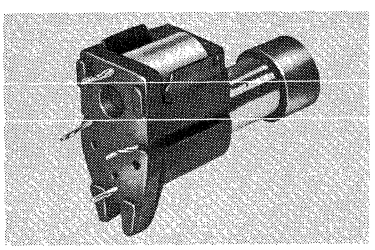
HORIZONTAL OUTPUT TRANSFORMERS: TYPE AT2083

Two types available. 3rd harmonic and 5th harmonic tuned 20-25 KV execution. Both types are of flame proof construction. Both executions are designed for use in color TV receivers.



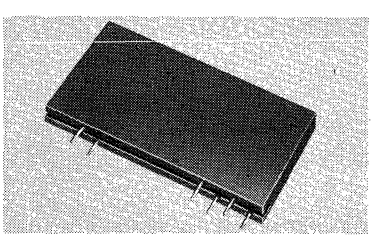
VERTICAL OUTPUT TRANSFORMERS: TYPE AT3513

Amperex AT3513 vertical output transformer is designed for tube equipped and transistorized television receivers. This output transformer is intended for use with 19 and 23 inch 110° CRTS, in conjunction with the Amperex Deflection Yoke AT1040. The magnetic circuit is comprised of 2 C-cores and three separate windings.



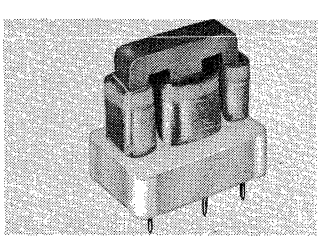
ADJUSTABLE LINEARITY CONTROL: TYPE AT4042/20

This unit has been designed for use in color TV circuits to adjust the linearity of the line deflection. It consists of a coil wound about a FERROXCUBE rod and three FERROXDURE magnets. This control is adjustable by means of a rotating magnet which adjusts the biasing field and thus the linearity of the line deflection.



DELAY LINES: (TYPE DL40 ILLUSTRATED)

Two types of Glass Delay Lines are available from Amperex. Both D. lines are intended for use in decoded circuits of color TV receivers. For receivers up to European PAL standard the nominal frequency of these lines is 4.433619 MHz and the phase delay time is 63.943 microseconds.



PINCUSHION TRANSDUCTOR: TYPE AT4041

This transductor is used in conjunction with deflection circuitry for large screen color television to correct for North-South and East-West distortion. Only device of its type, offering four-way correction. An amplitude control is also available to vary the amount of correction. Will replace active circuits performing same task.

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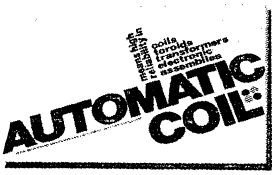
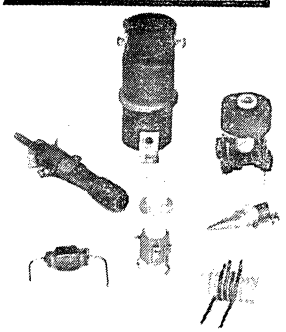
SPECIAL ASSEMBLIES

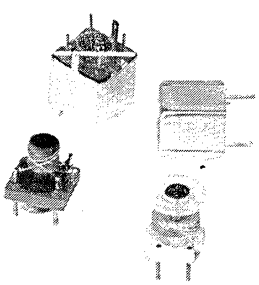


Automatic Coil, with nearly 20 years of experience, is a reliable source of standard RF coils, transformers, toroids and filters. And an innovative source of custom designed components and assemblies. Write for free catalog.



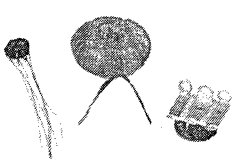
COMMERCIAL IF COILS

Printed Circuit and Panel Mount IF's for use in home entertainment industry.



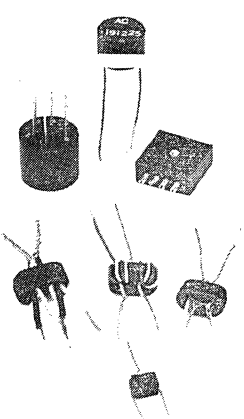
VARIABLE RF COILS — MINIATURE PRINTED CIRCUIT

For both military and commercial applications where small size is desirable. Available in 5/16", 3/8" and 13/32" square sizes.



OPEN CONSTRUCTION TOROIDS

Precision toroids fabricated to exacting customer specifications.

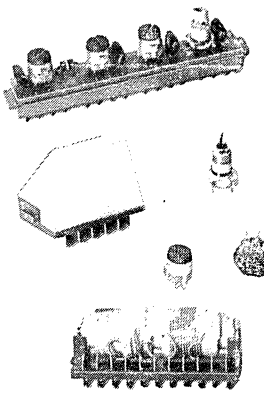


ENCAPSULATED TOROIDS

For both military and commercial applications. Fabricated and encapsulated to customer specifications.

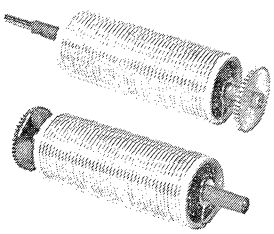
BALUN TRANSFORMERS

Miniature and sub-miniature line matching transformers for use in tuner and antenna applications.



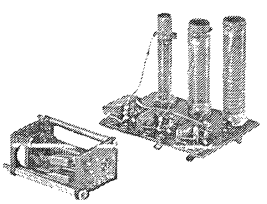
COIL ASSEMBLIES

Shown here are typical special coil assemblies manufactured for use in the U.S. Navy WRC-1 Receiver-Transmitter System. (Receiver R1051 Transmitter 827, Amplifier AM-3007. Antenna Coupler CU-937).



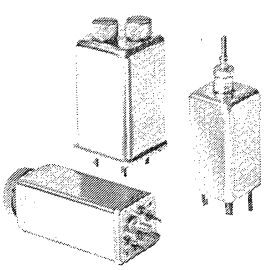
RF COIL ASSEMBLIES

These high frequency, precision coil assemblies are produced for the U.S. Navy PRC-47 Personnel Radio Communication System.



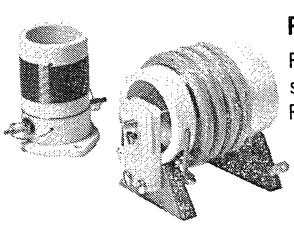
VARIABLE PITCH COILS

Complete facilities for variable pitch winding, to customer's specific requirements.



R-F & I-F XFMRS

Hermetically sealed R-F and I-F transformers for military and high quality commercial applications.



R-F HIGH VOLTAGE XFMRS

Radio frequency high voltage power supply transformers used on the Radar Jitter Tester.

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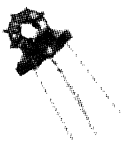
TOROIDAL INDUCTORS AND TRANSFORMERS



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On 0.1 Radius

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Stock No.	Impedance Ratio Primary: Secondary	Primary Inductance Microhenries	Primary Q	Primary DCR Ohms
6266	4:1	3.4	80	.04
6306	4:1	.80	165	.06
6305	4:1	.25	60	.05

HIGH Q TOROIDAL INDUCTORS

1 uH - 25 uH — 10% Tolerance

Stock No.	Inductance Microhenries	Nom. Q	Nominal D.C. Res. Ohms	Wire Size AWG
6315-1	.10	100	.01	24
6315-2	.22	120	.02	26
6315-3	.33	137	.03	28
6315-4	.47	133	.03	28
6315-5	.68	138	.08	33
6315-6	1.0	115	.10	33
6315-7	2.2	142	.14	33
6315-8	3.3	148	.20	33
6314-1	1.0	135	.02	28
6314-2	2.2	162	.10	33
6314-3	3.3	170	.11	33
6314-4	4.7	180	.14	33
6314-5	7.5	190	.16	33
6314-6	10	118	.18	33
6313-1	4.7	95	—	7/44
6313-2	7.5	78	—	7/44
6313-3	10	130	—	7/44
6313-4	15	125	—	7/44
6313-5	20	130	—	7/44
6313-6	25	150	—	7/44

ALSO AVAILABLE:

- Toroidal Power Inductors
- D.C. to D.C. Converter Transformers
- Saturable Reactors

Send Us Your Requirements

Caddell-Burns offers 25 years of experience in the design and manufacture of coils and transformers for industry and defense. We specialize in the manufacture of coils and electronic assemblies to the most rigid military specifications.

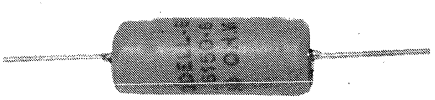
A few of our products:

FERRITE POT-CORE ASSEMBLIES
I.F. TRANSFORMERS
EPOXY ENCAPSULATED COIL ASSEMBLIES
BROADBAND MATCHING TRANSFORMERS
ANTENNA COILS AND TRANSFORMERS
OSCILLATOR COILS
BFO TRANSFORMERS
INVERTER-CONVERTER TRANSFORMERS
DELAY LINES
DIFFERENTIAL TRANSFORMERS
FILTERS (HIGH, LOW, BAND-PASS; TRAPS)
PHOTO-FLASH TRIGGER TRANSFORMERS
PULSE TRANSFORMERS

AND PARTS:
COIL FORMS AND BUSHINGS
SHIELD CANS
SPADE BOLTS AND MOUNTING HARDWARE
TUNING CORES
CUP CORES, POT CORES, TOROIDS
TERMINALS AND TERMINAL BOARDS
R. F. VARNISH, AND OTHER PARTS

Send for Catalog and Price List

TYPE 6150



HIGH CURRENT, VINYL JACKETED CHOKE
.375 Dia. x 1.00 L.
FERRITE FORM
10 uH - 100 uH • 10% Tolerance

Stock No.	Inductance Microhenries	Max. D.C. Res. Ohms	Current Rating Amps.	Min. Q	Wire Size AWG
6150-1	10.0	0.020	10.0	32	18
6150-2	20.0	0.035	6.0	25	20
6150-3	30.0	0.060	4.0	28	22
6150-4	40.0	0.105	2.5	30	24
6150-5	50.0	0.110	2.5	20	24
6150-6	75.0	0.180	1.5	25	26
6150-7	100.0	0.360	1.0	30	28

MINIATURE CHOKES

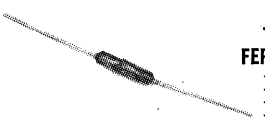
TYPE 6374

MICRO-MINIATURE CHOKE
.063 Dia. x .105 L.
POWDERED IRON FORM
.12 uH - 2.6 uH
10% Tolerance

Stock No.	Inductance Microhenries	Q	SRF MHz	DCR Ohms
6374-1	.12	60	>400	.023
6374-2	.16	60	>400	.024
6374-3	.20	70	>400	.025
6374-4	.24	70	>400	.026
6374-5	.29	80	>400	.027
6374-6	.37	80	>400	.028
6374-7	.44	85	>400	.029
6374-8	.53	75	340	.030
6374-9	.61	75	280	.032
6374-10	.70	80	230	.033
6374-11	.81	70	185	.034
6374-12	.92	75	160	.035
6374-13	1.0	55	140	.036
6374-14	1.2	55	130	.039
6374-15	1.4	55	120	.042
6374-16	1.7	55	110	.045
6374-17	2.0	55	100	.049
6374-18	2.3	55	90	.052
6374-19	2.6	55	80	.055

Available with #40 AWG Self Leads or #30 AWG Radial Leads on 0.1 Centers.

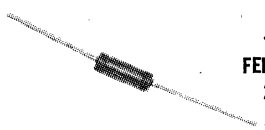
TYPE 620



.075 Dia. x .344 L.
FERRITE FORM
1 uh - 100 uH
10% Tolerance

Stock No.	Inductance Microhenries	Q	SRF MHz	D.C. Res.	Wire Size AWG
620-1	1	40	235	.12	36
620-2	2.5	40	150	.19	36
620-3	5	40	100	.26	36
620-4	7.5	40	90	.33	36
620-5	10	45	75	.38	36
620-6	15	60	60	.66	38
620-7	20	55	53	.80	38
620-8	25	50	49	.93	38
620-9	50	90	34	2.85	42
620-10	75	90	28	5.80	44
620-11	100	90	23	7.50	44

TYPE 659



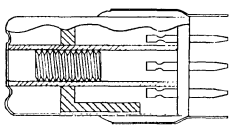
.107 Dia. x .330 L.
FERRITE FORM
250 uH - 10 mH
10% Tolerance

Stock No.	Inductance Microhenries	Q	SRF MHz	D.C. Res.	Wire Size AWG
659-1	250	50	3	1.8	36
659-2	500	45	2	3.5	38
659-3	1000	60	—	10	40
659-4	2500	55	—	30	42
659-5	5000	50	—	40	44
659-6	10000	45	—	68	44

CADDELL-BURNS

40 East 2nd Street • Mineola, N.Y. 11501 • Area Code 516 746-2310

SHIELDED TRANSFORMER AND VARIABLE INDUCTOR ASSEMBLIES

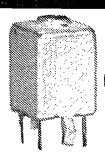


Magnetic Shield Minimizes Radiation, Improves Q, Increases Inductance Range

Nylon Coil Form • P.C. Mounting
INDUCTANCE RANGES: .08 uH - 10 mH
Q to 145

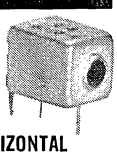
VARIABLE INDUCTORS

TYPE 6319 - 6320



6319 .420 Sq. x .575 L.

VERTICAL MOUNT



6320

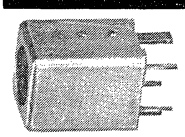
HORIZONTAL MOUNT

Electrical Specifications for Both Types are Identical

Stock No.	Inductance Range Microhenries Min.	Max.	Q′	Q″	Wire Size AWG
6320-1	.25	.65	90	50	26
6320-2	.5	1.2	87	68	30
6320-3	.9	2.3	90	63	32
6320-4	2.0	5.3	68	70	36
6320-5	4.4	10	56	102	7/44
6320-6	8	16	48	100	7/44
6320-7	13	29	70	97	7/44
6320-8	23	54	58	80	7/44
6320-9	45	95	60	70	7/44
6320-10	77	155	35	65	39
6320-11	125	290	41	60	39
6320-12	230	520	42	54	39
6320-13	420	860	41	47	39
6320-14	700	1200	39	52	39

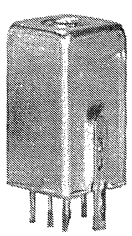
VARIABLE INDUCTORS

TYPE 6380



.545 Sq. x .688 H.

Stock No.	Inductance Range Microhenries Min.	Max.	Q′	Q″	DCR Ohms	Wire Size AWG
6380-1	.08	.11	70	85	.006	22
6380-2	.10	.17	85	100	.007	22
6380-3	.13	.23	85	100	.008	22
6380-4	.17	.28	95	105	.009	22
6380-5	.25	.44	100	110	.014	24
6380-6	.29	.53	105	110	.016	24
6380-7	.48	.84	105	105	.045	28
6380-8	.71	2.5	100	95	.081	.30
6380-9	1.8	5.7	60	105	.460	7/44
6380-10	4.5	14	60	130	.755	7/44
6380-11	12	40	70	125	1.30	7/44
6380-12	30	99	70	100	2.10	7/44
6380-13	73	190	65	125	3.29	7/44
6380-14	148	370	80	125	4.92	7/44



PROTOTYPE DESIGN KIT
.545 Sq. x 1.00 H.

TYPE 6370

The C-B 6370 Multitran Assembly provides the engineer with a flexible approach to R.F. and I.F. transformer design. The 6370 assembly is available with a choice of shielding cups (powdered iron or ferrite) and tuning cores in a wide range of sizes and materials. Type 6373 coils, designed for use in the 6370 assembly, are wound on slip-tubes and may be moved on the coil form, permitting precise adjustment of coupling and bandwidth. Or the coils may be used singly for the design of tuned circuits,

When an optimum design has been established, we will manufacture transformers, to specification, in any quantity.

TYPE 6373
COILS for C-B 6370 ASSEMBLY

Stock No.	Nom. Induct. Microhenries	Q @ L Nom.	Inductance Range Min.	Max.	DCR Ohms	Wire Size AWG
6373-1	.10	100	.08	.14	.007	22
6373-2	.25	110	.22	.37	.020	26
6373-3	.50	115	.41	.73	.032	26
6373-4	1.0	100	.37	1.25	.060	30
6373-5	2.5	108	.90	3.30	.240	10/44
6373-6	5.0	118	1.41	6.00	.310	10/44
6373-7	10	110	4.20	17	.919	7/44
6373-8	25	140	10	38	1.14	7/44
6373-9	50	135	14	60	1.45	7/44
6373-10	100	135	35	125	2.27	7/44
6373-11	250	145	96	330	3.70	7/44
6373-12	500	130	150	640	4.92	7/44
6373-13	1000	105	215	1200	9.19	5/44
6373-14	2500	108	610	3000	14.8	5/44
6373-15	5000	100	1000	6000	21.5	5/44
6373-16	10000	70	2450	12000	51.2	39

FERRITE SHIELDED CHOKES

- Low D.C. Resistance
- High Inductance
- Minimum External Field

TYPES 6375, 6376

1 uH - 5 mH • 10% Tolerance
.156 Dia. x .375 L.

Stock No.	Induct. Micro-henries	Q	SRF MHz	DCR Ohms	Wire Size AWG
6375-1	1	65	250	.005	34
6375-2	2.5	55	145	.008	34
6375-3	5	45	105	.012	34
6375-4	10	78	70	.042	39
6375-5	25	64	45	.066	39
6375-6	50	70	33	.125	40
6375-7	100	85	25	.284	40
6376-1	100	58	8	.530	36
6376-2	250	62	3.5	.800	36
6376-3	500	62	2.5	1.70	38
6376-4	1000	58	1.1	3.90	40
6376-5	2500	62	.700	6.30	40
6376-6	5000	55	.610	14.0	42

TYPE 1670

.25 mH - 100 mH • 10% Tolerance
.250 Dia. x .500 L.

Stock No.	Induct-ance Milli-henries	Min. Q	A.C. Test Volts	Max. D.C. Res. Ohms	Cur-rent Rating MA	Wire Size AWG
1670-1	.25	3.0	.007	.22	800	28
1670-2	.50	3.0	.014	.40	500	30
1670-3	1.0	3.0	.028	.75	315	32
1670-4	2.5	3.5	.07	2.2	250	33
1670-5	5.0	3.5	.14	3.9	200	34
1670-6	10.0	3.5	.15	7.0	125	36
1670-7	25.0	3.5	.30	18	125	36
1670-8	50.0	4.0	.40	35	75	38
1670-9	100.0	4.0	.24	60	50	40

TYPE 1662

5 mH - 1000 mH
10% Tolerance
.500 Dia. x .750 L.

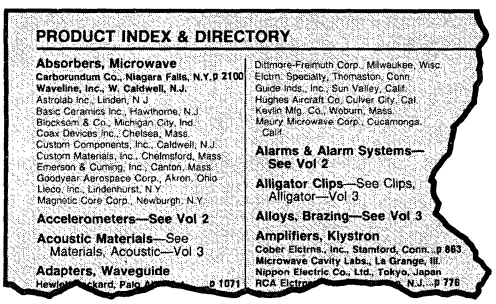
Stock No.	Induct-ance Milli-henries	Min. Q	A.C. Test Volts	Max. D.C. Res. Ohms	Cur-rent Rating MA	Wire Size AWG
1662-1	5.0	10.0	.14	.75	800	28
1662-2	10.0	10.0	.16	2.2	500	30
1662-3	25.0	10.0	.32	4.0	315	32
1662-4	50.0	10.0	.42	9.5	200	34
1662-5	100.0	10.0	.24	26	125	36
1662-6	250.0	10.0	.40	50	75	38
1662-7	500.0	10.0	.46	150	50	40
1662-8	1000.0	10.0	.25	220	30	42

ALL COILS ON THIS AND OPPOSITE PAGE ARE ALSO AVAILABLE: • TO HIGHER, INTERMEDIATE, OR LOWER INDUCTANCES.
• ENCAPSULATED OR WITH SPECIAL COATINGS.

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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Astrolab Inc., Linden, N.J.
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Bigelsom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
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Kevlin Mfg. Co., Woburn, Mass.
Meury Microwave Corp., Cucamonga, Calif.

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Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

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Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn. ... N.J. ... p 776

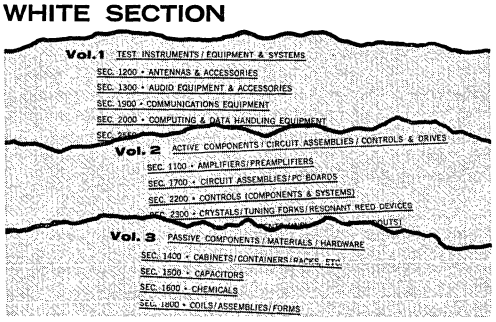
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

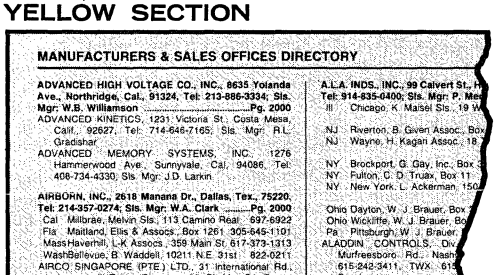
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolande Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St, 617-373-1313
Wash Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22; Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, GA... PRODS. DEPT., 900 Theres... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mes...
Ill Chicago, K. Maisel Sls., 19 W...
NJ Riverton, B. Gwen Assoc., Box...
NJ Wayne, H. Kagan Assoc., 18...
NY Brockport, G. Gay, Inc., Box 3...
NY Fulton, C. D. Truax, Box 11...
NY New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div... Murfreesboro, Rd., Nash... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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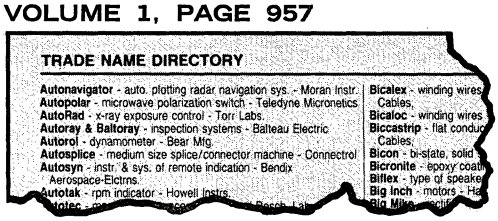

TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotec - ...
Bicalex - winding wires, Cables,
Bicaloc - winding wires
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike - ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

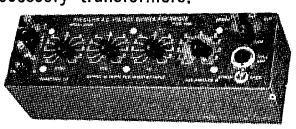
Coast Coil

AFFILIATE OF ADAMS-MAXWELL INC.
5333 WEST WASHINGTON BOULEVARD / LOS ANGELES, CALIFORNIA 90016
PHONE (213) 936-6188

PRECISION AC VOLTAGE DIVIDER AND BRIDGE, MODEL 2200

This compact, inexpensive unit contains a precision AC voltage divider and bridging transformer. This combination forms the essential circuitry of a precision AC bridge. The divider may be used for precision attenuation of a voltage; for calibrating and checking resolvers, meters, potentiometers; for the measurement of voltage ratios, especially transformer turns ratios. It's indispensible in the lab. The unit will serve in place of the expensive 6 and 7 decade units for 90% of measurements.

Basic accuracy is 0.004%. Resolution is 0.0005%. Models cover 50Hz to 10,000Hz. Input voltage ratings to 2.5X input frequency are available. Input signal conditioning (scaling) transformers are available and add to flexibility. Size is 12⅜"x3⅞"x3½" (less terminals). Weight is 5½ lbs. Available also in panel mounting version with or without accessory transformers.



Ask for:
Bulletin PAVD: Precision AC voltage divider
Bulletin BT: Bridging Transformers
Bulletin ST: Scaling Transformers
Bulletin AFBM: Application Notes

BRIDGING TRANSFORMERS

Ask for:
Bulletin BTI: Model 2100 Bridging Transformer
Bulletin BT2: Ultra Precision Bridging Transformer
Bulletin AFBM: Application Notes

Bridging transformers are used to provide coupling between isolated branches of an AC circuit. Typical applications include bridging networks and as signal pickoff. When used with AC voltage dividers, a bridging transformer designed to utilize the low output impedance of the divider can provide excellent guarding and high accuracy.

The Model 2100 series of bridging transformers has been designed to achieve optimal properties when used with AC voltage dividers. Data is supplied showing the additional error contribution of the bridging transformer as a function of circuit parameters. Sizes is 2⅜"x 2⅜"x1".

These inexpensive transformers are useful in a variety of circuit applications where AC signal isolation is needed.

CUSTOM FILTERS (AMI)

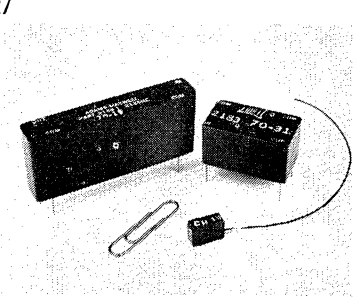
Our filter design engineer is one of the finest in the business. In addition to knowing filters, he knows systems and understands the total picture. This is vital to good filter design. Basically, all work is done by computerized design routines including ECAP and proprietary programs. Our breadboarding expertise as used with the powerful analytical techniques available to us allows the solution of the most difficult problems. We pioneered in the use of miniature inductors and chip caps in sub-miniature filters.

Your requirements will receive our immediate attention.

Filter Types: Band Pass, Low Pass, High Pass, Band Stop, Delay Lines, Matched Filters

Filter Functions: Bessel, Butterworth-Thompson, Tchebycheff, Elliptic, Hybrid

Specialties: Miniature VCO low pass
Precision Pairs — Phase match and tracking
MIL-F-18327



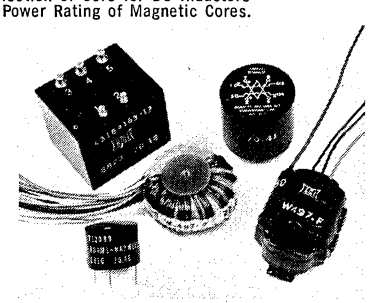
Ask for:
Bulletin CF: Capabilities

CUSTOM MAGNETIC COMPONENTS

Since 1951, the Coast Coil Co. has been a prime West Coast source for custom magnetic components. Over the years, the company has solved some of the knotiest magnetics problems around. May Coast Coil suggest to you your consideration of its capability.

Types: Toroidal, Bobbin, Multiple, Open Frame, Encapsulated, Hermetically Sealed
Families: Inductors, Transformers, Reactors, Coils
Sizes: To 10Kva
Services: MIL-T-27, MIL-I-45208, High-Rel, NASA
Specialties: Converter-Inverter, Toroidal, High Voltage Toroidal, Precision Ratio, Quick Prototype delivery

Write for our facilities brochure. Also available:
Bulletin DCI: Selection of Core for DC Inductors
Bulletin PRIAL: Power Rating of Magnetic Cores.



DECADE INDUCTOR

Write for **Bulletin DI-1.**

The Models 100, 101 and 102 decade inductors are ideal units for general laboratory use. Small in size, yet high in performance, they serve as convenient circuit elements of inductance for work in the audio and ultrasonic frequency range.

Model 100: 10mH to 9.99H, steps of 10mH, 3 decades
Model 101: 1mH to 999mH, steps of 1mH, 3 decades
Model 102: 100 uH to 99.9mH, steps of 100 uH, 3 decades
Current Rating: $\frac{2000}{\sqrt{L}}$ ma max (2000ma below 1mH) (L in mH)
DC Resistance: 0.16 L ohms (L in mH)
Voltage Rating: 150 volts AC Max (see current rating)
Accuracy: 2%
Size: 6¼"x3¾"x2" (excluding knobs)

DECADE FREQUENCY DIVIDER

A compact, inexpensive accessory to use with your low frequency counter. It will extend the range to as high as 30MHz at a fraction of [illegible] vides input frequency by 10 or 100 with no loss of accuracy. Original counter resolution is unchanged. Indispensable in labs, communications, "Hams," etc.

Frequency Division: Model 500: 10:1, Model 501: 10:1 & 100:1
Frequency Range: 30 MHz Max at input
Input: Level: 10 mv to 10 volts, Impedance: 50 ohms or 5000 ohms
Output: 0.5 v RMS into 500 ohms
Power: 117 V, 50-400 Hz
Write for **Bulletin DFD.**

TURNS COUNTER FOR TOROIDAL WINDER

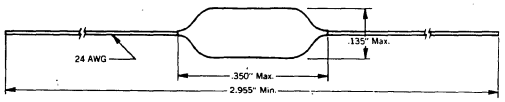
Coast Coil Co. has pioneered and patented the only real way to count the turns on a high speed toroidal coil winder. This equipment will count to 3000 Turns/Min using AWG 20 thru 50 and **never** miss. Dirty contacts, dirty apertures are a thing of the past. Essentially zero maintenance. Counter is adaptable to all machines: Gorman, Boesch, Universal and others.
Ask for **Bulletin TWC.**

DALE® for Optimum Value in Inductive Components

TYPE IR-2 EPOXY CONFORMAL COATED INDUCTORS

■ Designed primarily for commercial applications
■ Combines durability and low cost ■ Flame retardant coating

Standard tolerance: ±10%. **Inductance range:** .10 μh to 1000 μh. 49 standard values. Q, self-resonant frequency, DC resistance, rated current and core material as specified in MS-75083, 75084 and 75085.

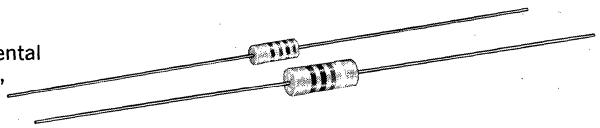


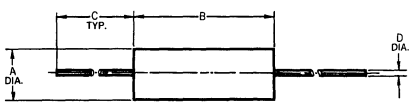
Maximum Dimensions: Body .350" L x .135" W with leads 2.955" L.

TYPE IM-2 and IM-4 MOLDED INDUCTORS

■ Designed to meet electrical, material, mechanical and environmental requirements of MIL-C-15305D ■ Features precision performance, reliability ■ Wide range of inductance values in a small package
■ Flame retardant molded coating

Standard values IM-2 (49) and IM-4 (47). Tolerance, Q, test frequency L & Q, self-resonant frequency, DC resistance, DC current rating and core material per standards shown in the Inductance Range and MIL Standard Chart below.





INDUCTANCE RANGE

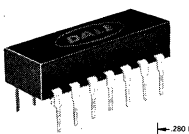
MODEL NO.	INDUCTANCE RANGE FROM	INDUCTANCE RANGE TO	CLASSIFICATION GRADE	CLASSIFICATION CLASS	MILITARY STANDARD
IM-2	.10 μh	1.00 μh	1	B	MS-75083
	1.2 μh	27. μh	1	A	MS-75084
	33. μh	1000. μh	1	A	MS-75085
IM-4	.15 μh	33. μh	1	B	MS-18130
	36. μh	240. μh	1	A	MS-90538

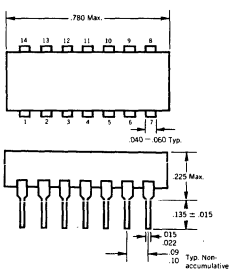
DIMENSIONS

MODEL NO.		A	B	C	D
IM-2	MAX.	.105	.260	1.626	.0215
	MIN.	.085	.240	1.250	.0185
IM-4	MAX.	.165	.385	1.626	.027
	MIN.	.145	.365	1.250	.023

TYPE PT 14 and PT 16 DIP PULSE TRANSFORMERS

■ Machine or hand insertable package designed to contain 3 pulse transformers (14 pin size) and 4 pulse transformers (16 pin size)
■ Fully sealed to permit cleaning in common solvents ■ Suitable for production soldering ■ Pulse transformers within the package designed with controlled precision characteristics to your requirements.





.300 between rows, pins on .100 centers.

TRANSFORMER SPECIFICATIONS

Electrical

Inductance Range: 1 μh to 2.0 mh
Temperature Range: −55°C to +125°C
Temperature Stability: ±10% standard, lower available
Tolerance: ±20% standard, lower available
Leakage Inductance: As low as 0.2% of inductance
Interwinding Capacitance: As low as 3 pf
ET Product: Up to 10 volt-microseconds
Dielectric Strength: 100 VRMS at 60 hz, winding to winding

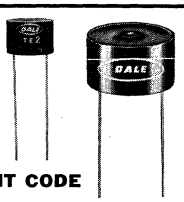
Material

Body: Molded plastic
Standard Terminals: Phosphor bronze, tin plated
Weight: Approximately 1 gram

NOTE
There is an inherent compromise between parameters which sometimes makes certain exact combinations unattainable.

TYPE TE-2, TE-3, TE-4 and TE-5 ENCAPSULATED TOROIDAL INDUCTORS

Epoxy encapsulated precision toroids designed to meet MIL-T-27C, Type TF5SX20ZZ for outstanding stability and performance under severe environmental conditions. Offers high Q and wide selection of Q vs frequency ranges, plus a large number of inductance values.



SPECIFICATIONS

DALE TYPE	INDUCTANCE	STANDARD TOLERANCE	TERMINAL SPACING	O.D.	HEIGHT	CENTER HOLE DIA.
TE-2Q0 TE-2Q3 TE-2Q4	50.0 μh to 10.0 mh 470 μh to 120 mh 1.00 mh to 250 mh	±1% > 2 mh ±2% 0.05 mh to 2.0 mh	.300"	.437"	.270"	–
TE-3Q0 TE-3Q3 TE-3Q4	50.0 μh to 15 mh 500 μh to 1 h 1 mh to 4 h	±1% > 2 mh ±2% 154 μh to 2 mh ±5% < 150 μh	.500"	.685"	.385"	.093"
TE-4Q0 TE-4Q3 TE-4Q4	150 μh to 20 mh 1 mh to 2 h 2 mh to 7.5 h	±1% > 2 mh ±2% < 2 mh	.900"	1.062"	.500"	.120"
TE-5Q0 TE-5Q3 TE-5Q4	1 mh to 100 mh 5 mh to 2 h 10 mh to 20 h	±1% > 2 mh ±2% < 2 mh	1.00"	1.320"	.725"	.144"

Within the inductance ranges shown above, Dale offers a wide choice of standard values each of which is within one percent of the preceding and succeeding values.

TEMPERATURE COEFFICIENT CODE (APPLIES TO CORE ONLY)

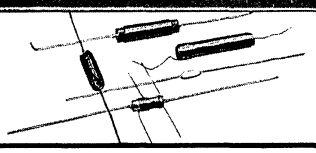
T.C. CODE	TEMPERATURE COEFFICIENT	TEMPERATURE RANGE	TYPE	T.C. AVAILABILITY Q0	Q3	Q4
TA	0±1%	−55°C to +125°C	All		X	X
TB	0±0.1%	+13°C to +35°C	TE-4 & 5		X	X
TD	0±0.1%	0°C to +55°C	All		X	X
TE	0±0.15%	0°C to +55°C	TE-4 & 5			X
TL*	+40 to +110 PPM/°C +85 to +185 PPM/°C	−55°C to +25°C +25°C to +85°C	TE-3, 4 and 5			X
TM	0±0.25%	−65°C to +125°C	All		X	X
TR	50 PPM/°C (Typical)	−65°C to +125°C	All	X		
TW	0±0.25%	−55°C to +85°C	All		X	X

*Inverse of typical temperature coefficient of polystyrene capacitor.

DALE® for Optimum Value in Inductive Components

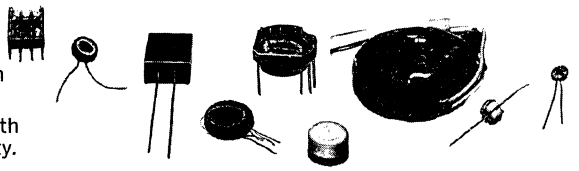
CUSTOM CHOKES

- Axial lead models
- Transformers on choke forms
- Universal wound models



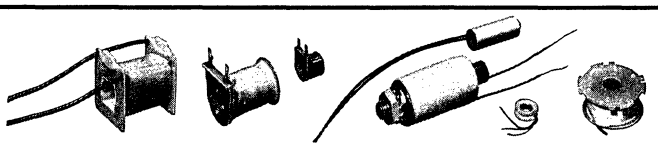
CUSTOM TOROIDS

- Potted with case sizes to fit your specific designs
- Open wound using Dale-formulated coatings for extra protection
- Hermetically-sealed cans
- Pulse transformers, inverters, RF inductors and transformers with or without terminal boards. Unusual shapes and sizes a specialty.



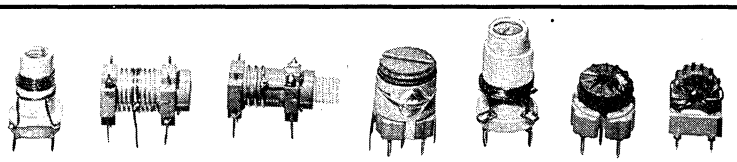
CUSTOM BOBBIN COILS

- Statistical control on high volume production items
- Low initial tooling cost



RF TRANSFORMERS & INDUCTORS

- Powdered iron bobbins
- Ceramic form types
- Molded solenoids
- P.C. cans & transformers

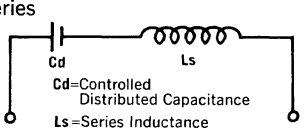


VARIABLE PITCH INDUCTORS

- Extensive design background in all sizes
- Complete engineering assistance

SERIES RESONANT TRAP

- Combines the electrical characteristics of an inductor and a capacitor in series
- Provides controlled self-resonance in a miniaturized circuit
- Saves space, reduces inventory
- Speeds assembly



BASIC SPECIFICATIONS

- Can be designed for any resonant frequency from .4 Mhz to 50 Mhz
- Impedance at design frequency: 15 ohms or less
- Impedance at ±50% of design frequency: 1500 ohms minimum
- Frequencies readily available: 10.7, 12, 14, 18 Mhz

TOUGH COIL JOBS?

Whether you need a hundred pieces or a million, we offer:

- Broad selection from standard lines, backed by men who believe in and give excellent customer service.
- Complete facilities to design, engineer and produce prototype quantities.
- Faster turn-around on custom samples and short run production quantities.
- Production engineering to translate your specifications into a product with optimum quality and economy.
- Development engineering to provide the electrical function you require.
- Design engineering to transform your basic idea into parts.
- Close production coordination including cost-saving statistical control on high volume items.
- Fulltime quality control personnel enable fast action in establishing military test procedures and in meeting other government requirements—including MIL-Q-9858.

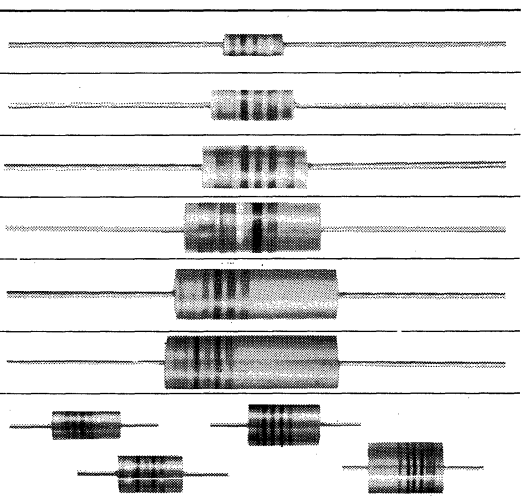
DALE ELECTRONICS, INC., P.O. BOX 180, YANKTON, SOUTH DAKOTA 57078
PHONE 605—665-9301 *A subsidiary of The Lionel Corporation*

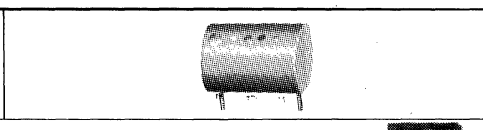
DELEVAN

COILS

Delevan Series Parts	Nominal Size Dia. - Length	Inductance Range UH	Number Values Available	Q Minimum Range	Military Designation
MICRO I ®					
100	.065 x .100 sq.	.015 - 10.0	30	35 - 40	——
150	.065 x .150 sq.	12.0 - 100	12	45	——
155	.075 x .160 sq.	.015 - 100	42	40 - 45	MS 15305
250	.065 x .250 sq.	120 - 1000	12	35 - 45	——
FIXED SERIES					
1025	.095 x .250	.10 - 1000.0	49	25 - 50	75083 75084 75085
1537	.155 x .375	.15 - 10,000	67	33 - 75	18130 90538
1840	.185 x .437	.15 - 27.0	25	35 - 65	75008
2150	.215 x .560	.47 - 39.0	26	35 - 70	90542
2500	.190 x .440	270 - 1000	16	60 - 65	90539
	.215 x .560	1000 - 3600	14	60 - 70	90540
	.240 x .740	3900 - 10,000	12	80	90541
2890	.280 x .900	1.2 - 120.0	25	40 - 95	91189
3500	.250 x .560	47 - 150	7	18 - 75	75052
	.310 x .560	180 - 390	5	75 - 80	75053
	.375 x .625	470 - 1000	5	70 - 80	75054
	.468 x .687	1500 - 10,000	8	70 - 85	75055
	.375 x .687	10,000	1	70	——
SHIELDED					
2610	.190 x .440	.10 - 100,000	61	18 - 67	—
2307	.157 x .395	.10 - 10,000	61	39 - 67	90537
1537-700	.155 x .375	.10 - 10,000	61	40 - 74	—
PLUG IN					
4500	.235 x .725	.47 - 39.0	20	35 - 60	18100- 1 - 20
	.282 x .625	47 - 150	7	15 - 60	18100-21 - 27
	.375 x .625	180 - 390	5	55 - 60	18100-28 - 32
	.437 x .625	470 - 1000	5	35 - 50	18100-33 - 37
	.500 x .825	1500 - 10,000	8	40 - 55	18100-38 - 42
2534	.250 x .345	100 - 150,000	39	< 10 - 80	——
VARIABLE					
4000/4100	.400 x .952	.18 - 70,000	62	20 - 110	90543 - 46
4450	.330 x .750	.10 - 1000	48	30 - 50	LT 4K
9405	.380 x .500	.10 - 10,000	31	38 - 110	——
9406	.375 sq. x .500	.10 - 10,000	31	38 - 110	——
TOROID					
2770	.700 x .400	1mH - 3H	46	30-67	—

Designed to fit inside or outside IC's.

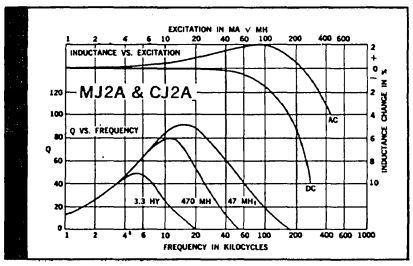


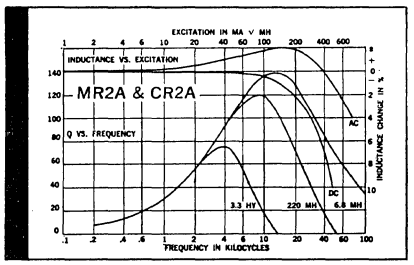


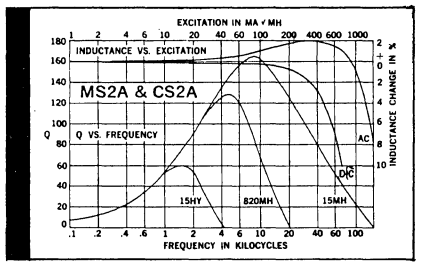
hisonic inc.

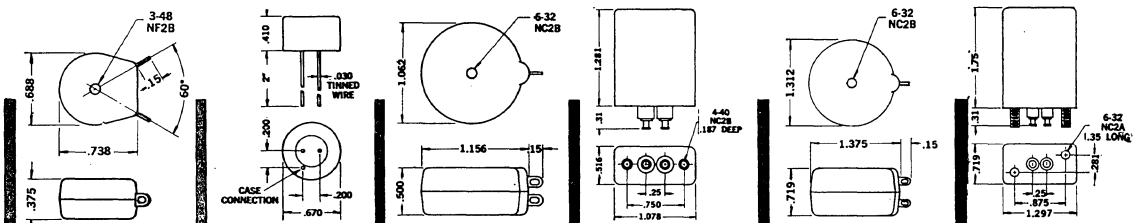
TOROIDAL INDUCTORS

Hisonic Toroidal Inductors are wound on either nickel-iron molybdenum (molybdenum permalloy) or carbonyl iron powder cores. Standard tolerance is 1% and values are true inductance. Units are available uncased, molded or cased as shown. Molded units are compression molded in high strength, high temperature thermosetting resin and pass requirements of MIL T 27 Grade 5 Class R. Cased units are hermetically sealed in shield cans and pass requirements of MIL T 27 Grade 4 Class R.









Ind. Val.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
5.6 MH	MJ2A41	CJ2A41	—	—	—	—
6.8 MH	MJ2A42	CJ2A42	MR2A42	CR2A42	MS2A42	CS2A42
8.2 MH	MJ2A43	CJ2A43	MR2A43	CR2A43	MS2A43	CS2A43
10 MH	MJ2A44	CJ2A44	MR2A44	CR2A44	MS2A44	CS2A44
12 MH	MJ2A45	CJ2A45	MR2A45	CR2A45	MS2A45	CS2A45
15 MH	MJ2A46	CJ2A46	MR2A46	CR2A46	MS2A46	CS2A46
18 MH	MJ2A47	CJ2A47	MR2A47	CR2A47	MS2A47	CS2A47
22 MH	MJ2A48	CJ2A48	MR2A48	CR2A48	MS2A48	CS2A48
27 MH	MJ2A49	CJ2A49	MR2A49	CR2A49	MS2A49	CS2A49
33 MH	MJ2A50	CJ2A50	MR2A50	CR2A50	MS2A50	CS2A50
39 MH	MJ2A51	CJ2A51	MR2A51	CR2A51	MS2A51	CS2A51
47 MH	MJ2A52	CJ2A52	MR2A52	CR2A52	MS2A52	CS2A52
56 MH	MJ2A53	CJ2A53	MR2A53	CR2A53	MS2A53	CS2A53
68 MH	MJ2A54	CJ2A54	MR2A54	CR2A54	MS2A54	CS2A54
82 MH	MJ2A55	CJ2A55	MR2A55	CR2A55	MS2A55	CS2A55
100 MH	MJ2A56	CJ2A56	MR2A56	CR2A56	MS2A56	CS2A56
120 MH	MJ2A57	CJ2A57	MR2A57	CR2A57	MS2A57	CS2A57
150 MH	MJ2A58	CJ2A58	MR2A58	CR2A58	MS2A58	CS2A58
180 MH	MJ2A59	CJ2A59	MR2A59	CR2A59	MS2A59	CS2A59
220 MH	MJ2A60	CJ2A60	MR2A60	CR2A60	MS2A60	CS2A60
270 MH	MJ2A61	CJ2A61	MR2A61	CR2A61	MS2A61	CS2A61
330 MH	MJ2A62	CJ2A62	MR2A62	CR2A62	MS2A62	CS2A62
390 MH	MJ2A63	CJ2A63	MR2A63	CR2A63	MS2A63	CS2A63
470 MH	MJ2A64	CJ2A64	MR2A64	CR2A64	MS2A64	CS2A64
560 MH	MJ2A65	CJ2A65	MR2A65	CR2A65	MS2A65	CS2A65
680 MH	MJ2A66	CJ2A66	MR2A66	CR2A66	MS2A66	CS2A66
820 MH	MJ2A67	CJ2A67	MR2A67	CR2A67	MS2A67	CS2A67
1.0 HY	MJ2A68	CJ2A68	MR2A68	CR2A68	MS2A68	CS2A68
1.2 HY	MJ2A69	CJ2A69	MR2A69	CR2A69	MS2A69	CS2A69
1.5 HY	MJ2A70	CJ2A70	MR2A70	CR2A70	MS2A70	CS2A70
1.8 HY	MJ2A71	CJ2A71	MR2A71	CR2A71	MS2A71	CS2A71
2.2 HY	MJ2A72	CJ2A72	MR2A72	CR2A72	MS2A72	CS2A72
2.7 HY	MJ2A73	CJ2A73	MR2A73	CR2A73	MS2A73	CS2A73
3.9 HY	—	—	MR2A75	CR2A75	MS2A75	CS2A75
4.7 HY	—	—	MR2A76	CR2A76	MS2A76	CS2A76
5.6 HY	—	—	MR2A77	CR2A77	MS2A77	CS2A77
6.8 HY	—	—	MR2A78	CR2A78	MS2A78	CS2A78
8.2 HY	—	—	—	—	MS2A79	CS2A79
10.0 HY					MS2A80	CS2A80
12.0 HY					MS2A81	CS2A81
15.0 HY					MS2A82	CS2A82

Above units also available in encapsulated construction with pin terminals arranged for printed circuit board applications. Write for information on 5101 - 5103 and 5105 series.

The above units represent only a small percentage of those available as standard from Hisonic, but represent those most commonly used. Thousands of additional standard inductors are available, one of which should meet your requirements. Special requirements get prompt and accurate development from Hisonic Custom Design Service.

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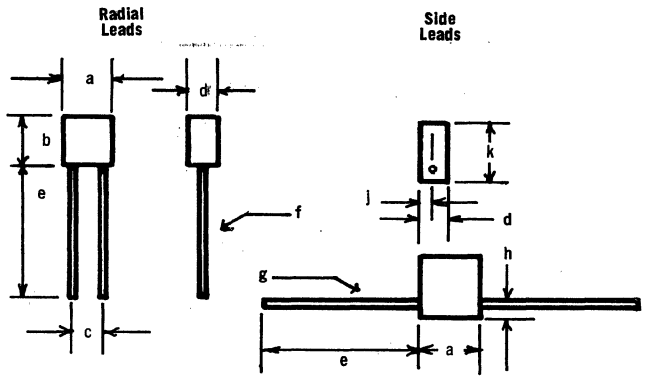


Encapsulated Subminiature and Miniature Toroidal Inductors

Features

- Applications: printed circuits and modules
- Environmental: designed to meet MIL-C-15305, Grade 1, Class B (−55°C to +125°C)
- Moisture and shock resistant, immersion proof
- Powdered iron toroidal core, low external magnetic field
- Identification: part number and inductance value printed in contrasting color

General Specifications (All Series)

Maximum operating temperature: 125°C
Rated temperature rise (at 90°C): 35°C
Dielectric withstanding voltage: 700 v rms
Terminal pull: 5 pounds
Altitude rating: 70,000 feet
Overload current: 1.4 times the rated current
Add Suffix -S to P/N for side leads configuration

T1 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test freq., MHz	Max. DC resist., ohms	Rated DC current mA
100066	0.01	60	150	0.02	3000
100067	0.012	60	150	0.02	3000
100068	0.015	60	150	0.02	3000
100069	0.018	60	150	0.02	3000
100070	0.022	60	100	0.02	3000
100071	0.027	60	100	0.02	3000
100072	0.033	60	100	0.02	3000
100073	0.039	60	100	0.02	3000
100074	0.047	60	100	0.02	3000
100075	0.056	60	100	0.02	3000
100076	0.068	60	100	0.03	2500
100077	0.082	60	100	0.04	2200
100078	0.10	80	50	0.04	2200
100079	0.12	80	50	0.05	2000
100080	0.15	80	50	0.06	1800
100081	0.18	80	50	0.07	1600
100082	0.22	80	50	0.08	1500
100083	0.27	80	50	0.10	1400
100084	0.33	80	50	0.12	1300
100085	0.39	80	50	0.15	1150
100086	0.47	80	50	0.20	1000
100087	0.56	70	50	0.25	900
100088	0.68	70	50	0.30	800
100089	0.82	70	50	0.35	750
100090	1.0	70	50	0.40	700

a	b	c	d	e	f	g	h	j	k
.2	.2	.1	.1	1.0	#24	#26	.05	.05	.26

Inductance Tolerances: 0.01 to 0.082 uh, ±20%; 0.10 to 1.0 uH, ±10%

T2 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test freq., MHz	Max. DC resist., ohms	Rated DC current mA
100092	0.10	55	25	0.04	2200
100093	0.12	60	25	0.05	2000
100094	0.15	60	25	0.06	1800
100095	0.18	60	25	0.07	1600
100096	0.22	65	25	0.08	1500
100097	0.27	65	25	0.10	1400
100098	0.33	65	25	0.11	1300
100099	0.39	65	25	0.14	1200
100100	0.47	65	25	0.17	1100
100101	0.56	70	25	0.22	1100
100102	0.68	70	25	0.27	900
100103	0.82	70	25	0.30	800
100104	1.0	70	25	0.35	750
100105	1.2	60	7.9	0.40	700
100106	1.5	60	7.9	0.50	630
100107	1.8	60	7.9	0.70	530
100108	2.2	60	7.9	0.90	470
100109	2.7	60	7.9	1.1	420
100110	3.3	60	7.9	1.3	390
100111	3.9	60	7.9	1.5	360
100112	4.7	60	7.9	1.8	330
100113	5.6	60	7.9	2.0	310
100114	6.8	60	7.9	2.2	300
100115	8.2	60	7.9	2.4	290
100116	10	60	7.9	2.6	280

a	b	c	d	e	f	g	h	j	k
.2	.2	.1	.1	1.0	#24	#26	.05	.05	.26

Inductance Tolerances: 0.10 to 0.82 uH, ±10%; 1.0 to 10 uH, ±5%.

T3 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test freq., MHz	Max. DC resist., ohms	Rated DC current mA
100117	10	75	2.5	1.1	550
100118	12	75	2.5	1.3	500
100119	15	75	2.5	1.5	450
100120	18	80	2.5	1.9	410
100121	22	80	2.5	2.3	380
100122	27	80	2.5	2.7	350
100123	33	80	2.5	3.3	320
100124	39	80	2.5	3.9	290
100125	47	80	2.5	4.7	260
100126	56	80	2.5	5.6	240
100127	68	80	2.5	6.8	220
100128	82	80	2.5	8.1	200
100129	100	80	2.5	9.7	180
100130	120	45	0.79	12	160
100131	150	45	0.79	14	150
100132	180	45	0.79	17	140
100133	220	50	0.79	20	130
100134	270	55	0.79	24	120
100135	330	55	0.79	19	130
100136	390	55	0.79	22	120
100137	470	55	0.79	27	110
100138	560	55	0.79	32	100
100139	680	55	0.79	19	130
100140	820	50	0.79	23	120
100141	1000	50	0.79	27	110

a	b	c	d	e	f	g	h	j	k
.27	.27	.2	.15	1.0	#22	#24	.05	.075	.33

Inductance Tolerance: ±5%; closer tolerances on request.

T4 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test freq., KHz	Max. DC resist., ohms	Rated DC current mA
100142	100	75	790	6	280
100143	120	75	790	7	260
100144	150	75	790	8	240
100145	180	75	790	10	220
100146	220	80	790	12	200
100147	270	80	790	14	180
100148	330	80	790	17	160
100149	390	80	790	20	150
100150	470	75	790	24	140
100151	560	75	790	28	130
100152	680	75	790	33	120
100153	820	75	790	39	110
100154	1000	75	790	45	100
100155	1200	45	250	31	120
100156	1500	45	250	37	110
100157	1800	50	250	44	100
100158	2200	50	250	52	90
100159	2700	50	250	61	85
100160	3300	50	250	71	80
100161	3900	50	250	82	75
100162	4700	50	250	93	70
100163	5600	45	250	105	65
100164	6800	40	250	140	60
100165	8200	40	250	160	55
100166	10000	50	250	180	50

a	b	c	d	e	f	g	h	j	k
.375	.375	.2	.187	1.0	#22	#24	.05	.093	.42

Inductance Tolerance: ±5%; closer tolerances on request.

MOLDED SHIELDED MINIATURE R F CHOKES

An extremely useful series of chokes where extraneous coupling presents problems in dense packaging. Electromagnetic shielding limits coupling to less than 3% when two units are placed side by side.

Part Number	MS Type	MS Type	Induct. Micro-henries ±10%	D.C. Resistance Max.	Milli-amp Rating Max.
9250-101	90537-1	75087-1	0.10	.025	2900
9250-121	90537-2	75087-2	.12	.034	2800
9250-151	90537-3	75087-3	.15	.037	2750
9250-181	90537-4	75087-4	.18	.047	2200
9250-221	90537-5	75087-5	.22	.067	1700
9250-271	90537-6	75087-6	.27	.11	1500
9250-331	90537-7	75087-7	.33	.13	1300
9250-391	90537-8	75087-8	.39	.18	1100
9250-471	90537-9	75087-9	.47	.25	1000
9250-561	90537-10	75087-10	.56	.33	900
9250-681	90537-11	75087-11	.68	.45	750
9250-821	90537-12	75087-12	.82	.59	600
9250-102	90537-13	75088-1	1.00	.07	1900
9250-122	90537-14	75088-2	1.20	.093	1600
9250-152	90537-15	75088-3	1.50	.12	1300
9250-182	90537-16	75088-4	1.80	.14	1200
9250-222	90537-17	75088-5	2.20	.19	1100
9250-272	90537-18	75088-6	2.70	.28	950
9250-332	90537-19	75088-7	3.30	.35	800
9250-392	90537-20	75088-8	3.90	.40	750
9250-472	90537-21	75088-9	4.70	.55	650
9250-562	90537-22	75088-10	5.60	.72	550
9250-682	90537-23	75088-11	6.80	1.02	500
9250-822	90537-24	75088-12	8.20	1.32	475
9250-103	90537-25	75088-13	10.0	1.62	450
9250-123	90537-26	75088-14	12.0	2.00	400
9250-153	90537-27	75089-1	15.0	.80	620
9250-183	70537-28	75089-2	18.0	.89	610
9250-223	90537-29	75089-3	22.0	.96	600
9250-273	90537-30	75089-4	27.0	1.19	500
9250-333	90537-31	75089-5	33.0	1.37	490
9250-393	90537-32	75089-6	39.0	1.93	410
9250-473	90537-33	75089-7	47.0	2.11	400
9250-563	90537-34	75089-8	56.0	2.23	380
9250-683	90537-35	75089-9	68.0	2.70	370
9250-823	90537-36	75089-10	82.0	2.44	360
9250-104	90537-37	75089-11	100.0	3.12	325
9250-124	90537-38	75089-12	120.0	3.60	290
9250-154	90537-39	75089-13	150.0	4.10	275
9250-184	90537-40	75089-14	180.0	4.40	260
9250-224	90537-41	75089-15	220.0	5.00	250
9250-274	90537-42	75089-16	270.0	5.80	240
9250-334	90537-43	75089-17	330.0	6.40	225
9250-394	90537-44	75089-18	390.0	7.40	200
9250-474	90537-45	75089-19	470.0	9.50	180
9250-564	90537-46	75089-20	560.0	10.5	174
9250-684	90537-47	75089-21	680.0	11.8	168
9250-824	90537-48	75089-22	820.0	13.0	152
9250-105	90537-49	75089-23	1,000.0	17.5	135
9250-125	90537-50	75089-24	1,200.0	22.1	115
9250-155	90537-51	75089-25	1,500.0	26.5	110
9250-185	90537-52	75089-26	1,800.0	29.9	105
9250-225	90537-53	75089-27	2,200.0	33.8	99
9250-275	90537-54	75089-28	2,700.0	47.3	83
9250-335	90537-55	75089-29	3,300.0	53.0	80
9250-395	90537-56	75089-30	3,900.0	73.8	67
9250-475	90537-57	75089-31	4,700.0	81.6	63
9250-565	90537-58	75089-32	5,600.0	98.9	56
9250-685	90537-59	75089-33	6,800.0	111.0	54
9250-825	90537-60	75089-34	8,200.0	119.0	52
9250-106	90537-61	75089-35	10,000.0	137.0	49
9250-126	90537-62	75089-36	12,000.0	143.0	46
9250-156	90537-63	75089-37	15,000.0	157.0	45
9250-186	90537-64	75089-38	18,000.0	175.0	41
9250-226	90537-65	75089-39	22,000.0	274.0	33
9250-276	90537-66	75089-40	27,000.0	308.0	31
9250-336	90537-67	75089-41	33,000.0	343.0	30
9250-396	90537-68	75089-42	39,000.0	376.0	27
9250-476	90537-69	75089-43	47,000.0	473.0	26
9250-566	90537-70	75089-44	56,000.0	512.0	25
9250-686	90537-71	75089-45	68,000.0	580.0	24
9250-826	90537-72	75089-46	82,000.0	618.0	23
9250-107	90537-73	75089-47	100,000.0	678.0	22

0.10 thru 0.82 uh — Phenolic Core

1.00 thru 12 uh — Iron Core

15 + uh — Ferrite Core

Size: .157 ±.010 diameter; .395 ±.020 length
Leads AWG #22TCW; 1.438 ±.188 length

MICRO MITE MOLDED RF CHOKES

Nicknamed the "Micro-Mite", these rugged coils exhibit high Q and very low distributed capacity, all concentrated into an amazingly small package. Size reduction ranges up to 80% of equivalent standard molded chokes. The construction of these coils permits miniaturization without the use of ferrite materials, thus maintaining temperature stability.

Miller Part Number	MS Type	Induct. Micro-henries ±5%	D.C. Resist. Max.	Milli-amp Rating Max.	Mold Size
9210-54	90538-01	36	2.50	180	D
9210-56	90538-02	39	2.60	176	D
9210-58	90538-03	43	2.70	172	D
9210-60	90538-04	47	2.75	170	D
9210-62	90538-05	51	2.85	167	D
9210-64	90538-06	56	3.00	164	D
9210-66	90538-07	62	3.15	160	D
9210-68	90538-08	68	3.30	156	D
9210-70	90538-09	75	3.70	147	D
9210-72	90538-10	82	3.90	143	D
9210-74	90538-11	91	4.30	136	D
9210-76	90538-12	100	4.50	133	D
9210-78	90538-13	110	4.90	128	D
9210-80	90538-14	120	5.20	124	D
9210-82	90538-15	130	5.45	121	D
9210-84	90538-16	150	6.05	114	D
9210-86	90538-17	160	6.40	111	D
9210-88	90538-18	180	6.75	108	D
9210-90	90538-19	200	7.10	106	D
9210-92	90538-20	220	7.45	103	D
9210-94	90538-21	240	7.80	101	D
9220-00	90539-01	270	8.2	110	A
9220-02	90539-02	300	8.7	107	A
9220-04	90539-03	330	9.1	105	A
9220-06	90539-04	360	9.6	102	A
9220-08	90539-05	390	10.0	100	A
9220-10	90539-06	430	10.6	97	A
9220-12	90539-07	470	11.1	95	A
9220-14	—	500	11.6	93	A
9220-15	90539-08	510	11.6	92	A
9220-16	90539-09	560	12.3	91	A
9220-18	90539-10	620	13.0	88	A
9220-20	90539-11	680	13.7	85	A
9220-22	90539-12	750	14.4	83	A
9220-24	90539-13	820	15.1	81	A
9220-26	90539-14	910	15.8	79	A
9220-28	90539-15	1000	16.5	78	A
9220-30	90540-01	1100	21.0	78	B
9220-32	90540-02	1200	22.0	76	B
9220-34	90540-03	1300	23.0	75	B
9220-36	90540-04	1500	25.0	72	B
9220-38	90540-05	1600	26.0	70	B
9220-40	90540-06	1800	28.0	68	B
9220-42	90540-07	2000	29.0	67	B
9220-44	90540-08	2200	30.0	66	B
9220-46	90540-09	2400	31.0	64	B
9220-48	90540-10	2700	33.0	62	B
9220-50	90540-11	3000	35.0	61	B
9220-52	90540-12	3000	38.0	58	B
9220-54	90540-13	3600	40.0	57	B
9220-56	90541-01	3900	44.0	61	C
9220-58	90541-02	4300	46.0	59	C
9220-62	90541-04	5000	50.0	57	C
9220-64	90541-05	5600	53.0	56	C
9220-66	90541-06	6200	56.0	54	C
9220-68	90541-07	6800	59.0	52	C
9220-70	90541-08	7500	62.0	51	C
9220-72	90541-09	8200	65.0	50	C
9220-74	90541-10	9100	68.0	49	C
9220-76	90541-11	10000	72.0	57	C

Mold Size	Mold Diameter	Mold Length	Lead Size	Lead Length
A	.190±.010	.440±.010	AWG #22	1.44±.188
B	.215±.010	.560±.010	AWG #21	1.44±.188
C	.240±.010	.740±.010	AWG #20	1.44±.188
D	.155±.010	.375±.010	AWG #22	1.44±.188

MOLDED RF CHOKES

Miller Part Number	MS Type	Induct. Micro-henries*	D.C. Re-sist. Max.	Milli-amp Rating Max.
9310-00	18130-1	.15*	.03	2450
9310-02	18130-2	.22*	.055	1900
9310-04	18130-3	.33*	.09	1400
9310-06	18130-4	.47*	.12	1225
9310-07	18130-5	.56	.135	1220
9310-08	18130-6	.68	.15	1100
9310-10	18130-7	.82	.22	900
9310-12	18130-8	1.00	.29	830
9310-14	18130-9	1.20	.42	650
9310-16	18130-10	1.50	.50	600
9310-18	18130-11	1.80	.65	525
9310-20	18130-12	2.20	.95	435
9310-22	18130-13	2.70	1.20	385
9310-24	18130-14	3.30	2.00	300
9310-26	18130-15	3.90	2.30	280
9310-28	18130-16	4.70	2.60	260
9310-30	18130-17	5.60	.32	750
9310-32	18130-18	6.80	.50	600
9310-34	18130-19	8.20	.60	545
9310-36	18130-20	10.0	.90	445
9310-38	18130-21	12.0	1.10	404
9310-40	18130-22	15.0	1.40	370
9310-42	18130-23	18.0	2.25	280
9310-44	18130-24	22.0	2.50	265
9310-46	—	24.0	2.50	265
9310-48	18130-25	27.0	2.60	260
9310-50	—	30.0	2.80	255
9310-52	18130-26	33.0	3.00	250

Mold Size: .156±.010 Diameter; .375±.010 Lgth. Leads: AWG #22 TCW; 1.437±.188 Lgth.

9320-00	75008-21	.15*	.030	3000
9320-02	75008-22	.22*	.035	2800
9320-04	75008-23	.33*	.065	2000
9320-06	75008-24	.47*	.085	1700
9320-07	75008-25	.56	.125	1450
9320-08	75008-26	.68	.150	1300
9320-09	75008-27	.82	.205	1100
9320-10	75008-28	1.00	.290	930
9320-11	75008-29	1.20	.400	785
9320-12	75008-30	1.50	.485	700
9320-13	75008-31	1.80	.740	580
9320-14	75008-32	2.20	.970	505
9320-16	75008-33	2.70	1.20	460
9320-18	75008-34	3.30	.140	1350
9320-20	75008-35	3.90	.155	1250
9320-22	75008-36	4.70	.210	1100
9320-24	75008-37	5.60	.280	935
9320-26	75008-38	6.80	.375	810
9320-28	75008-39	8.20	.440	750
9320-30	75008-40	10.0	.605	640
9320-32	75008-41	12.0	1.05	490
9320-34	75008-42	15.0	1.20	460
9320-35	75008-43	18.0	1.95	360
9320-36	75008-44	22.0	2.20	335
9320-38	75008-45	27.0	2.75	300

Mold Size: .188±.031 Diameter; 0.437±.031 Lgth. Leads: AWG #22 TCW; 1.437±.188 Lgth.

9330-00	90542-01	.47	.06	1970
9330-01	90542-02	.56	.08	1850
9330-02	90542-03	.68	.08	1700
9330-03	90542-04	.82	.11	1520
9330-04	90542-05	1.00	.14	1290
9330-06	90542-07	1.50	.28	925
9330-07	90542-08	1.80	.37	790
9330-08	90542-09	2.20	.50	680
9330-10	90542-10	2.70	.65	600
9330-12	90542-11	3.30	1.00	480
9339-14	90542-12	3.90	1.20	440
9330-16	90542-13	4.70	1.80	360
9330-18	90542-14	5.60	.13	1340
9330-20	90542-15	6.80	.20	1080
9330-22	90542-16	8.20	.22	1030
9330-24	90542-17	10.0	.26	950
9330-26	90542-18	12.0	.45	720
9330-28	90542-19	15.0	.52	670
9330-30	90542-20	18.0	.70	580
9330-32	90542-21	22.0	1.00	480
9330-34	90542-22	27.0	1.30	420
9330-36	90542-23	33.0	1.50	390
9330-38	90542-24	39.0	2.00	340

Mold Size: .22±.03 Diameter; 0.560±.010 Lgth. Leads: AWG #22 TCW; 1.437±.188 Lgth.

*Inductance Tolerance: ±20%.

MICRO-MINIATURE MOLDED RF CHOKES

We are pleased to offer the following series of molded RF chokes. They represent what we believe to be the smallest package for the current rating specified. Color Coding is per MIL-C-15305.

Miller Part Number	MS Type	Inductance Micro-henries ±10%	D.C. Resistance Max.	Milliamp Rating Max.
9230-94	75083-1	.10	.07	1100
9230-96	75083-2	.12	.08	1100
9230-00	75083-3	.15	.10	1100
9230-02	75083-4	.18	.12	1010
9230-04	75083-5	.22	.14	935
9230-06	75083-6	.27	.16	875
9230-08	75083-7	.33	.20	780
9230-10	75083-8	.39	.30	640
9230-12	75083-9	.47	.35	590
9230-14	75083-10	.56	.50	495
9230-16	75083-11	.68	.60	450
9230-18	75083-12	.82	.85	380
9230-20	75083-13	1.00	1.00	350
9230-22	75084-1	1.20	.18	825
9230-24	75084-2	1.50	.22	745
9230-26	75084-3	1.80	.30	640
9230-28	75084-4	2.20	.40	550
9230-30	75084-5	2.70	.50	495
9230-32	75084-6	3.30	.85	380
9230-34	75084-7	3.90	1.00	350
9230-36	75084-8	4.70	1.20	320
9230-38	75084-9	5.60	1.80	260
9230-40	75084-10	6.80	2.00	245
9230-42	75084-11	8.20	2.70	210
9230-44	75084-12	10.0	3.70	180
9230-46	75084-13	12.0	2.70	210
9230-48	75084-14	15.0	2.80	205
9230-50	75084-15	18.0	3.10	195
9230-52	75084-16	22.0	3.30	190
9230-54	75084-17	27.0	3.50	185
9230-56	75085-1	33.0	3.40	187
9230-58	75085-2	39.0	3.60	180
9230-60	75085-3	47.0	4.50	165
9230-62	75085-4	56.0	5.70	145
9230-64	75085-5	68.0	6.70	135
9230-66	75085-6	82.0	7.30	130
9230-68	75085-7	100.0	8.00	125
9230-70	75085-8	120.0	13.00	97
9230-72	75085-9	150.0	15.00	85
9230-74	75085-10	180.0	17.00	79
9230-76	75085-11	220.0	21.00	73
9230-78	75085-12	270.0	25.00	65
9230-80	75085-13	330.0	28.00	62
9230-82	75085-14	390.0	35.00	55
9230-84	75085-15	470.0	42.00	50
9230-86	75085-16	560.0	46.00	48
9230-88	75085-17	680.0	60.00	42
9230-90	75085-18	820.0	65.00	40
9230-92	75085-19	1000.0	72.00	38

Mold Size: .095 ± .010 Diameter; .250 ±.010 Length.
Leads: AWG #24 TCW; 1.500 ± .188 Length.

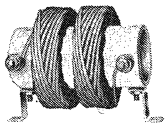
MOLDED RF CHOKES

Miller Part Number	MS Type	Micro-henries ±10%	D.C. Resist. Max.	Milli-amp Rating Max.	Mold Size
9340-00	91189-14	1.2	.075	2400	—
9340-02	91189-15	1.5	.090	2150	—
9340-03	91189-16	1.8	.135	1750	—
9340-04	91189-17	2.2	.160	1600	—
9340-06	91189-18	2.7	.220	1350	—
9340-08	91189-19	3.3	.305	1150	—
9340-10	91189-20	3.9	.45	955	—
9340-12	91189-21	4.7	.560	860	—
9340-14	91189-22	5.6	.745	745	—
9340-16	91189-23	6.8	1.05	635	—
9340-18	91189-24	8.2	1.4	550	—
9340-20	91189-25	10.0	1.9	460	—
9340-22	91189-26	12.0	2.65	395	—
9340-24	91189-27	15.0	3.25	355	—
9340-26	91189-28	18.0	4.15	315	—
9340-28	91189-29	22.0	.295	1150	—
9340-30	91189-30	27.0	.350	1050	—
9340-32	91189-31	33.0	.550	865	—
9340-34	91189-32	39.0	.65	810	—
9340-36	91189-33	47.0	1.0	640	—
9340-38	91189-34	56.0	1.15	620	—
9340-39	91189-35	68.0	1.85	470	—
9340-40	91189-36	82.0	2.10	440	—
9340-42	91189-37	100.0	2.50	405	—
9340-44	91189-38	120.0	4.00	315	—

Mold Size: 0.280 ± .031 Diameter; .940 ± .062 Length.
Leads: AWG #21 TCW; 1.437 ± .188 Length.

9350-00	75052-1	47.0	5.9	195	A
9350-02	75052-2	56.0	6.4	185	A
9350-04	75052-3	68.0	3.3	255	A
9350-06	75052-4	82.0	3.5	245	A
9350-08	75052-5	100.0	3.8	235	A
9350-10	75052-6	120.0	4.7	215	A
9350-12	75052-7	150.0	5.3	200	A
9350-14	75053-1	180.0	5.5	225	B
9350-16	75053-2	220.0	5.9	220	B
9350-18	75053-3	270.0	6.6	210	B
9350-20	75053-4	330.0	7.8	185	B
9350-22	75053-5	390.0	8.7	180	B
9350-24	75054-1	470.0	9.0	190	C
9350-26	75054-2	560.0	10.0	180	C
9350-28	75054-3	680.0	11.2	170	C
9350-30	75054-4	820.0	13.0	155	C
9350-32	75054-5	1000.0	14.5	145	C
9350-34	75055-1	1500.0	22.0	127	D
9350-36	—	2000.0	26.0	125	D
9350-37	75055-2	2200.0	27.0	115	D
9350-38	—	2500.0	30.0	115	D
9350-39	75055-3	2700.0	32.0	105	D
9350-40	—	5000.0	65.0	78	D
9350-41	75055-4	5100.0	66.0	73	D
9350-44	75055-5	10000.0	70.0	71	D

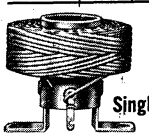
COIL DIMENSIONS	A	B	C	D
DIAMETER ±.010	.250	.310	.375	.468
LENGTH ±.010	.560	.560	.625	.687



DUAL LINE FILTER CHOKES

Miller Dual Duo-Lateral Line Filter Chokes are wound with two coils on one form, giving the advantage of small physical size in cases where space requirements are stringent and two single coils would occupy too much area Identical in specifications, except for dimensions, to our single type Duo-Lateral chokes. They are wound on white ceramic forms 2" in diameter by 4½" long.

Cat. No.	Amps.	Ohms	Uh.	Dimensions
D-7826	5	.28	570	4½" x 4"
D-7827	10	.15	370	4½" x 4"
D-7828	15	.085	200	4½" x 4"
D-7829	20	.05	135	4½" x 4"



LIGHT DUTY DUO-LATERAL LINE FILTER CHOKES

Single Line Filter Chokes

Dimensions: 1⅞" x 1¾".

Cat. No.	Amperes	Ohms	Uh.
7825	2	.7	600
7825-3	3	.25	250
7825-5	5	.1	100
7825-8	8	.05	50

DUAL LINE FILTER CHOKES

Dimensions: 3¼" x 2⅛".

Cat. No.	Amperes	Ohms	Uh.
D-7825	2	.7	600
D-7825-3	3	.25	250
D-7825-5	5	.1	100
D-7825-8	8	.05	50

HEAVY DUTY HASH CHOKES

Through the use of a molded powdered iron form we are able to offer a series of relatively high inductance, high current hash filter chokes.

Part No.	Uh. ±20%	Ohms Max.	Amps.	Dimensions
5218	3.35	.010	13	17/32" x 1¾"
5219	4.9	.016	8	½" x 1¼"
5220	8.8	.021	5	½" x 1¼"
5230	4.0	.012	5	5/16" x 29/32"
5240	40.0	.082	2	7/16" x 1¼"
5248	68.0	.054	5	17/32" x 1¼"
5250	100.0	.216	2	5/16" x 1¼"

SERIES S, M, L MOLDED R F CHOKES

Inductance Tolerance
0.1 to 22 uH, ±10% on Q-meter / 27 uH to 10,000, ±5% 1,000 bridge

Physical and Environmental Characteristics
Operating tem. −55° to +125°C terminal strength — meets five pound pull test per MIL-C-15305

All series meet requirements of MIL-C-15305, Grade 1, Class B

SERIES S

Part Number	-L- Micro-Henries	Max DC Res, Ohms	Max I mA
100170	0.10	0.02	4000
100171	0.12	0.025	3500
100172	0.15	0.03	3000
100173	0.18	0.03	3000
100174	0.22	0.03	3000
100175	0.27	0.04	2700
100176	0.33	0.05	2500
100177	0.39	0.08	2000
100178	0.47	0.08	2000
100179	0.56	0.10	1700
100180	0.68	0.12	1500
100181	0.82	0.18	1300
100182	1.0	0.24	1100
100183	1.2	0.35	1000
100184	1.5	0.43	850
100185	1.8	0.65	720
100186	2.2	0.80	610
100187	2.7	0.12	1600
100188	3.3	0.15	1400
100189	3.9	0.23	1200
100190	4.7	0.30	1000
100191	5.6	0.45	900
100192	6.8	0.55	800
100193	8.2	0.65	720
100194	10.0	0.73	650
100195	12.0	1.1	590
100196	15.0	1.4	500
100197	18.0	1.6	460
100198	22.0	1.8	430
100199	27.0	2.7	360
100200	33.0	3.5	300
100201	39.0	3.8	290
100202	47.0	4.0	275
100203	56.0	4.4	265
100204	68.0	4.7	250
100205	82.0	5.3	235
100206	100.0	6.0	220

SERIES M

Part Number	-L- Micro-Henries	Max DC Res, Ohms	Max I mA
100207	1.0	0.04	2700
100208	1.2	0.04	2700
100209	1.5	0.04	2700
100210	1.8	0.05	2500
100211	2.2	0.05	2500
100212	2.7	0.05	2500
100213	3.3	0.05	2500
100214	3.9	0.07	2100
100215	4.7	0.09	1800
100216	5.6	0.14	1550
100217	6.8	0.17	1300
100218	8.2	0.25	1150
100219	10.0	0.32	1000
100220	12.0	0.47	870
100221	15.0	0.62	730
100222	18.0	0.72	660
100223	22.0	0.8	600
100224	27.0	1.2	520
100225	33.0	1.5	450
100226	39.0	2.3	380
100227	47.0	3.0	300
100228	56.0	4.2	270
100229	68.0	5.2	250
100230	82.0	6.2	220
100231	100.0	7.0	200
100232	120.0	7.5	200
100233	150.0	8.0	190
100234	180.0	9.0	185
100235	220.0	10.0	180
100236	270.0	11.0	172
100237	330.0	12.0	165
100238	390.0	13.0	157
100239	470.0	14.0	150
100240	560.0	16.0	145
100241	680.0	17.0	140
100242	820.0	10.0	132
100243	1000.0	21.0	125

SERIES L

Part Number	-L- Micro-Henries	Max DC Res, Ohms	Max I mA
100244	10.0	0.15	1800
100245	12.0	0.23	1600
100246	15.0	0.3	1300
100247	18.0	0.4	1150
100248	22.0	0.5	1000
100249	27.0	0.6	900
100250	33.0	0.7	850
100251	39.0	1.1	720
100252	47.0	1.3	620
100253	56.0	1.8	540
100254	68.0	2.4	450
100255	82.0	2.8	425
100256	100.0	3.2	400
100257	120.0	4.8	360
100258	150.0	6.4	280
100259	180.0	9.5	240
100260	220.0	12.0	200
100261	270.0	13.0	195
100262	330.0	14.0	190
100263	390.0	15.5	180
100264	470.0	17.0	170
100265	560.0	18.5	165
100266	680.0	20.0	155
100267	820.0	22.0	150
100268	1000.0	24.0	145
100269	1200.0	27.0	137
100270	1500.0	29.0	130
100271	1800.0	32.0	125
100272	2200.0	35.0	120
100273	2700.0	40.0	112
100274	3300.0	45.0	105
100275	3900.0	49.0	100
100276	4700.0	53.0	95
100277	5600.0	60.0	90
100278	6800.0	67.0	85
100279	8200.0	75.0	82
100280	10000.0	80.0	80

Series	Lengths	Diameter	Lead Size	Lead Length
S	.44 max.	.188 max.	#22 AWG	1.3 min.
M	.60 max.	.25 max.	#21 AWG	1.3 min.
L	.90 max.	.31 max.	#21 AWG	1.3 min.

SUB-MINIATURE RF CHOKES

An extremely versatile series of iron core RF chokes designed to meet the industries' demand for high reliability, ultra-miniature components. The coils are ideally suited to network and filter design, delay lines, and computer applications. The coils are impregnated with a moisture resistant lacquer and on special order they can be fungus-proofed per JAN-T-152 using varnish per MIL-V-173A. They can also be encapsulated in epoxy resin to conform to Grade 1, Class B of MIL-C-15305.

Miller Part No.	Inductance Nominal*	D.C. Resistance Max.	Milliamp Rating Max.	Max. Winding Diam.	Form Length ±1/32
70F107AP	.10 uh★	.013	3200	.156	5/16
70F157AP	.15 uh★	.025	1600	.141	5/16
70F227AP	.22 uh★	.038	1280	.141	5/16
70F337AP	.33 uh★	.070	800	.125	5/16
70F477AP	.47 uh★	.125	510	.125	5/16
70F687AP	.68 uh★	.200	400	.125	5/16
70F757AP	.75 uh★	.264	320	.125	5/16
70F827AP	.82 uh★	.290	300	.125	5/16
70F106AI	1.0 uh	.048	636	.165	1/4
70F126AI	1.2 uh	.072	400	.160	1/4
70F156AI	1.5 uh	.096	316	.160	1/4
70F186AI	1.8 uh	.096	400	.160	1/4
70F226AI	2.2 uh	.156	202	.160	1/4
70F276AI	2.7 uh	.168	256	.160	1/4
70F336AI	3.3 uh	.240	159	.150	1/4
70F396AI	3.9 uh	.264	159	.150	1/4
70F476AI	4.7 uh	.457	100	.150	1/4
70F566AI	5.6 uh	.492	100	.150	1/4
70F686AI	6.8 uh	.624	100	.150	1/4
70F756AI	7.5 uh	.624	100	.150	1/4
70F826AI	8.2 uh	.744	100	.150	1/4
70F916AI	9.1 uh	1.44	75	.160	1/4
70F105AI	10 uh	1.56	75	.160	1/4
70F125AI	12 uh	1.68	75	.160	1/4
70F155AI	15 uh	1.92	75	.165	1/4
70F185AI	18 uh	2.28	75	.165	1/4
70F225AI	22 uh	2.28	75	.165	1/4
70F255AI	25 uh	2.64	75	.170	1/4
70F275AI	27 uh	2.64	75	.170	1/4
70F335AI	33 uh	2.76	75	.170	1/4
70F395AI	39 uh	3.36	75	.175	1/4
70F475AI	47 uh	3.36	75	.175	1/4
70F565AI	56 uh	3.84	75	.180	1/4
70F685AI	68 uh	4.20	75	.180	1/4
70F755AI	75 uh	4.56	75	.185	1/4
70F825AI	82 uh	4.80	75	.185	1/4
70F915AI	91 uh	4.92	75	.185	1/4
70F104AI	100 uh	7.68	75	.165	1/4
70F124AI	120 uh	8.16	75	.165	1/4
70F154AI	150 uh	8.16	75	.165	1/4
70F184AI	180 uh	8.16	75	.170	1/4
70F204AI	200 uh	10.3	75	.170	1/4
70F224AI	220 uh	11.5	75	.170	1/4
70F254AI	250 uh	12.1	75	.170	1/4

Miller Part No.	Inductance Nominal*	D.C. Resistance Max.	Milliamp Rating Max.	Max. Winding Diam.	Form Length ±1/32
70F274AI	270 uh	13.2	75	.175	1/4
70F304AI	300 uh	13.2	75	.175	1/4
70F334AI	330 uh	13.9	75	.175	1/4
70F354AI	350 uh	14.4	75	.180	1/4
70F394AI	390 uh	15.8	75	.180	1/4
70F474AI	470 uh	16.3	75	.185	1/4
70F504AI	500 uh	18.0	75	.195	1/4
70F564AI	560 uh	19.2	75	.195	1/4
70F684AI	680 uh	19.8	75	.200	1/4
70F754AI	750 uh	22.9	75	.210	1/4
70F824AI	820 uh	22.9	75	.210	1/4
70F914AI	910 uh	24.0	75	.220	1/4
70F103AI	1.00 mh	24.0	75	.225	1/4
70F123AI	1.20 mh	33.6	75	.220	1/4
70F153AI	1.50 mh	37.2	75	.225	1/4
70F183AI	1.80 mh	42.0	75	.235	1/4
70F223AI	2.20 mh	45.6	75	.240	1/4
70F253AI	2.50 mh	45.6	75	.260	3/8
70F273AI	2.70 mh	45.6	75	.260	3/8
70F333AI	3.30 mh	51.6	75	.260	3/8
70F393AI	3.90 mh	57.6	75	.275	3/8
70F473AI	4.70 mh	64.8	75	.285	3/8
70F563AI	5.60 mh	69.6	75	.300	3/8
70F683AI	6.80 mh	78.0	75	.310	3/8
70F753AI	7.50 mh	85.2	75	.310	3/8
70F823AI	8.20 mh	92.4	75	.330	3/8
70F913AI	9.10 mh	98.4	75	.330	3/8
70F102AI	10.0 mh	101	75	.335	3/8
70F122AI	12 mh	100	75	.300	1/2
70F152AI	15 mh	113	75	.300	1/2
70F182AI	18 mh	128	75	.325	1/2
70F222AI	22 mh	144	75	.330	1/2
70F252AF	25 mh	115	60	.300	5/8
70F272AF	27 mh	120	60	.313	5/8
70F332AF	33 mh	134	60	.313	5/8
70F392AF	39 mh	147	60	.330	5/8
70F472AF	47 mh	168	60	.344	5/8
70F502AF	50 mh	175	60	.360	5/8
70F562AF	56 mh	189	60	.360	5/8
70F682AF	68 mh	215	60	.375	5/8
70F752AF	75 mh	222	60	.390	5/8
70F822AF	82 mh	238	60	.390	5/8
70F912AF	91 mh	250	60	.390	5/8
70F101AF	100 mh	278	60	.406	5/8

*Tolerance 0.1 to 1.0 uh ±20%, 1.1 to 15 uh ±10%, over 15 uh ±5% ★Measured with leads 1/4" long from Q Meter binding posts

PHENOLIC CORE SINGLE LAYER WINDINGS

Dimensions of core: 3/16" diameter x 3/4" long. Leads are 1 1/2" long.

Miller Part Number	Inductance Nominal*	D. C. Resistance Maximum	Milliamp Rating Maximum	Diameter over Winding
4602	1.0 uh	.050	2000	.270
4604	1.5 uh	.093	1800	.270
4606	2.4 uh	.190	1500	.270
4608	3.9 uh	.450	1000	.270
4609	5.5 uh	.670	850	.270
4610	6.2 uh	.830	700	.270
4611	8.2 uh	1.20	600	.270
4612	10.0 uh	1.50	500	.270

*Tolerance 1.0 uh ±20%, 1.1 to 10 uh ±10%

IRON CORE SINGLE LAYER WINDINGS

Dimensions of core: 1/32" diameter x 7/8" long. Leads are 1 1/2" long.

4624	15 uh ±5%	.17	1000	.29
4626	24 uh ±5%	.34	800	.29
4628	39 uh ±5%	.65	600	.29
4629	55 uh ±5%	1.0	500	.29
4630	62 uh ±5%	1.2	475	.29
4631	82 uh ±5%	1.9	450	.29
4632	100 uh ±5%	3.0	400	.29

PHENOLIC CORE 3-SECTION WINDINGS

Dimensions of core: 3/16" diameter x 3/4" long. Leads are 1 1/2" long.

4642	.10 mh ±5%	5.4	160	.406
4644	.15 mh ±5%	6.5	160	.406
4646	.24 mh ±5%	8.5	160	.438
4648	.39 mh ±5%	11	160	.500
4649	.55 mh ±5%	13	160	.500
4650	.62 mh ±5%	15	160	.531
4651	.75 mh ±5%	16	160	.531
4652	1.0 mh ±5%	19	160	.563

IRON CORE 3-SECTION WINDINGS

Dimensions of core: 1/32" diameter x 7/8" long. Leads are 1 1/2" long.

Miller Part Number	Inductance @ 1000 Hertz	D. C. Resistance Maximum	Milliamp Rating Maximum	Diameter over Winding
4662	1.0 mh ±5%	8.6	160	.469
4664	1.5 mh ±5%	11	160	.469
4666	2.4 mh ±5%	15	160	.531
4668	3.9 mh ±5%	20	160	.563
4669	5.5 mh ±5%	25	160	.594
4670	6.2 mh ±5%	37	100	.531
4671	8.2 mh ±5%	46	100	.563
4672	10 mh ±5%	50	100	.594

FERRITE CORE 3-SECTION WINDINGS

Dimensions of core: 1/4" diameter x 7/8" long. Leads are 1 1/2" long.

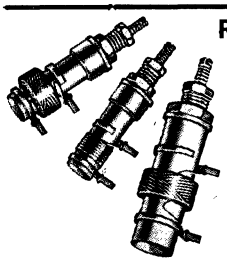
6302	2.5 mh ±5%	9.0	160	.469
6304	5.0 mh ±5%	14	160	.531
6306	10 mh ±5%	31	100	.531
6310	50 mh ±5%	127	65	.625

SINGLE LAYER COLOR CODED RF CHOKES

The following solenoid wound R.F. Chokes are impregnated with a thermosetting varnish and are color coded to EIA standards. Form Dimensions .156 x 1/2".

Part No.	L*	R Ohms Max.	I Ma. Max.	Part No.	L*	R Ohms Max.	I Ma. Max.
74F106AP	1.0 uh	.20	1000	74F125AP	12 uh	3.60	200
74F126AP	1.2 uh	.22	950	74F155AP	15 uh	6.00	150
74F156AP	1.5 uh	.25	900	74F185AP	18 uh	7.50	100
74F186AP	1.8 uh	.28	850	74F225AI	22 uh	2.00	500
74F226AP	2.2 uh	.30	800	74F275AI	27 uh	1.85	450
74F276AP	2.7 uh	.50	700	74F335AI	33 uh	2.00	450
74F336AP	3.3 uh	.70	600	74F395AI	39 uh	2.60	400
74F396AP	3.9 uh	.80	500	74F475AI	47 uh	3.50	350
74F476AP	4.7 uh	1.00	400	74F565AI	56 uh	3.75	300
74F566AP	5.6 uh	1.80	350	74F685AI	68 uh	4.00	250
74F686AP	6.8 uh	1.85	300	74F825AI	82 uh	5.10	200
74F826AP	8.2 uh	1.90	275	74F104AI	100 uh	6.00	150
74F105AP	10 uh	3.00	250				

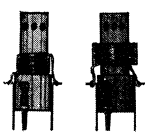
* Tolerance 1.0 to 2.2 uh, ±20%, 2.7 to 100 uh, ±10%



RESINITE ADJUSTABLE RF COILS

Resinite is a phenolic impregnated tubing which combines the mechanical and dielectric advantages of phenolics with the high dielectric strength, moisture resistance, and non-corrosive properties of cellulose acetate. Resinite can be certified to MIL-P-79B Type PBG. This series features an extremely wide choice of inductance ranges and utilizes only the highest quality commercial materials throughout. They find application where the severe moisture resistant characteristics of the encapsulated units and the mechanical properties of the ceramics are not required.

Miller Part No.	Inductance Range Max.	Inductance Range Min.	R Ohms Max.	Max. Current Ma.	Dia. over Winding
20A107RBI	.088 uh	.120 uh	.041	1600	.343
20A157RBI	.131 uh	.180 uh	.044	1600	.343
20A227RBI	.162 uh	.264 uh	.051	1600	.343
20A337RBI	.238 uh	.396 uh	.054	1000	.343
20A477RBI	.356 uh	.564 uh	.078	1000	.343
20A687RBI	.508 uh	.816 uh	.082	635	.343
20A827RBI	.735 uh	.984 uh	.090	635	.343
20A106RBI	.885 uh	1.20 uh	.135	400	.343
20A156RBI	1.08 uh	1.80 uh	.205	400	.343
20A226RBI	1.62 uh	2.64 uh	.522	100	.343
20A336RBI	2.38 uh	3.96 uh	.640	100	.343
20A476RBI	3.56 uh	5.64 uh	.770	100	.343
20A686RBI	5.08 uh	8.16 uh	.950	100	.343
20A826RBI	7.35 uh	9.84 uh	1.00	100	.343
20A105RBI	8.85 uh	12.0 uh	1.45	100	.343
20A155RBI	10.8 uh	18.0 uh	1.70	100	.343
20A225RBI	16.2 uh	26.4 uh	2.10	100	.343
20A335RBI	23.8 uh	39.6 uh	2.59	100	.343
20A475RBI	35.6 uh	56.4 uh	3.10	100	.343
20A685RBI	50.8 uh	81.6 uh	3.84	100	.343
20A825RBI	73.5 uh	98.4 uh	4.71	100	.375
20A104RBI	88.5 uh	120. uh	5.00	100	.406
20A154RBI	108. uh	180. uh	5.95	100	.406
20A224RBI	162. uh	264. uh	7.50	100	.406
20A334RBI	238. uh	396. uh	9.50	100	.437
20A474RBI	356. uh	564. uh	12.0	100	.500
20A684RBI	508. uh	816. uh	14.5	100	.500
20A824RBI	735. uh	984. uh	17.0	100	.562
20A103RBI	885. uh	1.20 uh	21.0	100	.594



VERTICAL MOUNTED PRINTED CIRCUIT VELVETORK ADJUSTABLE R F COILS

Dimensions (form only Over Collar 3/8" Dia. x 3/4" long.

The coil form is Polyester impregnated Alpha-Cellulose tubing with internally bonded resilient ribs which provide both thread and torque control. Coils may be adjusted from either end of form.

Miller Part No.	Inductance Range Max.	Inductance Range Min.	R Ohms Max.	Max. Current Ma.	Dia. over Winding
23A107RPC	.095 uh	.125 uh	.02	4100	.40
23A157RPC	.130 uh	.170 uh	.02	1600	.37
23A227RPC	.185 uh	.265 uh	.02	1600	.37
23A337RPC	.285 uh	.410 uh	.03	1000	.37
23A477RPC	.420 uh	.580 uh	.03	2500	.37
23A687RPC	.540 uh	.850 uh	.03	1600	.37
23A827RPC	.640 uh	1.00 uh	.03	1600	.37
23A106RPC	7.60 uh	1.25 uh	.04	1600	.37
23A156RPC	1.20 uh	1.87 uh	.06	1000	.37
24A226RPC	1.65 uh	2.75 uh	.14	400	.37
23A336RPC	2.40 uh	4.10 uh	.17	400	.37
23A476RPC	3.40 uh	5.80 uh	.24	400	.37
23A686RPC	3.40 uh	8.50 uh	.39	250	.37
23A826RPC	5.60 uh	10.0 uh	.64	160	.37
23A105RPC	7.10 uh	12.5 uh	.77	160	.37
23A155RPC	10.0 uh	18.7 uh	1.68	100	.37
23A225RPC	14.8 uh	27.5 uh	1.91	100	.37
23A335RPC	22.0 uh	41.0 uh	2.34	100	.37
23A475RPC	31.0 uh	58.0 uh	2.72	100	.40
23A685RPC	43.5 uh	85.0 uh	3.30	100	.40
23A825RPC	61.0 uh	100.0 uh	3.89	100	.40
23A104RPC	76.0 uh	125.0 uh	4.39	100	.40
23A154RPC	105.0 uh	187.0 uh	5.46	100	.40
23A224RPC	160.0 uh	275.0 uh	6.70	100	.44
23A334RPC	240.0 uh	410.0 uh	8.30	100	.44
23A474RPC	360.0 uh	580.0 uh	10.50	100	.48
23A684RPC	530.0 uh	850.0 uh	12.90	100	.48
23A824RPC	700.0 uh	1.00 mh	14.90	100	.53
23A103RPC	910.0 uh	1.25 mh	17.10	100	.58
23A153RPC	990.0 uh	1.87 mh	28.20	65	.45
23A223RPC	1.60 mh	2.75 mh	34.80	65	.45
23A333RPC	2.40 mh	4.10 mh	42.90	65	.48
23A473RPC	3.40 mh	5.80 mh	51.60	65	.48
23A683RPC	5.15 mh	8.50 mh	63.60	65	.55
23A823RPC	7.40 mh	10.00 mh	75.60	65	.55
23A102RPC	9.80 mh	12.50 mh	87.30	65	.55
23A152RPC	12.00 mh	18.70 mh	111.0	65	.60
23A222RPC	12.10 mh	27.50 mh	197.0	33	.60
23A332RPC	18.20 mh	41.00 mh	244.0	33	.60
23A472RPC	27.50 mh	58.00 mh	302.0	33	.60
23A682RPC	40.00 mh	85.00 mh	378.0	33	.58
23A822RPC	50.00 mh	100.00 mh	423.0	33	.58
23A101RPC	62.00 mm	125.00 mh	468.0	33	.60

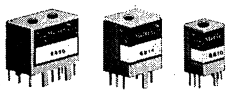
SHIELDED SUBMINIATURE ADJUSTABLE R F COILS

These compact adjustable coils offer a minimum two-to-one inductance range with relatively small changes in Q. The tuning adjustment is accessible from either the top or bottom of the coil assembly. Magnetic shielding is achieved through the use of cup cores while the metal shield offers effective electrostatic shielding. Printed circuit terminals on base and shield.

Dimensions: 1/2" sq. x 5/8" high.

Miller Part Number	Inductance Range	Inductance Range	R Ohms Max.	Max. Current Ma.
9050	1.5 uh	3.0 uh	.66	80
9051	3.0 uh	7.0 uh	.85	125
9052	7.0 uh	14.0 uh	1.38	80
9053	14.0 uh	28.0 uh	2.10	80
9054	28.0 uh	60.0 uh	3.00	100
9055	60.0 uh	120. uh	4.00	100
9056	120. uh	280. uh	5.75	80
9057	280. uh	650. uh	12.0	80
9058	650. uh	1.3 mh	15.0	100
9059	1.3 mh	3.0 mh	23.0	100
9060	3.0 mh	10.0 mh	76.0	30
9061	8.0 mh	20.0 mh	110.	30
9062	15.0 mh	40.0 mh	150.	30
9063	20.0 mh	60.0 mh	175.	25

I F COMPONENTS SUB MINIATURE

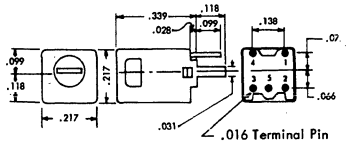


The transformers in this series represents the state of the art, as it relates to a commercial product. In both the 455 kc. and 10.7 Mc. groups there are a complete set of I.F. transformers as well as Ratio Detector and Discriminator transformers. Part No. 8814 incorporates a single section mechanical filter that sharpens the I.F. passband appreciably 4 kc. @ 6 db and 12 kc. @ 20 db. The physical dimensions of this unit are .415 wide .460 deep and .600 high.

Dimensions: 8849, 8850, 8851, 8805, 8806 & 8807 — 25/32" x 7/16" x 1/2" high.
8852, 8853 & 8854 — 13/32" sq. x 5/8" high.
8808* & 8809* — 1/4" sq. x 7/16" high.
***To be used as a pair.**
8810, 8811, 8812 & 8813 — 3/32" sq. x 13/32" high.
8814 — 13/32 x 13/32" x 7/16".

Cat. No.	Specs.	Description
		10.7 Mc. Transistor Transformers
8849	500 kc. P/P	10.7 Mc. Ratio Detector
8850	300 kc. P/P	10.7 Mc. Discriminator
8851-A	6 db 300 kc.	10.7 Mc. Double Tuned IF
8852	100 K-300	10.7 Mc. Single Tuned IF
8853	20 K-500	10.7 Mc. Single Tuned IF
8854	25 K-500	10.7 Mc. Single Tuned IF
		455 Kc. Transistor Transformers
8805	20 kc. P/P	455 kc. Ratio Detector
8806	20 kc. P/P	455 kc. Discriminator
8807	6 db 15 kc.	455 kc. Double Tuned IF
8808	100 K Input	455 kc. Discriminator Pri.*
8809	20 kc. P/P	455 kc. Discriminator Sec.*
8810	50 K-800	455 kc. Single Tuned IF
8811	30 K-500	455 kc. Single Tuned IF
8812	20 K-5 K	455 kc. Single Tuned IF
8813	Oscillator (455 kc. IF), (Tuning Cap. 78 to 110 pf. Max.)	
8814	70 K-800	455 kc. Single Tuned IF with Single Section Mechanical Filter

TRANSISTOR COILS ... SMALLEST YET LESS THAN 1/4"



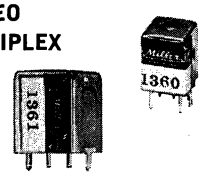
A complete set of 455 KHz IF transformers and matching Osc. coil, and a complete set of 10.7 MHz IF transformers and matching Discriminator coils ... all so small as to be almost unbelievable.

Each unit measures only .217 x .217 x .339 and is for printed circuitry.

Cat. No.	Freq.	Impedance	Use
★8855	10.7 MHz	20 K— 75 Ω	1st IF
★8856	10.7 MHz	15 K—300 Ω	2nd & 3rd IF
★8857	10.7 MHz	12 K— 3 K	Disc. Pri.
★8858	10.7 MHz	— 12 K	Disc. Sec.
★8815	455 KHz	50 K— 2 K	1st IF
★8816	455 KHz	50 K— 2 K	2nd IF
★8817	455 KHz	5 K— 5 K	3rd IF
★8818	540-1600 KHz		BC Osc.

(Tuning capacitor 67-78 pF maximum)

SMALLEST YET STEREO MULTIPLEX



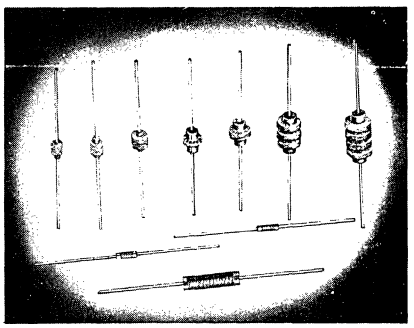
These recently developed Multiplex units when used with a Motorola IC #MC1304 FM Stereo Demodulator form a complete FM Stereo Decoder System. They provide excellent opportunity for OEM and Experimenter projects. Ask for "The Coil Forum" Application Note.

Each Multiplex System requires:

1 No. 1363 — PCB (PC Board)
2 No. 1359 and 1 No. 1360 or
2 No. 1361 and 1 No. 1362

Cat. No.	Description	Size
★1359	19 KHz	.591 x .402 x .402
★1360	38 KHz	.748 x .591 x .591
★1361	19 KHz	—
★1362	38 KHz	—

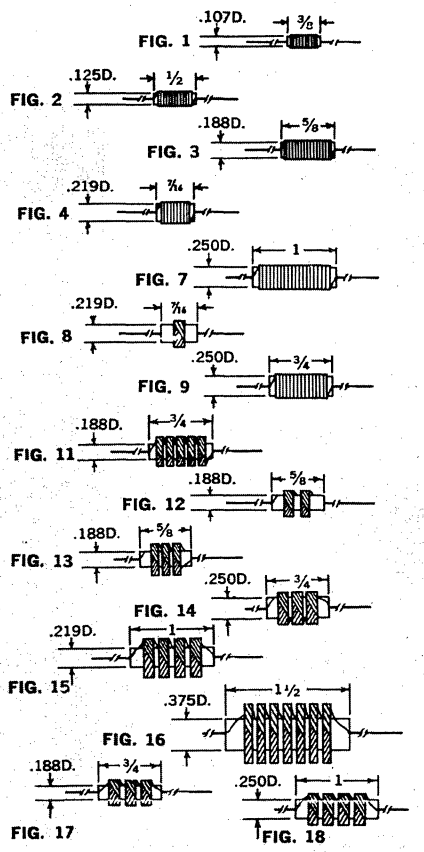
TYPICAL MILLEN INDUCTORS



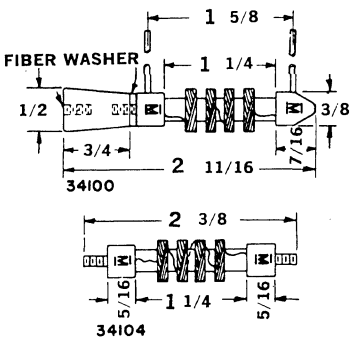
Part	Inductance Microhenries	Self Resonant Freq. Mc.	Fig. No.
34300-0.15	0.15 ± 10%	645 MC.	1
34300-0.22	0.22 ± 10%	510	1
34300-0.33	0.33 ± 10%	445	1
34300-0.47	0.47 ± 10%	375	2
34300-0.5	0.5 ± 10%	350	2
34300-0.68	0.68 ± 10%	300	2
34300-0.82	0.82 ± 10%	265	2
34300-1	1 ± 10%	175	4
34300-1.1	1.1 ± 10%	210	4
34300-1.2	1.2 ± 10%	210	3
34300-1.5	1.5 ± 5%	190	3
34300-1.8	1.8 ± 5%	171	3
34300-2.2	2.2 ± 5%	160	3
34300-2.5	2.5 ± 5%	140	3
34300-2.7	2.7 ± 5%	142	3
34300-3	3 ± 5%	132	3
34300-3.3	3.3 ± 5%	120	3
34300-3.9	3.9 ± 5%	118	3
34300-4.7	4.7 ± 5%	105	3
34300-5	5 ± 5%	85	3
34300-5.6	5.6 ± 5%	98	3
34300-6.2	6.2 ± 5%	90	7
34300-6.8	6.8 ± 5%	90	3
34300-8.2	8.2 ± 5%	81	3
34300-10	10 ± 5%	65	7

34300 SERIES INDUCTORS

Catalog Number	Inductance Microhenries	Self Resonant Freq. Mc.	Fig. No.
34300-12	12 ± 5%	65	3
34300-15	15 ± 5%	22	8
34300-18	18 ± 5%	22	8
34300-20	20 ± 5%	27	8
34300-22	22 ± 5%	46	9
34300-24	24 ± 5%	24	8
34300-25	25 ± 5%	26	8
34300-27	27 ± 5%	23	8
34300-30	30 ± 5%	15	8
34300-33	33 ± 5%	36	9
34300-36	36 ± 5%	35	9
34300-39	39 ± 5%	18	8
34300-47	47 ± 5%	18	8
34300-50	50 ± 5%	18	8
34300-56	56 ± 5%	28	9
34300-68	68 ± 5%	26	9
34300-75	75 ± 5%	12	8
34300-100	100 ± 5%	13	8
34300-120	120 ± 5%	12	8
34300-150	150 ± 5%	11	8
34300-180	180 ± 5%	9.8	8
34300-200	200 ± 5%	7.5	8
34300-220	220 ± 5%	12	11
34300-250	250 ± 5%	6.8	8
34300-270	270 ± 5%	11.9	11
34300-300	300 ± 5%	6	8
34300-330	330 ± 5%	8.5	17
34300-350	350 ± 5%	8	12
34300-470	470 ± 5%	7.6	13
34300-500	500 ± 5%	7.5	13
34300-750	750 ± 5%	5.8	14
34300-820	820 ± 5%	5.7	13
34300-1000	1000 ± 5%	4	12
34300-1200	1200 ± 5%	4.8	15
34300-1800	1800 ± 5%	2.6	16
34300-2200	2200 ± 5%	2.8	18
34300-2500	2500 ± 5%	2.7	18
34300-10000	10000 ± 5%	1.5	18

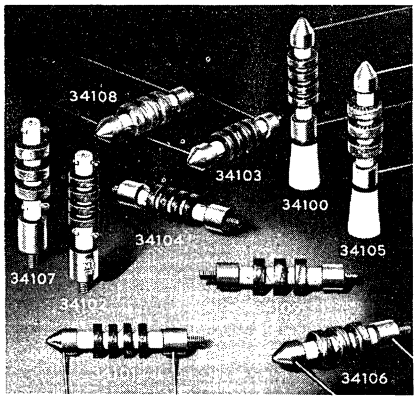


34100 SERIES R-F CHOKE COILS



Ceramic forms and insulators. Leads: #18 tinned solid wire, 2⅛" long. Mounting screws, 6-32 threaded x ¼" long.

Catalog Number	Inductance Millihenries	Maximum Current
34100	2.5	250 MA.
34101	2.5	250 MA.
34102	2.5	250 MA.
34103	2.5	250 MA.
34104	2.5	250 MA.
34105	1.0	300 MA.
34106	1.0	300 MA.
34107	1.0	300 MA.
34108	1.0	300 MA.
34109	1.0	300 MA.



"SPECIAL" AND STANDARD INDUCTANCES CATALOG LISTS THE COMPLETE MILLEN LINE OF INDUCTORS

JAMES MILLEN MFG. CO., INC.
MAIN OFFICE AND FACTORY
MALDEN, MASSACHUSETTS, U.S.A.

Nytronics, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 • TWX 810-665-2182

Inductors

Wee-Ductor — Magnetically shielded with inductance range 0.1 to 180,000 μH, designed to MIL-C-13305, Grade 1, Class B.
Encapsulated Envelope:
0.157″ diameter x .450″ length.

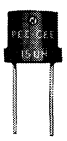
Wee Wee-Ductor — Magnetically shielded with inductance range 0.1 to 10,000 μH. Designed to MIL-C-15305.
Encapsulated Envelope:
0.125″ diameter x 0.335″ length.

Pee-Wee Ductor — The Pee Wee Ductor represents a 66% size reduction from the smallest magnetically shielded inductor previously available anywhere. Inductance values from .025 μH to 10,000 μH. 49 values available from stock from 0.1 μH to 1,000 μH.

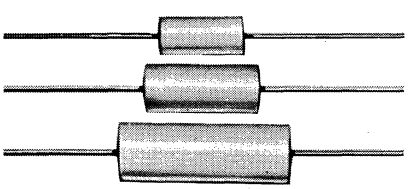
Super Wee-Ductor — Manufactured in accordance with MIL-C-15305D, Molded Magnetically shielded with inductance range 0.1 to 100,000 μH ±10% tolerance.
Molded Envelope:
0.163″ diameter x 0.410″ length.

Super Wee-Wee-Ductor—Miniature shielded with inductance range 15.0 μH to 10,000 μH. Designed to MIL-C-15305, Grade 1, Class B.
Epoxy-Molded Envelope:
0.125″ diameter x 0.335″ length.

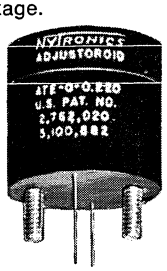
Pee-Cee Ductor — This inductor is designed to meet MIL-C-15305C, Grade 1, Class B. Printed board mounting is facilitated by 0.200 grid spacing and unit has shielded construction to allow maximum density packaging. Standardized in 73 stock values.



S-M-L Inductors—Non-shielded with inductance range 0.1 to 10,000 μH. Designed to MIL-C-15305, Grade 1, Class B.
Molded Envelope:
"S" Type — 0.188″ diameter x 0.44″ length
"M" Type — 0.25″ diameter x 0.60″ length
"L" Type — 0.31″ diameter x 0.90″ length

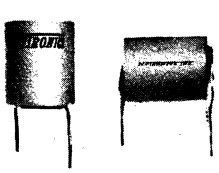


Adjustoroid—Adjustable toroid available in nominal values from 0.01 Hy to 12 Hy. This unit provides stepless adjustment in a completely hermetically sealed package.



Wee V-L — Magnetically shielded adjustable range 0.1 to 100,000 μH. Designed to MIL-C-15305, Grade 1, Class B. Epoxy Molded 0.300″ diameter x 0.400″ length.

Variable Inductor — Unlimited with adjustable range 0.1 to 4700 μH. Designed to meet MIL-C-15305, Grade 1, Class B.
Encapsulated Envelope:
0.400″ diameter x 0.500″ length. Vertical or Horizontal mounting.



Wee-Chip Inductor—The Wee-Chip Inductor is a magnetically shielded miniaturized inductor made especially for mounting on substrates. Copper terminations are of the wrap-around type for the highest degree of mounting flexibility. Available from stock in 23 standard values.

Deci-Ductor — Subminiature with inductance range 0.1 to 1000 μH. Designed to MIL-C-15305, Grade 1, Class B.
Molded Envelope:
0.100″ diameter x 0.250″ length.

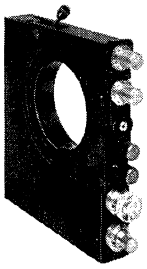
Pee-Dee Ductor — For hybrid circuit applications. Smallest unshielded inductor available. Less than 3/32″. Epoxy-encapsulated. Axial leads. Designed to meet MIL-C-15305. Forty-nine standard values, 0.1 to 1000 μH, ±10%.

Nytronics, Inc.

YOKE SPECIALISTS

COMPLETE LINE for every Military and Industrial Purpose in PRODUCTION QUANTITIES or CUSTOM DESIGNED to your specific requirements

- Yokes for ALL types of ⅞", 1", 1⅛", 1½", and 2⅛" neck dia. CRT's—only representative types are shown.
- Special designs for all types of computer and high speed character displays.
- Wide variety of coil impedances in both push-pull and single-ended configurations.
- Most experienced yoke engineers in the industry, plus complete production and testing capability.



MODEL D4499

MICROMETER—CONTROLLED PRECISION COIL ALIGNER

For fast, convenient alignment of yokes and focus coils in (1) ultra precision displays and flying spot scanners, and (2) laboratory research and prototype evaluation. **Exclusive** independent micrometer adjustment of pitch, yaw, horizontal and vertical translation . . . with firm precision locking. **Exclusive** true precision control and exact repeatability, plus rugged construction. For full details request catalog page.

TYPE F20

PRECISION ELECTRO-MAGNETIC FOCUS COILS for ⅞", 1½", 2⅛" and other neck dia. CRT's.

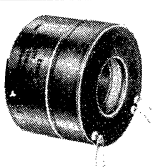
All designed for ultimate focus. Negligible effect on spot size when properly aligned to beam. Static types (all sizes)—low power or high power. Dynamic-static combinations (1½" neck dia.) . . . compact single gap design . . . or double gap design to simplify circuitry by eliminating coupling between static and dynamic coils. Wide range of coil resistances available. For full technical details, request catalog pages. Please specify your CRT and beam accelerating voltage.

TYPE P7

TYPE P8

ANTI-PINCUSHION DEVICES, both PM and EM types

Eliminates CRT geometrical picture distortion. Type P7 permanent magnet anti-pincushion assembly requires no current . . . occupies small space . . . easily adjustable . . . mounts directly on standard yokes . . . available in wide choice of magnet strengths with tight tolerances. Type P8 electromagnetic coil anti-pincushion assembly has very high precision construction . . . allows convenient front panel adjustment. For full technical details request catalog page.

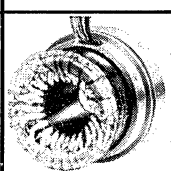


TYPE C4942

Request catalog page

SHIELDED DYNAMIC FOCUS COIL

For sharp focus applications up to 25kv accelerating potential, such as scan converter storage tubes and flat faced high resolution CRT's. Static and dynamic coils combined into a single gap to ease alignment and position. Gap in forward position for superior focus and best image-to-object ratio.



TYPES Y58-Y60-Y62-Y64 for 42°, 52°, 70°, & 90° Deflection Angles

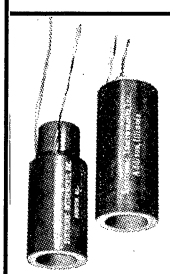
PRECISION STATOR YOKES for 1½" neck dia. CRT's.

High efficiency and accuracy achieved by stator type core which also provides exceptionally low astigmatism and residual magnetism. Push-pull or single-ended coils for time shared sweep displays, character displays and others. Request catalog sheet for full details.

TYPES Y68, Y70, Y72, Y74 for 42°, 52°, 70° & 90° Deflection Angles

FERRITE STATOR TYPE HIGH Q DEFLECTION YOKES for 1½" neck dia. CRT's

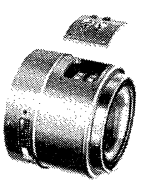
Applications: (a) high speed random positioning and alpha-numeric displays requiring fast settling and high speed strokes, and (b) high resolution resonant displays requiring high Q and high accuracy.



TYPES V21 & V22

VIDICON YOKES & FOCUS COILS for 1" Vidicons

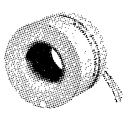
IN VOLUME PRODUCTION NOW. For both commercial and military applications. Engineering Service available. Special designs for all types of 1" vidicons including electrostatic focus magnetic deflection types. For full technical details request catalog page.



TYPE Y25-R Series Up to 52° and 70° Deflection Angles

COMPACT ROTATING COIL YOKES for 1½" neck dia. CRT's

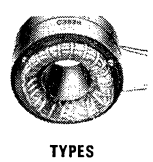
For Radar Plan Position Indicator and all other rotating coil applications. Versions available with dc off-centering coils. Complete in aluminum housing containing deflection coil, slip rings and brush assembly, drive gear and bearing for easy installation into any equipment design. Only 3¾" OD x 2 11/16" long. For technical details request catalog page.



TYPE Y65 Up to 70° Deflection Angle

ENCAPSULATED MINIATURE PRECISION YOKE for ⅞" or 1" neck dia. CRT's.

Push-pull and single-ended coils available in a wide range of inpedances for transistor drivers or vacuum tube circuits. Features electrically balanced windings with equal deflection sensitivities. Close angular tolerances of the display are achieved by precise construction. Epoxy encapsulated to withstand extreme environments. For full technical details, request catalog page.



TYPES C3287/C3528

MAGNETIC SCAN CONVERTER DEFLECTION YOKES

Stator Design for standard 1½ inch neck diameter scan converter storage tubes. High resolution, geometrical accuracy and sensitivity are combined to offer power savings, plus ultimate performance. A desirable short precision magnetic field is achieved by combining short overall length and small ears with the proper distribution, insertion and extreme care in construction. Magnetically shielded designs also available. Request catalog sheet for full details.

For engineering assistance in solving display problems, contact our nearest rep:

Boston Area	(617) 762-3164	Indianapolis	(317) 244-7867
Connecticut	(203) 966-4630	Chicago Area	(312) 446-9085
New York	(212) 695-3727	Minneapolis	(612) 920-1046
Philadelphia Area	(215) 789-2320	Dallas Area	(214) 631-0905
Maryland/D.C.	(301) 833-2039	Houston	(713) 667-5903
Florida (Orlando)	(305) 855-4510	Denver/Salt Lake	(303) 423-1020
Florida (St. Petersburg)	(813) 347-6183	Los Angeles Area	(213) 447-3511
Florida (Miami)	(305) 746-4591	San Francisco Area	(415) 322-8461

syntronic INSTRUMENTS, INC.

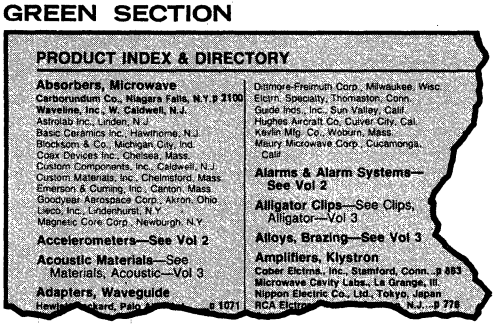
100 Industrial Road, Addison, Illinois 60101, (20 miles west of Chicago) Phone 312, 543-6444

Specialists in Components and Equipment used with Cathode Ray Tubes

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Wavelins, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieb, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo [illegible] p 1071
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Electr. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kaylin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

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Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
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Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn[illegible] N.J. ..p 778

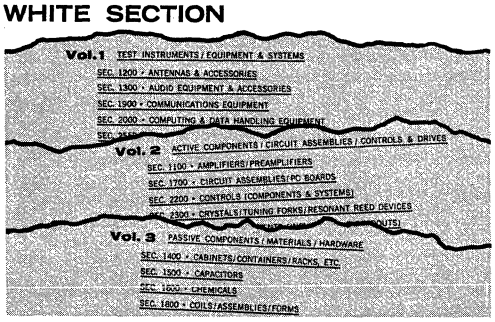
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
[illegible]OUTS)
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

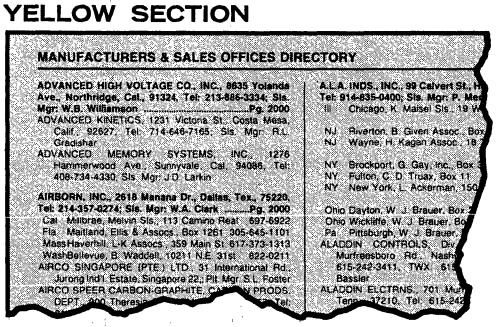
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION

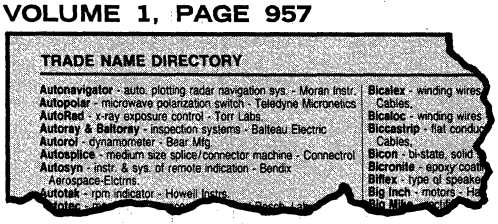

MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria, St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradisher
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330; Sls. Mgr: J.O. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-6274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal. Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla. Maitland, Ellis & Assocs., Box 1261 305-645-1101
MassHaverhill, L-K Assocs., 359 Main St. 617-373-1313
WashBellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Indl. Estate, Singapore 22; Plt. Mgr. S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, [illegible] PRODS. DEPT., [illegible] Tel:
A.L.A. INDS., INC., 99 Calvert St., H[illegible] Tel: 914-835-0400; Sls. Mgr: P. Mes[illegible] Ill. Chicago, K. Maisel Sls., 19 W[illegible] N.J. Riverton, B. Given Assoc., Box[illegible] N.J. Wayne, H. Kagen Assoc., 18[illegible] NY. Brockport, G. Gay, Inc., Box [illegible] NY. Fulton, C. D. Truax, Box 11[illegible] NY. New York, L. Ackerman, 150[illegible] Ohio Dayton, W. J. Brauer, Box [illegible] Ohio Wickliffe, W. J. Brauer, Bo[illegible] Pa. Pittsburgh, W. J. Brauer, [illegible]
ALADDIN CONTROLS, Dur[illegible] Murfreesboro Rd., Nash[illegible] 615-242-3411, TWX 615[illegible] Bassler
ALADDIN ELCTRNS., 701 Mur[illegible] Tenn., 37210, Tel: 615-24[illegible]

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

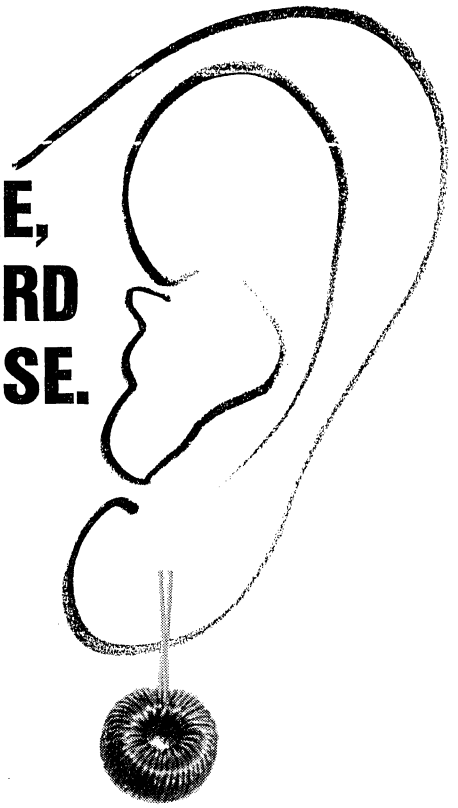
Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible]
Bicalex - winding wires, Cables.
Bicaloc - winding wires,
Biccastrip - flat conduc[illegible] Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati[illegible]
Biflex - type of speake[illegible]
Big Inch - motors - He[illegible]
Bio Mike - [illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

TOKIN, THE FERRITE CORE PEOPLE, WANT TO WHISPER A WORD ABOUT NOISE.



TOKIN SN Coils is the word—the best solution today to performance-noise problems . . . especially thyristor-originated noise.
TOKIN SN Coils are made with our own magnetic dust cores—latest development in a long line of dust-core products. The saturation magnetic flux density reads out to an impressive 15,000 gausses—four to five times that of ferrite cores.
TOKIN SN Coils' very small size allows for extra compact circuit design; heat resistance is good for continuous performance at up to 200°C.
TOKIN SN Coils completely cover the RF range with top permeability for HF.

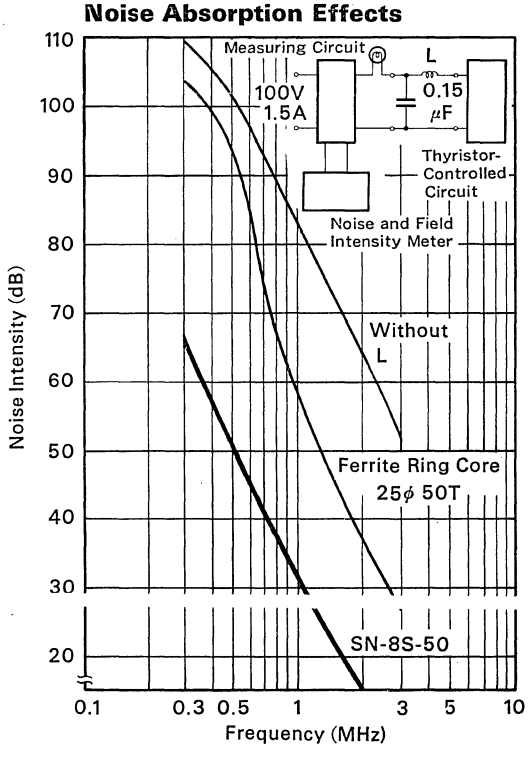
Standard SN Coils

Item / Type	Current capacity I (A)	Inductance L (μH)*	Dimensions (outside diameter x height) (mm)
SN-8S-30	2	26 or more	15ϕ x 7
SN-8S-40	2	50 or more	15ϕ x 7
SN-8S-50	2	72 or more	16ϕ x 8
SN-8D-30	2	45 or more	16ϕ x 13
SN-8D-40	2	80 or more	17ϕ x 14
SN-10-30	3	46 or more	20ϕ x 10
SN-10-40	3	82 or more	22ϕ x 11
[illegible]	[illegible]	[illegible]	[illegible]
SN-12-40	5	65 or more	24ϕ x 10
SN-12-50	5	100 or more	26ϕ x 12

* 100kHz 1mA.

We also manufacture, to order, large capacity SN coils (8A, 10A, 15A, 20A).

Noise Absorption Effects



Main Products: Ferrite Cores, Memory Cores, Memory Matrices, Ferrite Magnetostrictive Vibrators, Pulse Transformers, Permanent Magnets (Cast, Ferrite), Tape Wound Cores, Bobbin Cores, Magnetic Laminations, Fe-Co Alloys, Sendust Cores

Tokin
Tohoku Metal Industries, Ltd.

Koei Bldg., 13-10, 7-chome, Ginza, Chuo-ku, Tokyo, Japan Telephone: Tokyo 542-6171 Telex: 02522117(TOHOKUMETAL TOK)

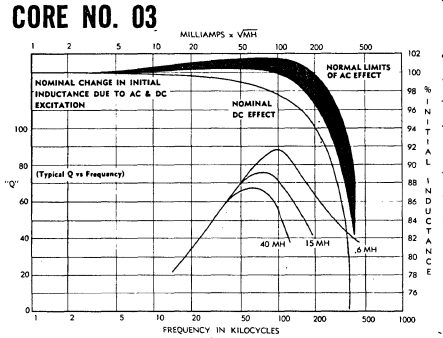
TOROTEL INC.

13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030

PHONE: 816 SO 1-6314 TWX-910-777-7037

- OFFERING THE MOST COMPLETE LINE OF TOROIDAL INDUCTORS AVAILABLE FROM STOCK FOR 24 HOUR DELIVERY.
- PLASTIC MOLDED ("P" SERIES) INDUCTORS ARE MANUFACTURED TO MIL-T27B, GRADE 5, CLASS S, LIFE EXPECTANCY X.
- METAL ENCASED ("M" SERIES) ARE MANUFACTURED TO MIL-T-27B, GRADE 4, CLASS R, LIFE EXPECTANCY X.
- STANDARD INDUCTANCE TOLERANCE: ±1%.
- TEMPERATURE STABILITY: ±1% from −55°C to +100°C.

CORE NO. 03



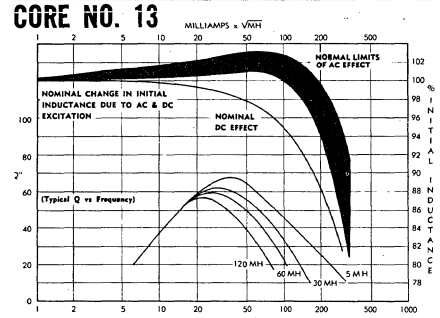
INDUCTANCE: Up to 250 MH.
FREQUENCIES: Up to 50 KHz.
TYPICAL DCR: 1.5 Ohms/MH.

DIMENSIONS

Type	Case	A	B	C	D
P03	Style 1	.285	.450	.300	.025
M03	Style 5	.385	.448	.200	.020

STANDARD INDUCTANCE VALUES (MH)	
1.0	15.0
1.25	17.5
1.5	20.0
1.75	24.0
2.0	30.0
2.4	36.0
2.5	43.0
3.0	50.0
3.6	60.0
4.3	72.0
5.0	75.0
6.0	86.0
7.2	100.0
7.5	120.0
8.0	150.0
8.6	175.0
10.0	178.0
12.0	200.0
12.5	250.0

CORE NO. 13



INDUCTANCE: Up to 100 MH.
FREQUENCIES: 10 to 200 KHz.
TYPICAL DCR: 3 Ohms/MH.

DIMENSIONS

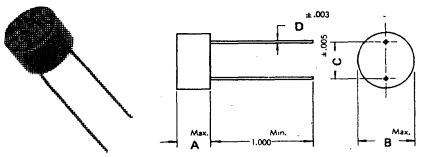
Type	Case	A	B	C	D
P13	Style 1	.285	.450	.300	.025
M13	Style 5	.385	.448	.200	.020

STANDARD INDUCTANCE VALUES (MH)	
.50	8.6
.60	10.0
.72	12.0
.86	15.0
1.0	17.5
1.25	20.0
1.5	24.0
1.75	25.0
2.0	30.0
2.4	36.0
2.5	40.0
3.0	43.0
3.6	50.0
4.3	60.0
5.0	72.0
6.0	86.0
7.2	100.0

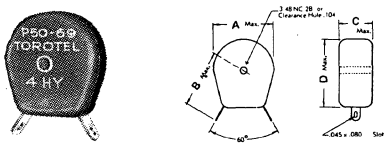
STANDARD CASE STYLES

SEE DIMENSION TABLES UNDER CORE TYPES

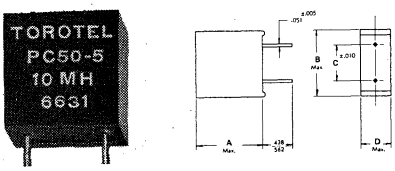
STYLE 1 EPOXY ENCAPSULATED TYPES P03, P13, P29, PS50 & PS51



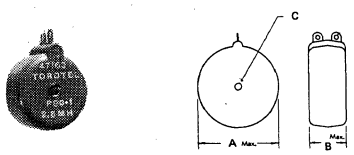
STYLE 2 COMPRESSION MOLDED TYPES P50, P51



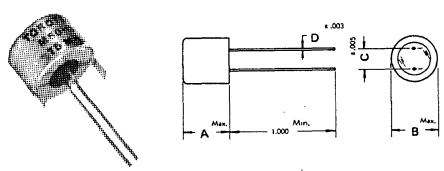
STYLE 3 EPOXY ENCASED TYPES PC50, PC51, PC06, PC48



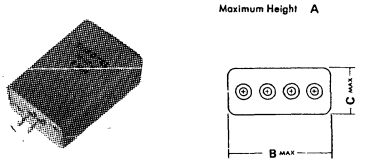
STYLE 4 COMPRESSION MOLDED TYPES P90, P89, P06, P48, P30, & P84



STYLE 5 HERMETIC SEALED TYPES M03, M13, M29, M50, M51, & M53



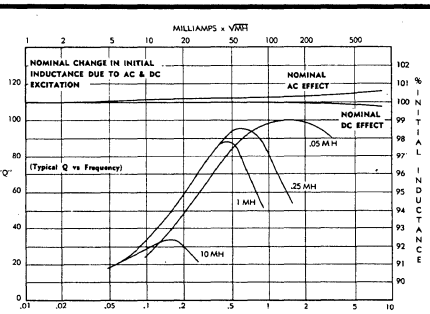
STYLE 6 HERMETIC SEALED TYPES M90, M89, M06, M48, M30, & M84



STANDARD MOUNTING PROVISIONS VARY. SEE SPECIFICATIONS UNDER CORE NUMBERS.

ALL CORE TYPES ALSO AVAILABLE IN "U SERIES" UNCASED UNITS.

CORE NO. 29



INDUCTANCE: Up to 15 MH.
FREQUENCIES: 50 KHz-5 MHz.
TYPICAL DCR: 20 Ohms/MH.

DIMENSIONS

Type	Case	A	B	C	D
P29	Style 1	.285	.450	.300	.025
M29	Style 5	.385	.448	.200	.020

STANDARD INDUCTANCE VALUES (MH)			
.05	.200	.750	3.00
.06	.240	.860	3.60
.072	.250	1.00	4.00
.075	.300	1.20	4.30
.086	.360	1.25	5.00
.100	.400	1.50	6.00
.120	.430	1.75	7.20
.125	.500	2.00	7.50
.150	.600	2.40	8.60
.175	.720	2.50	10.0

TOROTEL INC

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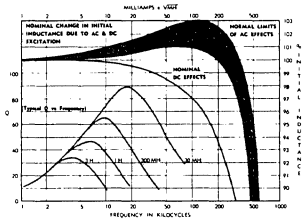
CORE NO. 50



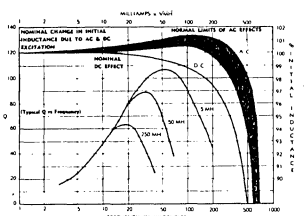
DIMENSIONS

TYPE	CASE	A	B	C	D
P50	Style 2	.693	.640	.380	.743
PS50	Style 1	.438	.680	.300	.031
PC50	Style 3	.743	.743	.500	.350
M50	Style 5	.438	.680	.150	.031

STANDARD INDUCTANCE VALUES		
1.0 MH	40. MH	430. MH
2.5 MH	43. MH	500. MH
5.0 MH	50. MH	600. MH
6.0 MH	60. MH	720. MH
7.2 MH	72. MH	750. MH
7.5 MH	75. MH	860. MH
8.6 MH	86. MH	1.0 HY
10.0 MH	100. MH	1.2 HY
12. MH	120. MH	1.25 HY
12.5 MH	125. MH	1.5 HY
15. MH	150. MH	1.75 HY
17.5 MH	175. MH	2.0 HY
20. MH	200. MH	2.4 HY
24. MH	240. MH	2.5 HY
25. MH	250. MH	3.0 HY
30. MH	300. MH	3.6 HY
36. MH	360. MH	4. HY
	400. MH	

MAXIMUM INDUCTANCE: 4.5 Hy.
FREQUENCY RANGE: Up to 20 KHz.
TYPICAL DCR: 500 Ohms/Hy.

CORE NO. 51



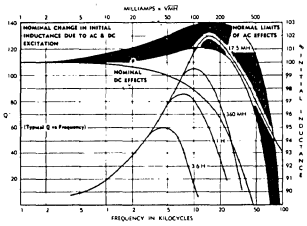
DIMENSIONS

TYPE	CASE	A	B	C	D
P51	Style 2	.693	.640	.380	.743
PS51	Style 1	.438	.680	.300	.031
PC51	Style 3	.743	.743	.500	.350
M51	Style 5	.438	.680	.150	.031

STANDARD INDUCTANCE VALUES		
1.0 MH	8.6 MH	72. MH
1.2 MH	10. MH	86. MH
1.5 MH	12. MH	100. MH
1.75 MH	15. MH	120. MH
2.0 MH	17.5 MH	150. MH
2.4 MH	20. MH	175. MH
3.0 MH	24. MH	200. MH
3.6 MH	30. MH	240. MH
4.3 MH	36. MH	300. MH
5.0 MH	43. MH	360. MH
6.0 MH	50. MH	430. MH
7.2 MH	60. MH	500. MH

MAXIMUM INDUCTANCE: 1 Hy.
FREQUENCY RANGE: 10 KHz to 100 KHz.
TYPICAL DCR: 1 Ohm/MH.

CORE NO. 90



DIMENSIONS

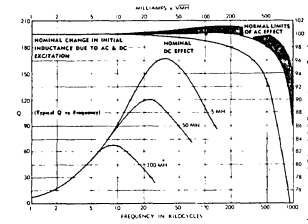
TYPE	CASE	A	B	C
P90	Style 4	.875	.453	6-32 thd.
M90	Style 6	1.093	.938	.516

TYPE M90 MTG: 2 4-40 x .156 INSERTS

STANDARD INDUCTANCE VALUES		
3.0 MH	40. MH	430. MH
3.6 MH	43. MH	500. MH
4.0 MH	50. MH	600. MH
4.3 MH	60. MH	720. MH
5.0 MH	75. MH	860. MH
7.2 MH	86. MH	1.0 HY
7.5 MH	100. MH	1.2 HY
8.6 MH	120. MH	1.25 HY
10.0 MH	125. MH	1.5 HY
12.0 MH	150. MH	1.75 HY
12.5 MH	175. MH	2.0 HY
15.0 MH	200. MH	2.4 HY
20. MH	250. MH	3.0 HY
24. MH	300. MH	3.6 HY
25. MH	360. MH	4.0 HY
30. MH	400. MH	5.0 HY
36. MH		6.0 HY

MAXIMUM INDUCTANCE: 9 Hy.
FREQUENCY RANGE: To 20 KHz.
TYPICAL DCR: 300 Ohms/Hy.

CORE NO. 89



DIMENSIONS

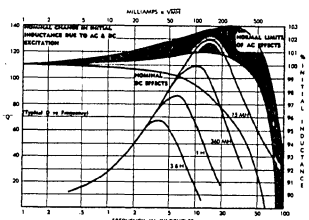
TYPE	CASE	A	B	C
P89	Style 4	.875	.453	6-32 thd.
M89	Style 6	1.093	.938	.516

TYPE M89 MTG.: 2 4-40 x .156 INSERTS

STANDARD INDUCTANCE VALUES		
1.5 MH	12.0 MH	100. MH
1.75 MH	15.0 MH	120. MH
2.0 MH	17.5 MH	150. MH
2.4 MH	20. MH	175. MH
3.0 MH	24. MH	200. MH
3.6 MH	30. MH	240. MH
4.3 MH	36. MH	300. MH
5.0 MH	43. MH	360. MH
6.0 MH	50. MH	430. MH
7.2 MH	60. MH	500. MH
8.6 MH	72. MH	600. MH
10.0 MH	86. MH	

MAXIMUM INDUCTANCE: 1.5 Hy.
FREQUENCY RANGE: To 100 KHz.
TYPICAL DCR: 700 hms/Hy.

CORE NO. 06



DIMENSIONS

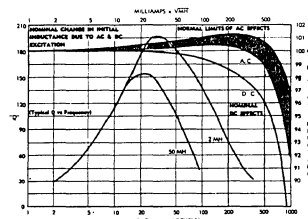
TYPE	CASE	A	B	C
M06	Style 6	1.250	1.078	.516
P06	Style 4	1.068	.505	6-32 thd.

TYPE M06 MTG.: 2 4-40 x .188 INSERTS

STANDARD INDUCTANCE VALUES		
5.0 MH	60. MH	720. MH
6.0 MH	72. MH	750. MH
7.2 MH	75. MH	860. MH
7.5 MH	86. MH	1.0 HY
8.6 MH	100. MH	1.2 HY
10. MH	120. MH	1.25 HY
12. MH	125. MH	1.5 HY
12.5 MH	150. MH	1.75 HY
15. MH	175. MH	2.0 HY
17.5 MH	200. MH	2.4 HY
20. MH	240. MH	2.5 HY
24. MH	250. MH	3.0 HY
25. MH	300. MH	3.6 HY
30. MH	360. MH	4.3 HY
36. MH	400. MH	5.0 HY
40. MH	430. MH	6.0 HY
43. MH	500. MH	7.2 HY
50. MH	600. MH	

MAXIMUM INDUCTANCE: 7.2 Hy.
FREQUENCY RANGE: To 20 KHz.
TYPICAL DCR: 210 Ohms/Hy.

CORE NO. 48



DIMENSIONS

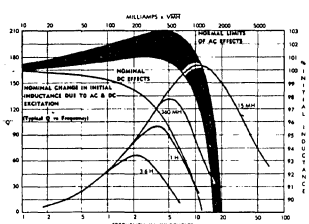
TYPE	CASE	A	B	C
P48	Style 4	1.068	.505	6-32 thd.
M48	Style 6	1.250	1.078	.516

TYPE M48 MTG.: 2 4-40 x .188 INSERTS

STANDARD INDUCTANCE VALUES		
2.0 MH	15. MH	100. MH
2.4 MH	17.5 MH	120. MH
3.0 MH	20. MH	150. MH
3.6 MH	24. MH	175. MH
4.3 MH	30. MH	200. MH
5.0 MH	36. MH	240. MH
6.0 MH	43. MH	300. MH
7.2 MH	50. MH	360. MH
8.6 MH	60. MH	430. MH
10. MH	72. MH	500. MH
12. MH	86. MH	600. MH

MAXIMUM INDUCTANCE: 1 Hy.
FREQUENCY RANGE: To 100 KHz.
TYPICAL DCR: 420 Ohms/Hy.

CORE NO. 30



DIMENSIONS

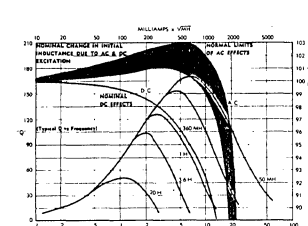
TYPE	CASE	A	B	C
P30	Style 4	1.318	.724	6-32 thd.
M30	Style 6	1.750	1.297	.719

TYPE M30 MTG.: 2 4-40 x .188 INSERTS

5.0 MH	75. MH	1.25 HY
6.0 MH	86. MH	1.5 HY
7.2 MH	100. MH	1.75 HY
7.5 MH	120. MH	2.0 HY
8.6 MH	125. MH	2.4 HY
10. MH	150. MH	2.5 HY
12. MH	175. MH	3.0 HY
12.5 MH	200. MH	3.6 HY
15. MH	240. MH	4.0 HY
17.5 MH	250. MH	4.3 HY
20. MH	300. MH	5.0 HY
24. MH	360. MH	6.0 HY
25. MH	400. MH	7.2 HY
30. MH	430. MH	7.5 HY
36. MH	500. MH	8.6 HY
40. MH	600. MH	10.0 HY
43. MH	720. MH	12.0 HY
50. MH	750. MH	12.5 HY
60. MH	860. MH	15.0 HY
72. MH	1.0 HY	17.5 HY
	1.2 HY	

MAXIMUM INDUCTANCE: 17.5 Hy.
FREQUENCY RANGE: To 20 KHz.
TYPICAL DCR: 105 Ohms/Hy.

CORE NO. 84



DIMENSIONS

TYPE	CASE	A	B	C
P84	Style 4	1.730	.755	8-32 thd.
M84	Style 6	2.281	1.906	.563

M84 MTG.: 4 6-32 x .375 STUDS

5.0 MH	86. MH	1.25 HY
6.0 MH	100. MH	1.5 HY
7.2 MH	120. MH	1.75 HY
7.5 MH	125. MH	2.0 HY
8.5 MH	150. MH	2.4 HY
10. MH	175. MH	2.5 HY
12. MH	200. MH	3.0 HY
12.5 MH	240. MH	3.6 HY
15. MH	250. MH	4.0 HY
17.5 MH	300. MH	4.3 HY
20. MH	360. MH	5.0 HY
24. MH	400. MH	6.0 HY
25. MH	430. MH	7.2 HY
30. MH	500. MH	7.5 HY
36. MH	600. MH	8.6 HY
40. MH	720. MH	10.0 HY
43. MH	750. MH	12.0 HY
50. MH	860. MH	12.5 HY
60. MH	1.0 HY	15.0 HY
72. MH	1.2 HY	17.5 HY
75. MH		20.0 HY

MAXIMUM INDUCTANCE: 25 Hy.
FREQUENCY RANGE: To 12 KHz.
TYPICAL DCR: 75 Ohms/Hy.

TOROTEL INC.

13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030

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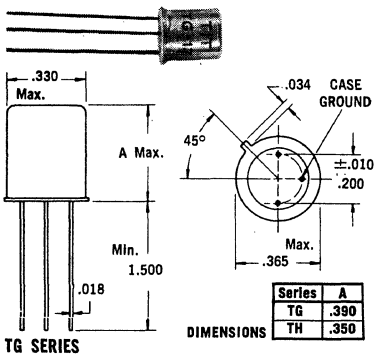
MINI-L HERMETICALLY SEALED R.F. INDUCTORS — TG, TH SERIES



Series	A
TG	.390
TH	.350

DIMENSIONS

- HERMETICALLY SEALED, HIGH "Q" INDUCTOR IN A TO-5 TRANSISTOR CONFIGURATION.
- LOW EXTERNAL MAGNETIC AND ELECTROSTATIC FIELD.
- AMBIENT TEMPERATURE RANGE: −55°C to +85°C.
- DIELECTRIC WITHSTANDING VOLTAGE: 100 volts rms.
- INSULATION RESISTANCE: 10,000 meg. ohms Min.

TG SERIES

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-T-27B, GRADE 4, CLASS R.
- FREQUENCY RANGE: 10 to 500 KHz.
- INDUCTANCE RANGE: 1 to 500 mh.
- INDUCTANCE TOLERANCES: ±5%.
- INDUCTANCE STABILITY: ±2% (−20°C to +85°).

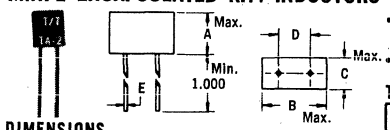
TH SERIES

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-C-150305C, GRADE 1, CLASS O.
- FREQUENCY RANGE: 100 KHz to 10 KHz.
- INDUCTANCE RANGE: 10 to 1000.
- INDUCTANCE TOLERANCES: 10 uh through 33 uh ±10%, 39 uh through 130 uh ±5%, greater than and including 150 uh ±3%.
- INDUCTANCE STABILITY: ±2% (−20°C to +85°C).

Part No.	Inductance (MH)	Inductance Test Freq. (KHz)	"Q" Min.	"Q" Test Freq. (KHz)	DCR Max. (ohms)	Min. SRF (MHz)	DC Curr. (ma)
TG- 1	1.0	10	120	200	3.3	1500	123
TG- 2	1.0	10	120	200	3.6	1300	118
TG- 3	1.5	10	120	200	4.8	1160	102
TG- 4	1.75	10	120	200	5.2	1080	98
TG- 5	2.0	10	120	200	5.7	1000	94
TG- 6	2.4	10	120	200	7.9	920	80
TG- 7	3.0	10	120	150	8.9	820	75
TG- 8	3.6	10	120	150	9.8	730	71
TG- 9	4.3	10	120	150	13.7	660	60
TG-10	5.0	10	120	150	14.7	600	58
TG-11	6.0	10	120	150	20.0	540	50
TG-12	7.2	10	120	100	21.8	480	48
TG-13	8.6	10	100	100	24.0	430	45
TG-14	10.0	10	100	100	32.4	400	39
TG-15	12.0	10	100	100	34.8	360	38
TG-16	15.0	10	100	100	39.1	320	36
TG-17	17.5	10	85	70	55.0	300	30
TG-18	20.0	10	85	70	60.0	280	29
TG-19	24.0	10	85	70	64.7	250	28
TG-20	30.0	10	85	70	86.3	220	24
TG-21	36.0	10	85	70	95.8	195	23
TG-22	43.0	10	85	70	132	185	19
TG-23	50.0	10	85	70	143	165	18
TG-24	60.0	10	75	50	155	145	18
TG-25	72.0	10	75	50	172	130	17
TG-26	86.0	10	75	50	233	125	15
TG-27	100	10	75	50	252	115	14
TG-28	120	5	75	50	290	105	13
TG-29	150	5	50	40	323	95	13
TG-30	175	5	50	40	350	85	12
TG-31	200	5	50	40	477	80	10
TG-32	240	5	50	40	515	71	10
TG-33	300	5	50	40	735	63	8
TG-34	360	5	30	30	1005	57	7
TG-35	430	5	30	30	1100	51	6.5
TG-36	500	5	30	20	1200	48	6.5

Part No.	Inductance (uh)	Inductance Test Freq. (KHz)	"Q" Min.	"Q" Test Freq. (KHz)	DCR Max. (ohms)	Min. SRF (MHz)	DC Curr. (ma)
TH- 7	10	1000	75	2500	2.4	35.0	102
TH- 8	12	1000	75	2500	2.5	30.0	100
TH- 9	15	1000	75	2500	2.6	25.0	98
TH-10	18	1000	75	2500	2.7	23.0	96
TH-11	22	1000	75	2500	2.8	20.0	94
TH-12	27	1000	75	2500	2.9	17.0	93
TH-13	33	1000	75	2500	3.0	14.0	91
TH-14	39	500	70	2500	3.1	11.0	90
TH-15	47	500	70	2500	3.2	10.0	88
TH-16	56	500	70	2500	3.3	9.5	87
TH-17	68	500	70	2500	3.4	9.0	85
TH-18	82	500	70	2500	4.5	8.0	74
TH-19	100	500	70	1500	5.1	7.5	70
TH-20	110	500	70	1500	6.0	7.0	64
TH-21	120	500	70	1500	6.2	6.5	63
TH-22	130	500	70	1500	6.4	6.0	62
TH-23	150	500	70	1500	6.6	5.5	61
TH-24	160	500	60	790	8.6	5.3	54
TH-25	180	500	60	790	9.0	5.0	52
TH-26	200	500	60	790	9.5	4.5	51
TH-27	220	250	60	790	10.0	4.0	50
TH-28	240	250	60	790	10.6	3.8	48
TH-29	270	250	60	790	11.2	3.6	48
TH-30	300	250	60	790	14.2	3.4	42
TH-31	330	250	60	790	14.6	3.2	41
TH-32	360	250	60	790	15.0	3.0	41
TH-33	390	250	60	790	15.6	2.9	40
TH-34	430	250	60	790	16.4	2.8	39
TH-35	470	250	60	790	20.4	2.7	35
TH-36	510	250	60	790	21.8	2.6	34
TH-37	560	250	60	790	23.6	2.5	32
TH-38	620	250	60	790	24.6	2.3	32
TH-39	680	250	50	790	25.8	2.1	31
TH-40	750	250	50	790	26.8	1.9	31
TH-41	820	250	50	790	38.4	1.7	25
TH-42	910	250	50	790	40.8	1.5	25
TH-43	1000	250	50	790	42.6	1.4	24

MINI-L ENCAPSULATED R.F. INDUCTORS — TA, TF, TB & TD SERIES



DIMENSIONS

Series	A	B	C	D	E	Max. Power
TA	.225	.210	.110	.100	.020	0.2 Watt
TB	.300	.280	.160	.200	.025	0.33 Watt
TD	.390	.390	.197	.200	.025	0.5 Watt
TF	.225	.210	.110	.100	.020	0.2 Watt

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-C-15305C, GRADE 1, CLASS B (−55°C to +125°C).
- DIELECTRIC WITHSTANDING VOLTAGE: 700 volts rms.
- RATED TEMPERATURE RISE: 35°C at an ambient temperature of 90°C.
- LEADS: Tinned Copper. Weldable leads available by special order.

TA SERIES

- MIN. "Q": 60 to 70.
- INDUCTANCE RANGE: 1 to 10 uh.
- FREQUENCY RANGE: 1 to 50 mcs.
- INDUCTANCE TOLERANCES: Less than 1.0 uh, ±10%. Greater than or equal to 1.0 uh, ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: +50 PPM/°C maximum.
- MAXIMUM POWER DISSIPATION: 0.2 watt.

TF SERIES

- MIN. "Q": 60 to 80.
- FREQUENCY RANGE: 20 to 300 mcs.
- INDUCTANCE RANGE: .01 to 1 uh.
- INDUCTANCE TOLERANCES: Less than 0.1 uh, ±20%. Greater than or equal to 0.1 uh, ±10%. Closer tolerances available by special request.
- INDUCTANCE TC: +200 PPM/°C maximum.
- MAXIMUM POWER DISSIPATION: 0.2 watt.

TD SERIES

- MIN. "Q": 40 to 80.
- INDUCTANCE RANGE: 100 to 10,000 uh.
- RECOMMENDED FREQUENCY RANGE: 50 kcs to 10 mcs.
- INDUCTANCE TOLERANCE: ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: From +60 PPM/°C, maximum to +300 PPM/°C maximum, depending upon inductance value.
- MAXIMUM POWER DISSIPATION: .50 watt.

TB SERIES

- MIN. "Q": 50 to 80.
- RECOMMENDED FREQUENCY RANGE: 50 kcs to 35 mcs.
- INDUCTANCE RANGE: 10 to 1,000 uh.
- INDUCTANCE TOLERANCE: ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: From +60 PPM/°C maximum to +300 PPM/°C maximum, depending upon inductance value.
- MAXIMUM POWER DISSIPATION: .33 watt.

TA SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TA- 1	0.10	60	25	450	0.04	2230
TA- 2	0.12	60	25	410	0.05	2000
TA- 3	0.15	65	25	350	0.06	1825
TA- 4	0.18	65	25	325	0.07	1675
TA- 5	0.22	65	25	300	0.08	1550
TA- 6	0.27	65	25	280	0.09	1475
TA- 7	0.33	65	25	260	0.10	1400
TA- 8	0.39	70	25	240	0.11	1325
TA- 9	0.47	70	25	220	0.15	1125
TA-10	0.56	70	25	200	0.20	1000
TA-11	0.68	70	25	180	0.25	900
TA-12	0.82	70	25	165	0.30	810
TA-13	1.0	70	25	150	0.35	750
TA-14	1.2	65	7.9	130	0.25	875
TA-15	1.5	65	7.9	120	0.30	800
TA-16	1.8	65	7.9	110	0.50	600
TA-17	2.2	65	7.9	100	0.75	500
TA-18	2.7	65	7.9	90	0.90	450
TA-19	3.3	65	7.9	70	1.0	425
TA-20	3.9	65	7.9	60	1.2	400
TA-21	4.7	60	7.9	50	1.5	350
TA-22	5.6	60	7.9	45	1.7	325
TA-23	6.8	60	7.9	40	2.0	300
TA-24	8.2	60	7.9	37	2.4	290
TA-25	10.0	60	7.9	35	2.6	280

TB SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TB- 1	10	75	2.5	35	1.1	550
TB- 2	12	75	2.5	31	1.3	500
TB- 3	15	75	2.5	27	1.5	460
TB- 4	18	80	2.5	25	1.9	410
TB- 5	22	80	2.5	22	2.2	380
TB- 6	27	80	2.5	22	2.6	350
TB- 7	33	80	2.5	18	3.3	320
TB- 8	39	80	2.5	16	3.8	290
TB- 9	47	80	2.5	14	4.6	260
TB-10	56	80	2.5	12	5.6	240
TB-11	68	80	2.5	11	6.7	220
TB-12	82	80	2.5	10	8.1	200
TB-13	100	80	2.5	9.1	9.6	180
TB-14	120	50	0.79	8.2	10.0	175
TB-15	150	50	0.79	7.5	11.0	160
TB-16	180	50	0.19	6.5	12.0	155
TB-17	220	50	0.79	5.6	13.0	150
TB-18	270	55	0.79	5.0	17.0	125
TB-19	330	55	0.79	4.5	19.0	130
TB-20	390	55	0.79	4.0	21.0	120
TB-21	470	55	0.79	3.5	22.0	115
TB-22	560	55	0.79	3.0	24.0	110
TB-23	680	55	0.79	2.8	19.0	130
TB-24	820	50	0.79	2.5	23.0	120
TB-25	1,000	50	0.79	2.1	26.0	110

TF SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TF- 1	0.01	60	150	1000	0.02	3100
TF- 2	0.012	60	150	1000	0.02	3100
TF- 3	0.015	60	150	1000	0.02	3100
TF- 4	0.018	60	150	1000	0.02	3100
TF- 5	0.022	60	100	900	0.02	3100
TF- 6	0.027	60	100	800	0.02	3100
TF- 7	0.033	60	100	750	0.02	3100
TF- 8	0.039	60	100	700	0.02	3100
TF- 9	0.047	60	100	650	0.02	3100
TF-10	0.056	60	100	600	0.02	3100
TF-11	0.068	60	100	550	0.03	2500
TF-12	0.082	60	100	500	0.03	2500
TF-13	0.10	80	50	450	0.04	2200
TF-14	0.12	80	50	400	0.05	2000
TF-15	0.15	80	50	350	0.06	1800
TF-16	0.18	80	50	320	0.07	1650
TF-17	0.22	80	50	300	0.08	1500
TF-18	0.27	80	50	280	0.10	1400
TF-19	0.33	80	50	260	0.12	1300
TF-20	0.39	80	50	240	0.15	1150
TF-21	0.47	80	50	220	0.20	1000
TF-22	0.56	70	50	200	0.25	900
TF-23	0.68	70	50	180	0.30	800
TF-24	0.82	70	50	160	0.35	750
TF-25	1.0	70	50	150	0.40	700

TD SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TD- 1	100	75	790	8.4	6	280
TD- 2	120	75	790	7.5	7	260
TD- 3	150	75	790	6.8	8	240
TD- 4	180	75	790	6.1	10	220
TD- 5	220	80	790	5.4	12	200
TD- 6	270	80	790	4.7	14	180
TD- 7	330	80	790	4.2	17	165
TD- 8	390	80	790	3.8	20	150
TD- 9	470	75	790	3.4	.24	140
TD-10	560	75	790	3.1	28	130
TD-11	680	75	790	2.8	33	120
TD-12	820	75	790	2.5	40	110
TD-13	1,000	75	790	2.2	46	100
TD-14	1,200	45	250	1.9	30	120
TD-15	1,500	45	250	1.6	35	110
TD-16	1,800	50	250	1.4	40	105
TD-17	2,200	50	250	1.3	50	95
TD-18	2,700	50	250	1.2	60	85
TD-19	3,300	50	250	1.1	70	80
TD-20	3,900	50	250	1.0	80	75
TD-21	4,700	50	250	.9	90	70
TD-22	5,600	45	250	.8	100	65
TD-23	6,800	40	250	.7	140	60
TD-24	8,200	40	250	.6	160	55
TD-25	10,000	40	250	.6	175	50

TOROTEL INC.
13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030
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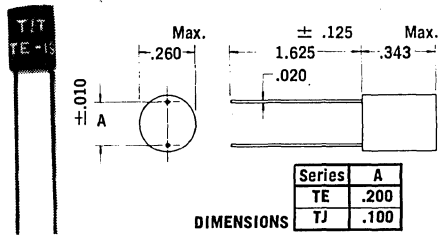
MINI-L ENCAPSULATED R.F. INDUCTORS — TE, & TJ SERIES



Series	A
TE	.200
TJ	.100

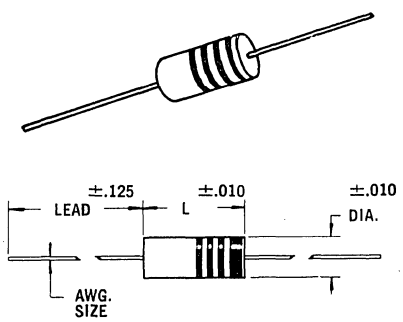
DIMENSIONS

- DESIGNED TO MEET MIL-C-15305C, GRADE 1, CLASS B (−55°C to +125°C).
- INDUCTANCE VALUES: 0.10 mh to 220.0 mh.
- FREQUENCY RANGE: 25 KHz to 2.5 MHz.
- DIELECTRIC WITHSTANDING VOLTAGE: 500 volts rms.
- RATED TEMPERATURE RISE: 35°C at an ambient temperature of 90°C.
- LEADS: Tinned Copper. Weldable leads available by special order.

Part No.	Inductance Ref. @ 1KHz (mh)	Min. "Q"	Test Freq. (KHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TJ-1 TE-1	0.10	80	790	4.5	1.8	450
TJ-2 TE-2	0.12	80	790	3.9	2.1	425
TJ-3 TE-3	0.15	75	790	3.6	2.3	400
TJ-4 TE-4	0.18	75	790	3.3	2.7	380
TJ-5 TE-5	0.22	75	790	3.0	2.9	360
TJ-6 TE-6	0.27	75	790	2.7	3.2	320
TJ-7 TE-7	0.33	70	790	2.5	3.6	300
TJ-8 TE-8	0.39	70	790	2.3	4.0	275
TJ-9 TE-9	0.47	65	790	2.1	4.4	265
TJ-10 TE-10	0.56	60	790	2.0	4.7	250
TJ-11 TE-11	0.68	55	790	1.8	5.4	240
TJ-12 TE-12	0.82	50	790	1.6	5.8	225
TJ-13 TE-13	1.00	80	250	1.5	8.7	190
TJ-14 TE-14	1.20	75	250	1.4	9.5	180
TJ-15 TE-15	1.50	75	250	1.2	11.6	160
TJ-16 TE-16	1.80	75	250	1.1	15.8	140
TJ-17 TE-17	2.20	75	250	0.95	17.3	130
TJ-18 TE-18	2.70	70	250	0.87	18.9	125
TJ-19 TE-19	3.30	70	250	0.80	25.2	110
TJ-20 TE-20	3.90	70	250	0.75	27.2	105
TJ-21 TE-21	4.70	65	250	0.70	31.5	100

Part No.	Inductance Ref. @ 1KHz (mh)	Min. "Q"	Test Freq. (KHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TJ-22 TE-22	5.60	65	250	0.60	42.0	85
TJ-23 TE-23	6.80	60	250	0.55	52.5	75
TJ-24 TE-24	8.20	55	250	0.50	63.0	65
TJ-25 TE-25	10.0	45	250	0.45	89.2	55
TJ-26 TE-26	12.0	40	79	0.40	105.0	50
TJ-27 TE-27	15.0	40	79	0.35	121.0	45
TJ-28 TE-28	18.0	40	79	0.33	136.0	40
TJ-29 TE-29	22.0	40	79	0.30	147.0	35
TJ-30 TE-30	27.0	40	79	0.26	241.0	30
TJ-31 TE-31	33.0	35	79	0.24	325.0	28
TJ-32 TE-32	39.0	35	79	0.22	367.0	25
TJ-33 TE-33	47.0	35	79	0.20	420.0	23
TJ-34 TE-34	56.0	30	79	0.18	483.0	20
TJ-35 TE-35	68.0	25	79	0.16	630.0	18
TJ-36 TE-36	82.0	20	79	0.14	893.0	16
TJ-37 TE-37	100.0	20	79	0.12	1100	15
TJ-38 TE-38	120.0	10	50	0.10	1200	14
TJ-39 TE-39	150.0	10	50	0.095	1360	13
TJ-40 TE-40	180.0	10	40	0.080	1520	11
TJ-41 TE-41	220.0	10	40	0.070	1890	10

MINI-L SHIELDED R.F. INDUCTORS — SB, RA, RB, & RC SERIES



- DESIGNED TO MEET MIL-C-15305C, GRADE 1, CLASS B.
- EPOXY MOLDED FOR HIGH RELIABILITY. EXCELLENT RESISTANCE TO IMMERSION, MOISTURE RESISTANCE, VIBRATION AND SHOCK TESTS.
- OPERATING TEMPERATURE EXTREMES FROM −55°C TO 125°C (35°C RISE AT 90°C AMBIENT).
- OPERATION TO ALTITUDES OF 70,000 FEET.
- COLOR CODED PER MIL-C-15305C.
- TINNED COPPER LEADS. WELDABLE LEADS AVAILABLE UPON REQUEST.

Series	Inductance Range (uh)	Power Rating (W)	D	L	AWG Size
RB	.15-240	.25	.155	.375	22
*SB	.10-100000	.25	.157	.395 ±.020	22
RC	270-1000	.25	.190	.440	22
RD	1100-3600	.40	.215	.560	22
RF	3900-10000	.45	.240	.740	20
RG	47-150	.30	.250	.560	22
RH	1.2-120	.33	.280	.900	21
RJ	180-390	.40	.310	.560	21
RK	470-1000	.45	.375	.625	21
RL	1500-10000	.55	.468	.687	21

* Maximum Current Rating Based on (1) Temperature Rise Not to Exceed 35°C at 90°C Ambient (2) Overload Not to Exceed 1½ Times Rated Current.

SB SERIES

Part No.	Inductance @ Test Freq. (uh)	"Q" Min.	Test Freq. (MH)	Min. SRF (MHz)	Max. DCR (ohms)	Rated DC Curr. (ma)	5% ΔL DC Curr. (ma)
SB-101	.10	50	25	250	.025	2900	2900
SB-121	.12	51	25	250	.034	2800	2800
SB-151	.15	51	25	250	.037	2750	2750
SB-181	.18	50	25	250	.047	2200	2200
SB-221	.22	49	25	250	.067	1700	1700
SB-271	.27	47	25	250	.11	1500	1500
SB-331	.33	46	25	250	.13	1300	1300
SB-391	.39	44	25	250	.18	1100	1100
SB-471	.47	44	25	235	.25	1000	1000
SB-561	.56	43	25	210	.33	900	900
SB-681	.68	42	25	190	.45	750	750
SB-821	.82	40	25	180	.59	600	600
SB-102	1.00	47	25	140	.07	1900	1900
SB-122	1.20	46	7.9	130	.093	1600	1600
SB-152	1.50	45	7.9	115	.12	1300	1300
SB-182	1.80	43	7.9	105	.14	1200	1200
SB-222	2.20	45	7.9	100	.19	1100	1100
SB-272	2.70	46	7.9	92	.28	950	950
SB-332	3.30	44	7.9	85	.35	800	800
SB-392	3.90	44	7.9	75	.40	750	750
SB-472	4.70	44	7.9	70	.55	650	650
SB-562	5.60	47	7.9	65	.72	550	550
SB-682	6.80	50	7.9	55	1.02	500	500
SB-822	8.20	50	7.9	50	1.32	475	475
SB-103	10.0	49	7.9	46	1.62	450	450
SB-123	12.0	55	2.5	44	2.00	400	400
SB-153	15.0	44	2.5	49	.80	620	250
SB-183	18.0	45	2.5	45	.89	610	235
SB-223	22.0	46	2.5	41	.96	600	220
SB-273	27.0	49	2.5	38	1.19	500	200

RA SERIES

Part No.	Inductance (Microhenrys)	Inductance Tolerance (%)	"Q" Min.	L & Q Test Freq. (MHz)	Self Resonant Freq. Min. (MHz)	DC Resist. Max. (ohms)	*Max. Curr. Rat'g (ma)
RA-101	.10	10	39	25.0	690	.075	1270
RA-121	.10	10	39	25.0	650	.080	1230
RA-151	.15	10	38	25.0	600	.100	1100
RA-181	.18	10	37	25.0	550	.110	1050
RA-221	.22	10	35	25.0	510	.130	965
RA-271	.27	10	34	25.0	435	.160	870
RA-331	.33	10	31	25.0	410	.200	780
RA-391	.39	10	31	25.0	380	.300	650
RA-471	.47	10	30	25.0	340	.350	590
RA-561	.56	10	30	25.0	300	.500	500
RA-681	.68	10	30	25.0	275	.600	450
RA-821	.82	10	28	25.0	250	.840	380
RA-102	1.00	10	27	25.0	240	1.000	350
RA-122	1.20	10	27	7.9	150	.170	825
RA-152	1.50	10	30	7.9	140	.220	745
RA-182	1.80	10	32	7.9	125	.300	640
RA-222	2.20	10	32	7.9	120	.390	550
RA-272	2.70	10	37	7.9	100	.500	495
RA-332	3.30	10	45	7.9	90	.800	390
RA-392	3.90	10	45	7.9	86	.970	350
RA-472	4.70	10	45	7.9	77	1.150	320
RA-562	5.60	10	51	7.9	72	1.750	260
RA-682	6.80	10	51	7.9	62	2.000	245
RA-822	8.20	10	58	7.9	61	2.650	210
RA-103	10.0	10	58	7.9	52	3.600	180
RA-123	12.0	10	45	2.5	41	2.600	215
RA-153	15.0	10	46	2.5	40	2.750	210
RA-183	18.0	10	50	2.5	32	3.100	195
RA-223	22.0	10	50	2.5	26	3.300	190
RA-273	27.0	10	50	2.5	23	3.700	180

RB SERIES

Part No.	Inductance (Microhenrys)	Inductance Tolerance (%)	"Q" Min.	L & Q Test Freq. (MHz)	Self Resonant Freq. Min. (MHz)	DC Resist. Max. (ohms)	*Max. Curr. Rat'g (ma)
RB-151	.15	20	50	25.0	525	.03	2450
RB-221	.22	20	50	25.0	450	.05	1900
RB-331	.33	20	45	25.0	375	.09	1400
RB-471	.47	20	45	25.0	310	.12	1225
RB-561	.56	10	50	25.0	280	.15	1220
RB-681	.68	10	50	25.0	250	.15	1100
RB-821	.82	10	50	25.0	220	.22	900
RB-102	1.00	10	50	25.0	200	.25	830
RB-122	1.20	10	33	7.9	180	.42	650
RB-152	1.50	10	33	7.9	160	.50	600
RB-182	1.80	10	33	7.9	150	.65	525
RB-222	2.20	10	33	7.9	135	.95	435
RB-272	2.70	10	33	7.9	120	1.20	385
RB-332	3.30	10	33	7.9	110	2.00	300
RB-392	3.90	10	33	7.9	100	2.30	280
RB-472	4.70	10	33	7.9	90	2.60	260
RB-562	5.60	10	45	7.9	60	.32	750
RB-682	6.80	10	50	7.9	55	.50	600
RB-822	8.20	10	50	7.9	50	.60	545
RB-103	10.0	10	55	7.9	45	.90	445
RB-123	12.0	10	65	2.5	42	1.10	404
RB-153	15.0	10	65	2.5	40	1.30	370
RB-183	18.0	10	75	2.5	34	2.25	280
RB-223	22.0	10	75	2.5	30	2.50	265
RB-243	24.0	5	60	2.5	26	2.50	265
RB-273	27.0	5	60	2.5	25	2.60	260
RB-303	30.0	5	65	2.5	19	2.80	255
RB-333	33.0	5	65	2.5	19	2.90	250
RB-363	36.0	5	52	2.5	16	2.50	270
RB-393	39.0	5	52	2.5	15	2.60	265

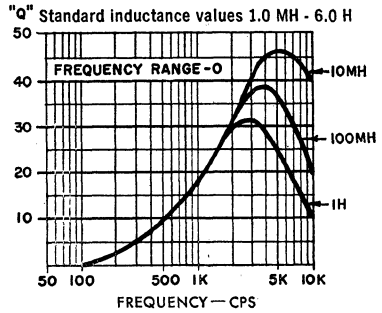
RC SERIES

Part No.	Inductance (Microhenrys)	Inductance Tolerance (%)	"Q" Min.	L & Q Test Freq. (MHz)	Self Resonant Freq. Min. (MHz)	DC Resist. Max. (ohms)	*Max. Curr. Rat'g (ma)
RC-151	0.15	20	55	25.0	510	0.030	3000
RC-221	0.22	20	50	25.0	415	0.035	2800
RC-331	0.33	20	50	25.0	350	0.065	2000
RC-471	0.47	20	50	25.0	300	0.085	1700
RC-561	0.56	10	50	25.0	270	0.125	1600
RC-681	0.68	10	45	25.0	250	0.150	1300
RC-821	0.82	10	40	25.0	210	0.205	1100
RC-102	1.00	10	40	25.0	200	0.290	930
RC-122	1.20	10	30	7.9	180	0.400	785
RC-152	1.50	10	30	7.9	170	0.485	700
RC-182	1.80	10	30	7.9	150	0.740	580
RC-222	2.20	10	30	7.9	140	0.970	505
RC-272	2.70	10	30	7.9	120	1.20	460
RC-332	3.30	10	30	7.9	70	0.140	1350
RC-342	3.90	10	30	7.9	65	0.155	1250
RC-472	4.70	10	30	7.9	60	0.210	1100
RC-562	5.60	10	30	7.9	50	0.280	935
RC-682	6.80	10	30	7.9	50	0.375	810
RC-822	8.20	10	30	7.9	48	0.440	750
RC-103	10.00	10	30	7.9	42	0.605	640
RC-123	12.00	10	50	2.5	36	1.05	490
RC-153	15.00	10	55	2.5	30	1.20	460
RC-183	18.00	10	60	2.5	30	1.95	360
RC-223	22.00	10	60	2.5	24	2.20	335
RC-273	27.00	10	65	2.5	22	2.75	300
RC-303	30.00	5	65	2.5	19	2.60	265
RC-333	33.00	5	65	2.5	19	2.60	260
RC-363	36.00	5	60	2.5	16.0	2.65	255
RC-393	39.00	5	60	2.5	15.0	2.70	250
RC-433	43.00	5	60	2.5	13.7	2.75	245

TORWICO ELECTRONICS — TOROIDAL INDUCTORS

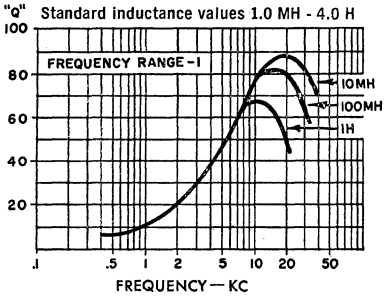
TWC Series

"Q" Standard inductance values 1.0 MH - 6.0 H



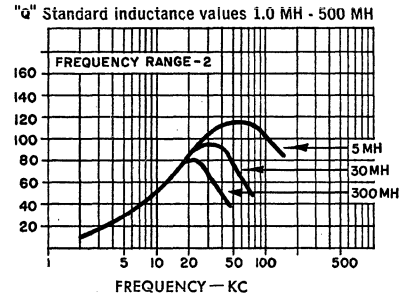
A. DC resistance (nominal) = 280 ohms/henry
B. DC current (ma) for 5% decrease in L= 135
C. Maximum AC current (ma) = $\frac{372}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 1.0 MH - 4.0 H

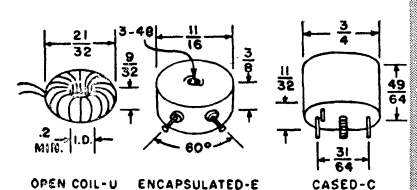


A. DC resistance (nominal) = 520 ohms/henry
B. DC current (ma) 5% decrease in L= 210
C. Maximum AC current (ma) = $\frac{424}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 1.0 MH - 500 MH

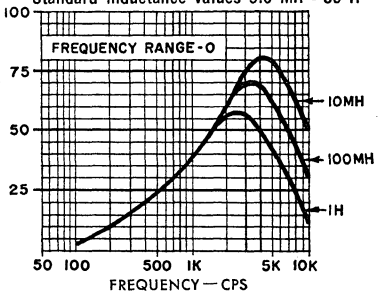


A. DC resistance (nominal) = 1100 ohms/henry
B. DC current (ma) for 5% decrease in L= 340
C. Maximum AC current (ma) = $\frac{453}{\sqrt{mh}}$ $\sqrt{mh}$



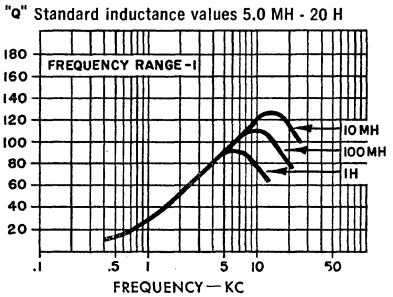
TWS Series

"Q" Standard inductance values 5.0 MH - 30 H



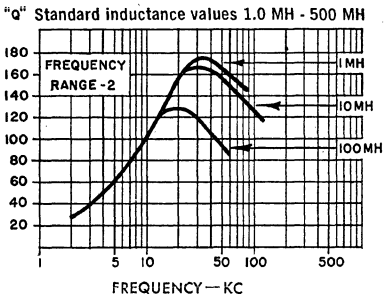
A. DC resistance (nominal) = 135 ohms/henry
B. DC current (ma) for 5% decrease in L= 320
C. Maximum AC current (ma) = $\frac{708}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 5.0 MH - 20 H

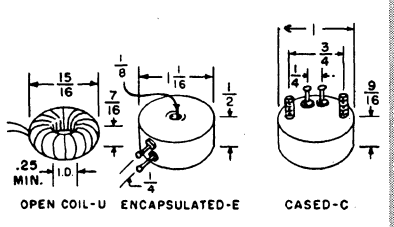


A. DC resistance (nominal) = 255 ohms/henry
B. DC current (ma) for 5% decrease in L= 380
C. Maximum AC current (ma) = $\frac{790}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 1.0 MH - 500 MH

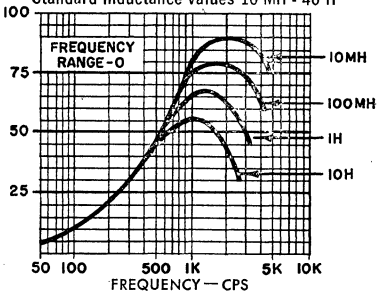


A. DC resistance (nominal) = 630 ohms/henry
B. DC current (ma) for 5% decrease in L= 420
C. Maximum AC current (ma) = $\frac{822}{\sqrt{mh}}$ $\sqrt{mh}$



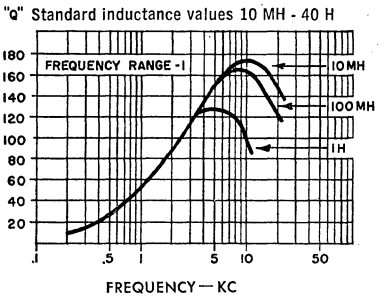
TWM Series

"Q" Standard inductance values 10 MH - 40 H



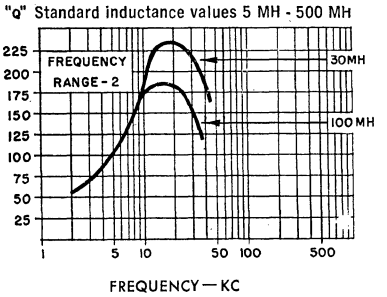
A. DC resistance (nominal) = 60 ohms/henry
B. DC current (ma) for 5% decrease in L = 500
C. Maximum AC current (ma) = $\frac{1300}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 10 MH - 40 H

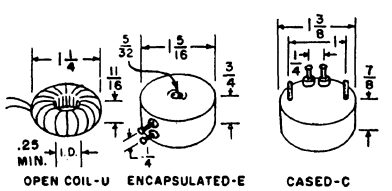


A. DC resistance (nominal) = 115 ohms/henry
B. DC current (ma) for 5% decrease in L = 550
C. Maximum AC current (ma) = $\frac{1415}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 5 MH - 500 MH



A. DC resistance (nominal) = 250 ohms/henry
B. DC current (ma) for 5% decrease in L= 880
C. Maximum AC current (ma) = $\frac{1548}{\sqrt{mh}}$ $\sqrt{mh}$



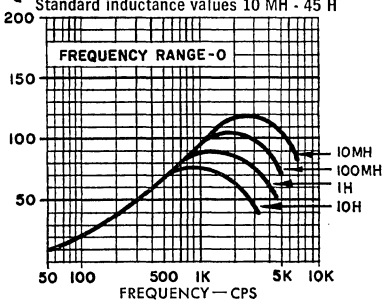
TORWICO ELECTRONICS INC. LAKEWOOD, N.J.

TORWICO ELECTRONICS

TOROIDAL INDUCTORS

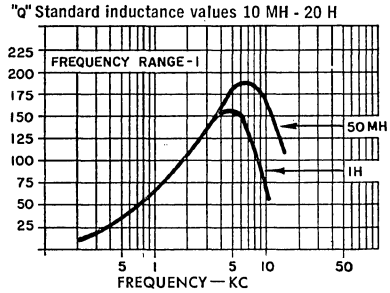
TWI Series

"Q" Standard inductance values 10 MH - 45 H

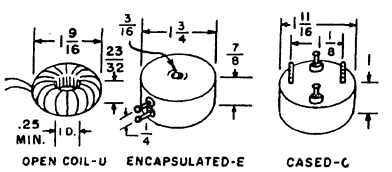


A. DC resistance (nominal) = 45 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{715}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{1500}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 10 MH - 20 H

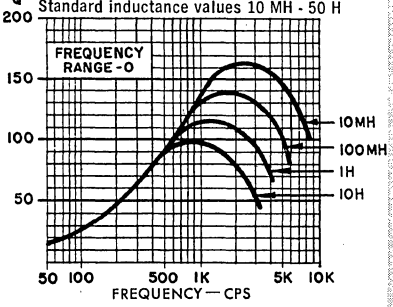


A. DC resistance (nominal) = 94 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{900}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{1644}{\sqrt{mh}}$ $\sqrt{mh}$



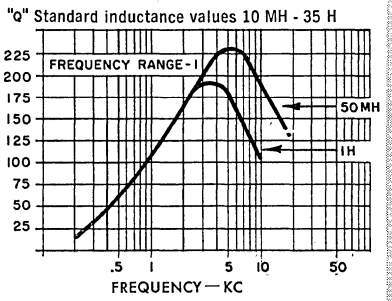
TWD Series

"Q" Standard inductance values 10 MH - 50 H

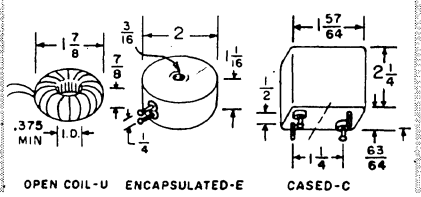


A. DC resistance (nominal) = 27 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{1100}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{2000}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 10 MH - 35 H

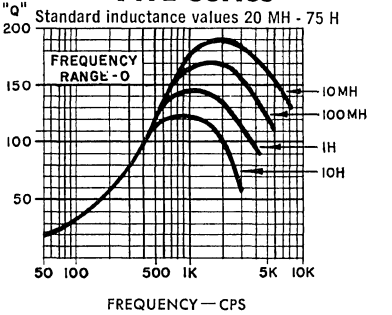


A. DC resistance (nominal) = 54 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{1200}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{2264}{\sqrt{mh}}$ $\sqrt{mh}$



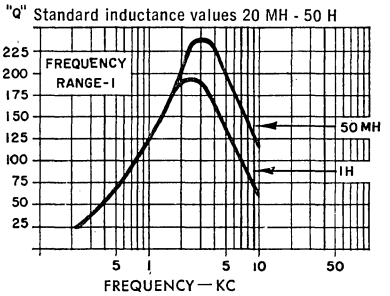
TWL Series

"Q" Standard inductance values 20 MH - 75 H

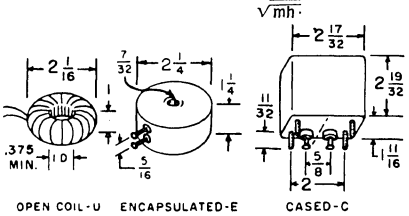


A. DC resistance (nominal) = 21 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{1450}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{3100}{\sqrt{mh}}$ $\sqrt{mh}$

"Q" Standard inductance values 20 MH - 50 H



A. DC resistance (nominal) = 35 ohms/henry
B. DC current (ma) for 5% decrease in L = $\frac{1700}{\sqrt{mh}}$
C. Maximum AC current (ma) = $\frac{3290}{\sqrt{mh}}$ $\sqrt{mh}$



HOW TO ORDER

Order these standard inductors by their part number.
Example: **TWC100MHOE**

TWC	100MH	0	E
(1)	(2)	(3)	(4)

(1) Size: TWC, TWS, TWM, TWI, TWD, TWL

(2) Inductance:

Use MH—for millihenry designation below 1.0 henry
H—for henries above 1.0 henry

(3) Frequency Range: 0, 1, 2

(4) Packaging: U—Open Coil E—Encapsulated C—Steel Cased

GENERAL SPECIFICATIONS

Tolerance—The tolerance on standard inductors is ± 1%

Test Level—Standard inductors are adjusted at 1.0 volts, 1000 cps

Maximum Voltage—The maximum voltage across standard inductors shall be 115 VRMS

Insulation Resistance—10,000 megohms minimum, except for open coil versions which shall be 1,000 megohms minimum

Standard Torwico Inductors are designed to meet the following MIL-T-27 requirements:
Open Coil—Grade 6, Class S, Life Expectancy X
Military Designation: TF6SX04ZZ

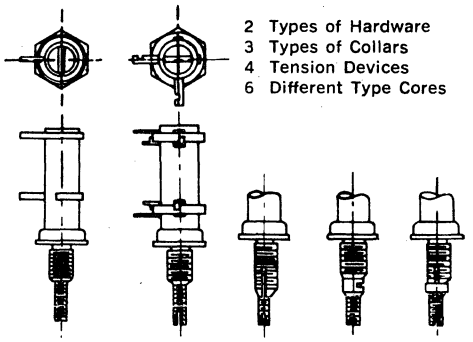
Encapsulated—Grade 5, Class S, Life Expectancy X
Military Designation: TF5SX04ZZ

Steel Cased—Grade 4, Class S, Life Expectancy X
Military Designation: TF4SX04YY

Detailed information on request!

TORWICO ELECTRONICS INC. LAKEWOOD, N.J.

unipco electronic assemblies



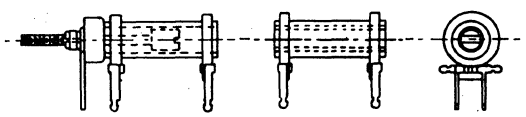
2 Types of Hardware
3 Types of Collars
4 Tension Devices
6 Different Type Cores

CERAMIC COIL FORMS

Basic Part No.	No. Collars	Lugs Per Collar	Total Lugs	A	B	C	D	E	F Dimension PB	CN	CS	CT	Size of Hex
AY-4124	2	2	4	.205	19/32	23/64	1/64	9/32	1/4	21/64	1/4	1/4	1/4
AY-4122	2	1	2	.205	19/32	23/64	1/64	9/32	1/4	21/64	1/4	1/4	1/4
AY-3624	2	2	4	.260	27/32	9/16	1/32	15/32	5/16	13/32	9/32	5/16	3/8
AY-3622	2	1	2	.260	27/32	9/16	1/32	15/32	5/16	13/32	9/32	5/16	3/8
AY-2524	2	2	4	.375	1 1/16	23/32	1/32	5/8	5/16	27/64	9/32	5/16	1/2
AY-2522	2	1	2	.375	1 1/16	23/32	1/32	5/8	5/16	27/64	9/32	5/16	1/2
AY-1724	2	2	4	.500	1 11/16	1 1/8	1/32	1 1/32	5/16	29/64	5/16	5/16	5/8
AY-1722	2	1	2	.500	1 11/16	1 1/8	1/32	1 1/32	5/16	29/64	5/16	5/16	5/8

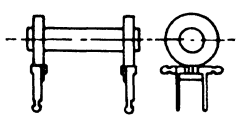
PRINTED CIRCUIT — HORIZONTAL MOUNT

CERAMIC



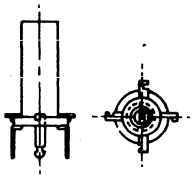
AY - 1112 AY - 1134

FIBERGLAS

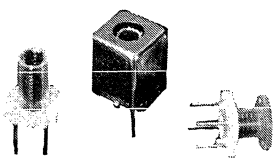


AY - 1203

VERTICAL MOUNT

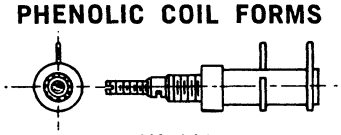


Ceramic	AY - 1140
Fiberglas	AY - 1204
Phenolic	AY - 1142

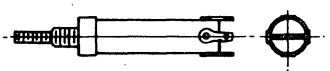


Miniature Printed Circuit Coil Forms

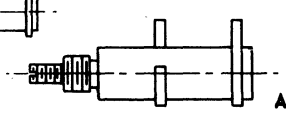
PHENOLIC COIL FORMS



AY - 1065

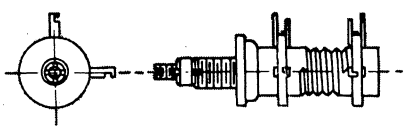


AY - 1066



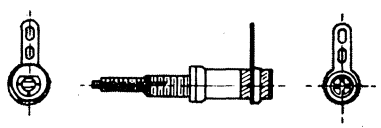
AY - 1064

THREADED COIL FORMS



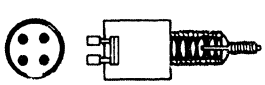
AY - 1071 - 3 — 3 turns at 12 T.P.I.
AY - 1071 - 5 — 5 turns at 16 T.P.I.
AY - 1071 - 7 — 7 turns at 18 T.P.I.

CAPACITORS (Piston/Ceramic)



AY-1041-1 0.5 — 4.5 uufd.
AY-1041-2 1.5 — 12.5 uufd
AY-1036-1 1.0 — 8.0 uufd
AY-1036-2 3.0 — 25.0 uufd

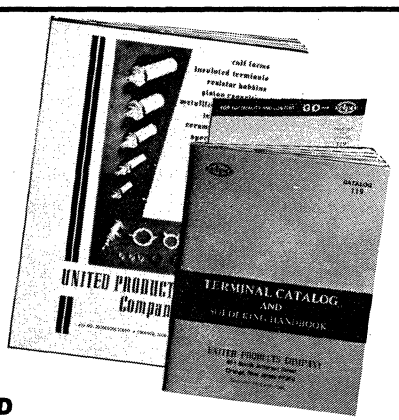
SHIELDED COIL FORMS



AY - 1070

New Products

- SOLDER TERMINALS WRITE FOR/BULLETIN 119
- PRINTED CIRCUIT & MOLDED COIL FORMS WRITE FOR BULLETIN 120



SOLDER TERMINALS & MINI-PINS

- Single End
- Double End
- Tubular
- Slabbed
- Slotted
- Taper Pin

SPECIAL ASSEMBLIES DESIGNED & MANUFACTURED

UNITED PRODUCTS COMPANY 55 SOUTH DENTON AVENUE, NEW HYDE PARK, N. Y. 11040
PHONE: (516) 328-3300 TWX: 510-223-0642

VARI-L CO., INC. / 3883 MONACO PARKWAY/DENVER, COLORADO 80207
TELEPHONE: (303) 321-1511/TWX 910•931•0590

Z-MATCH

MITE SERIES ELECTRICALLY VARIABLE INDUCTORS

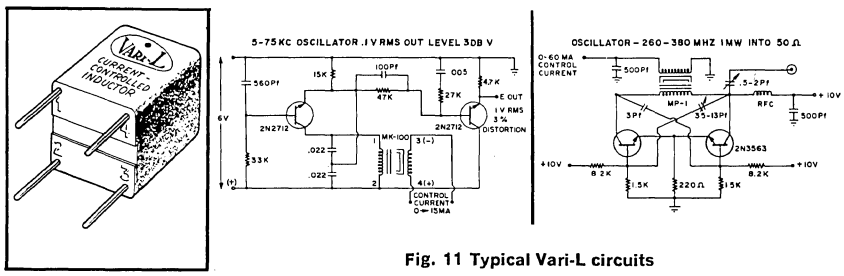


Fig. 11 Typical Vari-L circuits

The **Vari-L Inductor** consists of a high-Q coil wound on a ferromagnetic core, and an electromagnetic element for controlling its inductance. The coil is connected into an oscillator, amplifier or filter, along with suitable capacitance to establish the initial parameters; current in the control winding will then do the tuning. The rate of control can be slow for semi-fixed operation — or fast, up to several thousand Hz, for sweep or frequency modulation. The control current is usually in the milliampere range, or can be made higher to fit special applications.

The component is entirely solid-state, with no moving parts to get out of adjustment or wear out, so it can safely be located remote from the control point or potted as part of your own intricate sub-assembly.

Vari-L tuning has been in use for 15 years in numerous industrial instruments, and in critical military applications including outer space and oceanography. It is a natural for such sweep services as TV-alignment generators, spectrum analyzers, and panoramic receivers; but it is also chosen frequently because of its non-mechanical advantages such as remote control, sub-miniaturization, or automatic (closed-loop) tuning.

The **"MITE"** Series described below was brought out to keep step with the trend toward printed circuits and smaller equipment; but we also make larger units for high-power circuits or multi-function service.

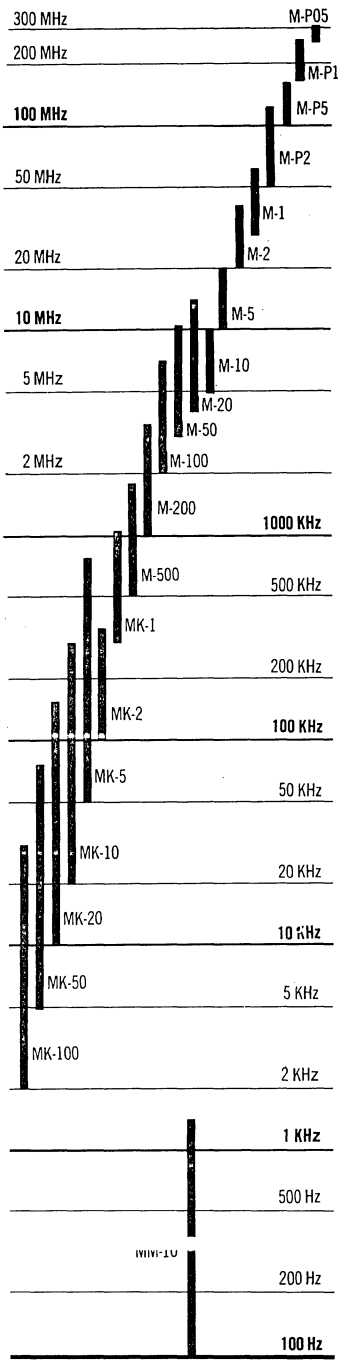
We will quote promptly on your special requirements. Applicable bulletin: 167

MITE SERIES INDUCTOR SPECIFICATIONS

MODEL	INDUCTANCE AT ZERO CONTROL CURRENT ±10% (L_s)	INDUCTANCE AT MAX. RECOMMEND. CONTR. CURRENT (L_{sat})	TYP. FREQ.† AT ZERO CONTROL CURRENT (F_s)	HIGH-FREQ. END OF RANGE WITH F. SHOWN (F_{sat})	CONTROL WINDING INDUCTANCE ±20% (L_c)	PRICE 1-9
MM-10	10 H	.044 H	100 CPS	1.5 KC	2.5 H	**$24.80**
MK-100	100 MH	.445 MH	2 KC	30 KC	450 MH	**19.65**
MK-50	50 MH	.223 MH	5 KC	75 KC	450 MH	**19.65**
MK-20	20 MH	.089 MH	10 KC	150 KC	450 MH	**19.65**
MK-10	10 MH	.045 MH	20 KC	300 KC	450 MH	**19.65**
MK-5	5 MH	.022 MH	50 KC	750 KC	450 MH	**19.65**
MK-2	2 MH	.163 MH	.1 MC	.35 MC	160 MH	**19.65**
MK-1	1 MH	.082 MH	.3 MC	1.05 MC	160 MH	**19.65**
M-500	500 μH	40.8 μH	.5 MC	1.75 MC	160 MH	**19.25**
M-200	200 μH	16.3 μH	1 MC	3.5 MC	160 MH	**19.25**
M-100	100 μH	8.15 μH	2 MC	7 MC	160 MH	**19.25**
M-50	50 μH	4.08 μH	3 MC	10.5 MC	160 MH	**19.25**
M-20	20 μH	1.63 μH	4 MC	14 MC	160 MH	**19.25**
M-10	10 μH	2.5 μH	5 MC	10 MC	80 MH	**19.25**
M-5	5 μH	1.25 μH	10 MC	20 MC	80 MH	**19.25**
M-2	2 μH	.5 μH	20 MC	40 MC	80 MH	**19.25**
M-1	1 μH	.25 μH	30 MC	60 MC	75 MH	**19.25**
M-P5	.5 μH	.125 μH	60 MC	120 MC	75 MH	**19.25**
M-P2	.2 μH	.078 μH	100 MC	160 MC	55 MH	**19.25**
M-P1	.1 μH	.051 μH	170 MC	240 MC	55 MH	**19.25**
M-P05	.05 μH	.035 μH	250 MC	300 MC	55 MH	**19.25**

For all models except MM-10 the control-winding resistance is 75 ohms, and maximum recommended control current is 60 ma. Rc of MM-10 is 30 ohms./Shield Cans are available at $1 extra per unit.

For other Vari-L products see Sections 3400 and 5600.



TYPICAL FREQUENCY RANGES OF THE "MITE"-SERIES MODELS

† The ranges shown are approximate and usually may be extended

(ADC) Bantam Jack Panels

Bantam Jack Panels are designed to satisfy the increasing demand for more compact patchfields in modern electronic and communication equipment. Bantam Jack Panels, with miniaturized jacks, provide twice the number of jacks in a standard size panel. They require only ½ the rack space previously used by conventional panels. The new panel assemblies weigh 65% less when compared to an assembly using an equivalent number of jacks on a conventional jack panel. ■ Bantam Jack Panels are compact, lightweight, and yet provide the same dependable service as the long established telephone types. This new design offers 96 jacks (48 pairs) in a 1¾ inch x 19 inch standard sized panel. The jacks on this panel are spaced to prevent the cross patching of adjacent circuits when using double plugs.

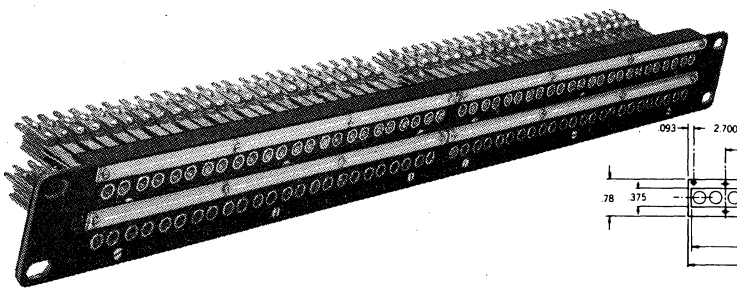
specifications

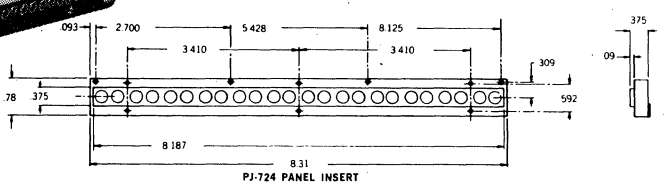
1. **Panel:** Aluminum alloy, extruded. Finished black anodized per Mil-A-8625A. Overall dimensions 1¾"x19"—Standard EIA mounting centers.
2. **Jack Mounting:** Four moulded plastic inserts, each provides for 24 jacks. Pairs of jacks on 5/16 inch centers. Double-row panel provides 96 jacks total. Blank inserts can be furnished where only single row of jacks is required.
3. **Designation Strip:** Extruded clear plastic.
4. Panel assemblies are available with a wide variety of two and three-conductor jacks. See listing of Bantam jacks for complete details.

PJ-731 Double row panel, assembly less jacks, holds 96 jacks.
PJ-737 Double row panel, with 48 pair (96 total) PJ-818 jacks.
PJ-739 Double row panel, with 48 pair (96 total) PJ-839 jacks.
PJ-724 Panel inserts, less jacks, 24 holes.
PJ-700 Panel inserts, blank (same as PJ-724 without holes).
PJ-736* Double row panel, with 104 PJ-818 jacks.
PJ-738* Double row panel, with 104 PJ-839 jacks.

*Panels with 104 jacks (26 per insert, jacks all on 5/16 inch centers) are available on special order.

Custom panel assemblies with up to 104 jacks are available on special order.

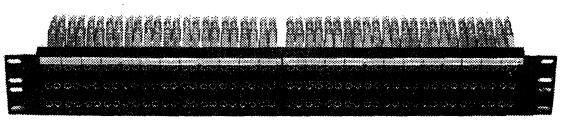




PJ-724 PANEL INSERT

Bantam Triple Row Jack Panel

Bantam Triple Row Jack Panels provides 144 jacks in a 2⅝ inch x 19 inch size panel. The specification and construction of this panel is the same as Bantam Double Row Panels except width of panel is one and one-half the standard panel size. Mounting centers conform to standard EIA rack spacing. Three rows of jacks with 48 jacks in each row. These three rows are particularly desirable for use in 2 wire and 4 wire VF Circuit applications where space can be saved by having three verticle jacks appear as a jack set. When needed number plates or labels to show row functions can be furnished on special order.



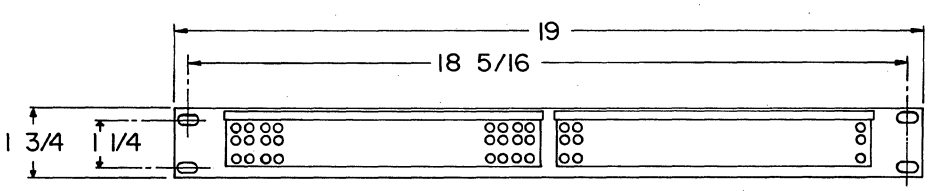
"BANTAM TRIPLE ROW JACK PANEL — 2⅝" WIDE"

BANTAM TRIPLE ROW JACK PANEL

PJ-732 Triple Row Panel Assembly, less jacks, holds 144 jacks
PJ-733 Triple Row Panel, with 144 PJ-818 Jacks
PJ-734 Triple Row Panel, with 144 PJ-839 Jacks
PJ-735 Triple Row Panel, with 96 PJ-839 Jacks (top and middle row)
48 PJ-838 Jacks (bottom row).

Bantam 2 + 1 Jack Panels

Bantam 2 + 1 Jack Panels are the newest development in the ADC line of Bantam components which offer the maximum in patching density. These unique three row panels feature three miniature jacks on a single frame, which effectively requires ⅓ less space than regular Bantam jacks. The Bantam 2+1 panels include 48 of these three conductor jacks, in a standard size 1¾ inch wide by 19 inch long panel. These panels were especially designed to provide vertically positioned jack sets such as the "Line", "Equipment" and "Monitor" jacks in a Voice Frequency Circuit. The Bantam 2 + 1 Jacks provided in these panels are available with solder type terminals and with wire wrap terminals. When required number plates or labels for identifying row functions can be provided on special order.



"BANTAM 2 + 1 JACK PANEL — 1¾" WIDE"

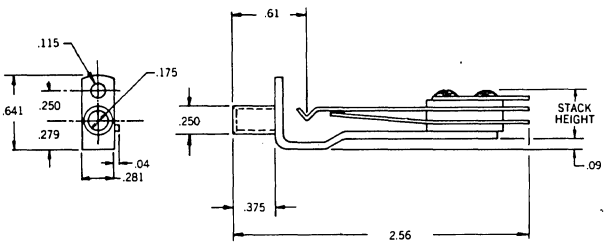
PJ-721 Panel Assembly, with 48 PJ-821 Jacks
PJ-721W Panel Assembly, with 48 PJ-821W Jacks

(ADC) **ADC PRODUCTS**
4900 W. 78th St., Minneapolis, Minn. 55435

(ADC) Bantam Jacks

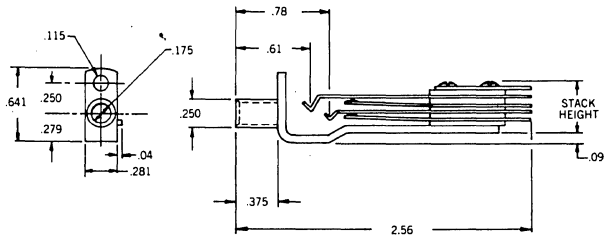
Bantam Jacks will meet the electrical, mechanical and environmental requirements of the military specification for long frame telephone jacks. Although reduced in size these jacks will provide the same reliable service equal to that expected from regular size telephone jacks. These jacks are available in a variety of two and three conductor types, with isolated circuit contacts as well as normalling contacts.

FOR COMPLETE LINE OF BANTAM LITES, SWITCHES, ACCESSORIES, SEE ADC COMMUNICATIONS COMPONENTS CATALOG.



2 CONDUCTOR JACK

3 CONDUCTOR JACK



SCHEMATIC DIAGRAM	PART NO.	STACK HEIGHT (Inches)
	PJ-803	13/32
	PJ-808	43/64
	PJ-815	35/64
	PJ-816	35/64
	PJ-818	13/32
	PJ-823	27/64
	PJ-836	5/8
	PJ-805	43/64
	PJ-824	43/64
	PJ-838	35/64
	PJ-839	17/32
	PJ-841	43/64
	PJ-880	3/4

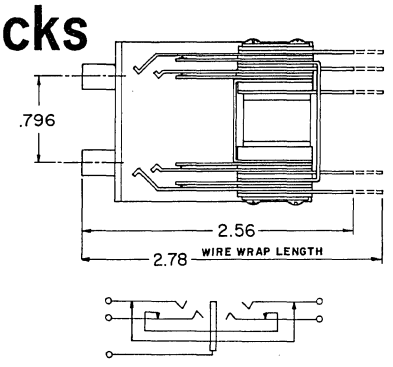
specifications

Frame: Steel, Cadmium plate with chromate conversion coating to withstand 50 hours of salt spray.
Springs: Nickel silver.
Contacts: W. E. #1 gold alloy, cross-bar contacts are welded to springs.
Insulation: Spacers, Phenolic Type PBE-P per MIL-P-3115B.
Bushing: Brass, silver soldered to frame. Finish same as frame.

All of the above jacks are available on special order with Palladium cross-bar contacts.
If gold plating is required for all surfaces, jacks should be ordered as the PJ number with a "G" suffix. ADC uses .00005 gold per MIL-G-45204, TYPE II. The solder lugs are not tinned for gold plated jacks. Any requirements other than those described require special notation.

Bantam Twin Jacks

Bantam Twin Jacks are the miniature equivalent of the ADC PJ-482 or the WE 482A. These three conductor type jacks have normal contacts on both the tip and ring springs strapped, thereby reducing and simplifying wiring. The Bantam Twin Jacks are designed with sleeves on .796 inch centers and are made to mount in the ADC PJ-731 Double Row Panels and the PJ-732 Triple Row Panels. Bantam Twin Jacks are available with solder terminals and wire wrap terminals.



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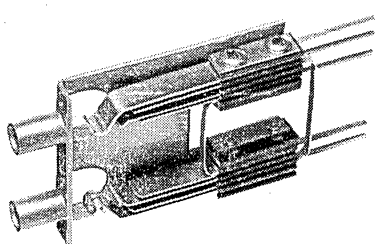
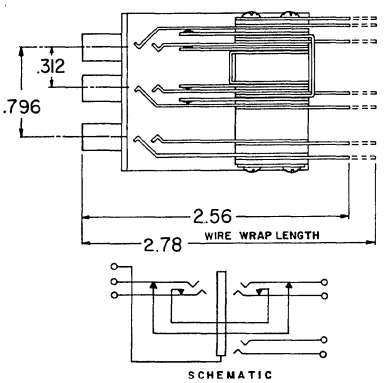


PJ-882 Bantam Twin Jack — Solder Terminals
PJ-882W Bantam Twin Jack — Wire Wrap Terminals

Bantam 2 + 1 Jacks

Bantam 2 + 1 Jacks offer almost unbelievable space saving advantages . . . Savings even greater than regular Bantam jacks. Bantam 2 + 1 Jacks literally permits tripling of the patching density of a 1¾ inch wide panel. This unique design features three jacks on a single frame. The jacks are three conductor types. Two of the jacks have normal contacts on both tip and ring springs. These normal contacts are strapped to simplify wiring. Ideally suited to VF Circuit applications where two of the jacks would function as "Line" and "Equipment" jacks and the third as a "Monitor" jack. Up to 48 Bantam 2 + 1 Jacks can be mounted on a 1¾ inch wide by 19 inch long panel. Bantam 2 + 1 Jacks are available with solder type terminals and with wire wrap terminals. These very remarkable miniature jacks are specifically designed to mount in the Bantam 2 + 1 Panel PJ-721.



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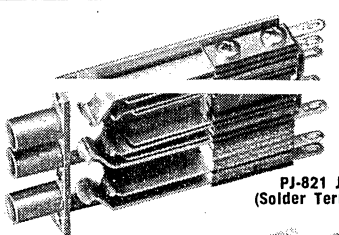
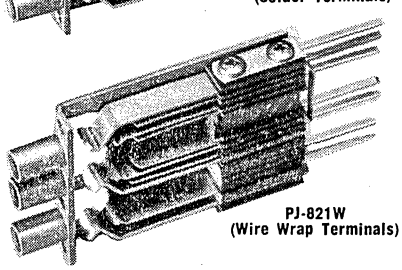


PJ-821 Jack (Solder Terminals)

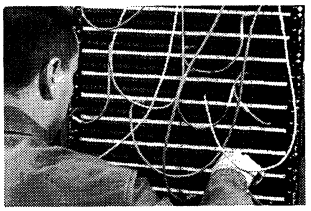


PJ-821W (Wire Wrap Terminals)

(ADC) Bantam Patch Cords

Bantam Patch Cords are plastic jacketed, shielded cords complete with molded-on plugs. The plugs are made with molded insulation between conductors. Bantam Patch Cords are available with single and double two and three conductor plugs. A cord strain relief feature is included in the plug construction.

Bantam plugs may be gold plated on special order per MIL-G-45204, Type II, .00005 inches thick.



specifications

Cord: Plastic jacketed, stranded copper conductors, braided shield. Jacket color — gray.

Plugs: Conductor parts are brass, finished to 32 microinch finish maximum.

Plug Insulation: Molded polystyrene.

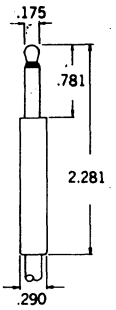
Internal Connections: Soldered.

Plug Shell: Plastic, black, rigid thermoplastic.

NOTE 1: Length is measured from the rear of the plug shell to rear of plug shell on opposite end.

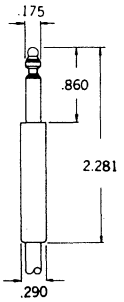
2 CONDUCTOR SINGLE PLUG

Length (see Note 1)	Single (2) Conductor Plug
6 inch	PJ-701
12 inch	PJ-702
18 inch	PJ-703
24 inch	PJ-704
30 inch	PJ-705
36 inch	PJ-706
48 inch	PJ-708
60 inch	PJ-710



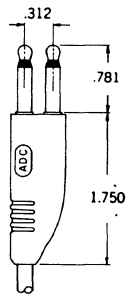
3 CONDUCTOR SINGLE PLUG

Length (see Note 1)	Single (3) Conductor Plug
6 inch	PJ-711
12 inch	PJ-712
18 inch	PJ-713
24 inch	PJ-714
30 inch	PJ-715
36 inch	PJ-716
48 inch	PJ-718
60 inch	PJ-720



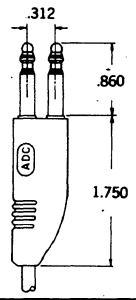
2 CONDUCTOR (DOUBLE)

Length	Double (2) Conductor Plug
6 inch	PJ-751
12 inch	PJ-752
18 inch	PJ-753
24 inch	PJ-754
30 inch	PJ-755
36 inch	PJ-756
48 inch	PJ-758
60 inch	PJ-760



3 CONDUCTOR (DOUBLE)

Length	Double (3) Conductor Plug
6 inch	PJ-761
12 inch	PJ-762
18 inch	PJ-763
24 inch	PJ-764
30 inch	PJ-765
36 inch	PJ-766
48 inch	PJ-768
60 inch	PJ-770



specifications

Cord: Plastic jacketed, stranded copper conductors, braided shield. Jacket color — gray.

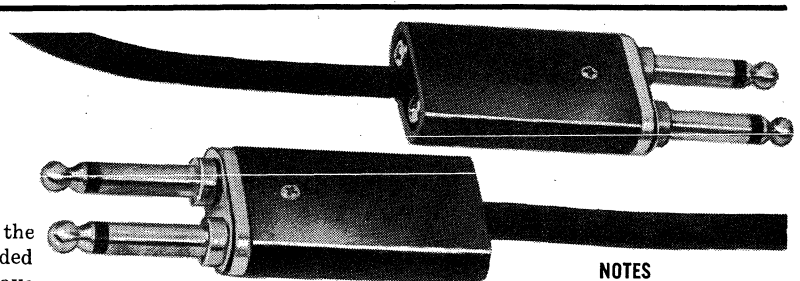
Plugs: Conductor parts are brass, finished to 32 microinch finish maximum.

Plug Insulation: Molded polystyrene.

Internal Connections: Soldered.

Plug Shell: Plastic, gray, flexible thermoplastic.

Patch Cords



ADC Patch Cords have become standards in the communications industry. The heavy Nylon braided jacket excels in abrasion resistance. All cords have been designed to give the ultimate combination of durability, flexibility and reliability. ADC has numerous combinations of special cord assemblies using virtually every plug combination required. You are invited to submit your requests or requirements for quotations.

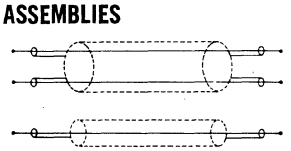
PATCH CORD LENGTH	TOLERANCE
6 inch	+ .375" —.00"
1 foot	+ .75 " —.00"
2 feet	+1.125" —.00"
3 feet	+1.375" —.00"
4 feet	+1.625" —.00"
5 feet	+2.0 " —.00"
6 feet	+2.25 " —.00"
10 feet	+2.625" —.00"

NOTES

1. Patch cord lengths are measured from backs of plug shells.
2. When outer jacket colors other than noted are required add suffix:
   S — For Slate G — For Green
   R — For Red B — For Black
3. All cords and cord assemblies will withstand 500 V, 60 Hz PBT between all conductor. Cordage is designed to have minimum leakage resistance of 50 Megohms with 100 volts applied.

2 CONDUCTOR SHIELDED, CORD ASSEMBLIES

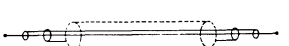
Length	Cord w/ PJ-1 Plugs	Cord w/ PJ-055B Plugs	Replacement Cords Only
6 inch	PJ-10½	PJ-50½	PJ-20½
1 foot	PJ-11	PJ-51	PJ-21
2 feet	PJ-12	PJ-52	PJ-22
3 feet	PJ-13	PJ-53	PJ-23
4 feet	PJ-14	PJ-54	PJ-24
5 feet	PJ-15	PJ-55	PJ-25
6 feet	PJ-16	PJ-56	PJ-26
10 feet	PJ-10	PJ-50	PJ-20



These cords provide two tinsel wire conductors plus a braided shield. The overall jacket is braided nylon. Black nylon is standard, also available in slate, green and red on special order, see Note 2.

3 CONDUCTOR SHIELDED, CORD ASSEMBLIES

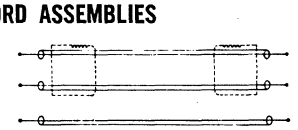
Length	Cord w/ PJ-2 Plugs	Cord w/ PJ-051R Plugs	Replacement Cords Only
1 foot	PJ-71	PJ-81	PJ-61
2 feet	PJ-72	PJ-82	PJ-62
3 feet	PJ-73	PJ-83	PJ-63
4 feet	PJ-74	PJ-84	PJ-64
5 feet	PJ-75	PJ-85	PJ-65
6 feet	PJ-76	PJ-86	PJ-66



These cords provide two tinsel wire conductors plus a braided shield. Overall jacket is braided nylon. Black nylon is standard with slate colored jacket also stocked. Green and red are available on special order. See Note 2.

2 CONDUCTOR UNSHIELDED, CORD ASSEMBLIES

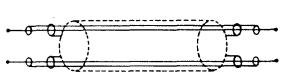
Patch Cords Length	Cord w/ PJ-327 Plugs	Cord w/ PJ-047R Plugs
1 foot	PJ-181	PJ-471
2 feet	PJ-182	PJ-472
3 feet	PJ-183	PJ-473
4 feet	PJ-184	PJ-474
5 feet	PJ-185	PJ-475
6 feet	PJ-186	PJ-476



The PJ-180 and PJ-470 series cords offer tinsel wire conductors, thermo plastic insulated. Standard color for PJ-180 series patch cords is slate. The standard color for the PJ-470 series cords is red. Other colors are available on special order, see Note 2.

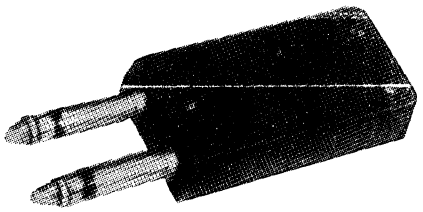
3 CONDUCTOR SHIELDED, CORD ASSEMBLIES

Length	Cord w/ PJ-7 Plugs	Cord w/ PJ-8 Plugs
1 foot	PJ-171	PJ-91
2 feet	PJ-172	PJ-92
3 feet	PJ-173	PJ-93
4 feet	PJ-174	PJ-94
5 feet	PJ-175	PJ-95
6 feet	PJ-176	PJ-96

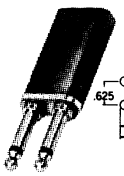
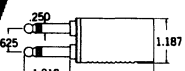


The PJ-90 and PJ-170 series cords provide four tinsel wire conductors, plus a shield common to both sleeves on the plugs. Standard color for these cords is black. They are also available in slate, green or red on special order. See Note 2.

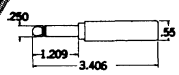
(ADC) Plugs



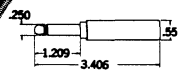
TWO CONDUCTOR

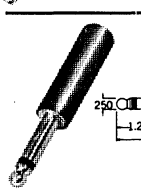
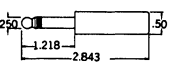
PJ-1 — Equivalent WE-241. Heavy duty die cast frame. Black phenolic shell. Has self-aligning plug sleeves on 5/8" centers for use with all standard jack panels. Two tip conductors, plus sleeve connection common to both sleeves.



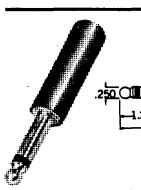
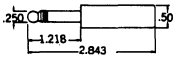
PJ-047R — Equivalent WE-347. Designed for use with tip and sleeve jacks. Molded insulation, red plastic handle, design and construction in accordance with MIL-P-642B specifications.



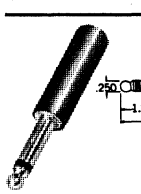
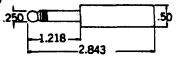
PJ-047B — Same as above except black plastic handle.

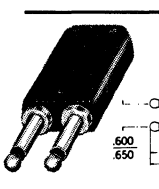
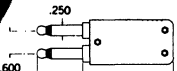
PJ-055B — Formerly ADC PJ-5, fits 1/4" phone jacks. Black plastic shell. Screw terminals, designed and manufactured in accordance with MIL-P-642B.

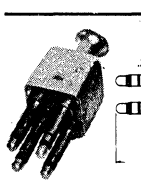
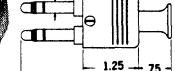
PJ-055M — Same as above except has metal handle, brass, nickel plated.

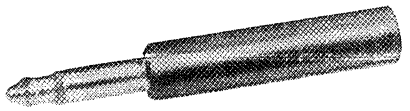
PJ-055R — Same as above except has red plastic handle.

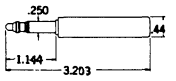
PJ-327 — Equivalent WE-327. Twin plug provides two electrically independent 2 conductor plugs in a black phenolic shell which is notched to indicate polarity. Self-aligning plug sleeves are on 5/8" centers. Designed and constructed in accordance with specification MIL-P-642B.

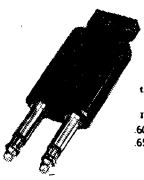
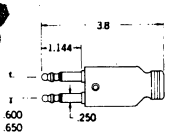
D7200 — Equivalent WE-315B. Four sleeves, self-aligning plug. Molded insulation. Brass shell notched for polarity is nickel plated and connected to plug sleeves to provide shielding for tip conductors. For use with four PJ-318 double jacks mounted on 5/8" centers. Five conductors total.



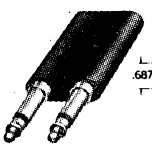
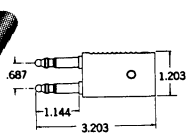
THREE CONDUCTOR



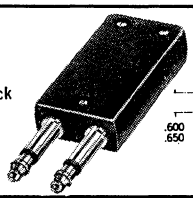
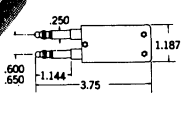
PJ-2 — Equivalent WE-291A. Designed for use with 1/4" diameter tip, ring and sleeve jacks. Especially designed cone-shaped tip to prevent momentary shorting of tip and ring conductors when used with ADC PJ-339, WE-239A or similar three circuit jacks.

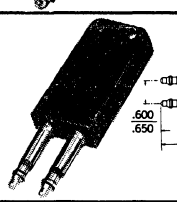
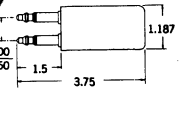
PJ-4 — Looping plug, dual three conductor type. Same conductor configuration as PJ-051 except has conductors wired internally, tip to tip, ring to ring and sleeve to sleeve. Black plastic shell.

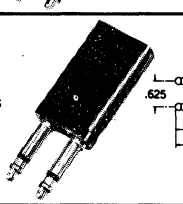
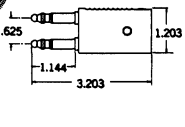
PJ-6 — Equivalent WE-213. Designed for applications requiring two separate 3 conductor circuits. Popularly used with operator's intercom/monitor headsets. Black shell notched for polarity identification. Self-aligning plug on 1 1/16" centers. (**Note:** Not intended for use with standard jack panels where jacks are mounted on 5/8" centers.)

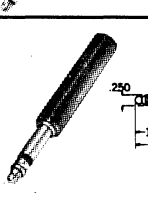
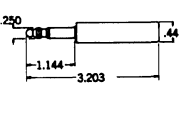
PJ-7 — Equivalent WE-425. Twin type plug with tip, ring and sleeve conductors on 5/8" centers for use with all standard jack panels. Designed to mate with three conductor jacks having 1/4" diameter sleeves. Molded insulation. Black phenolic shell is notched to indicate polarity.

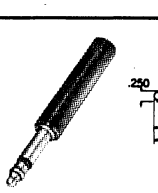
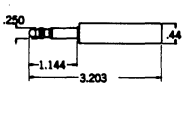
PJ-8 — Dual three conductor type with same conductor configuration as PJ-2, designed for non-shorting of tip and ring circuits when used with PJ-339, WE-239A or similar jacks. Black plastic handle notched to indicate polarity.

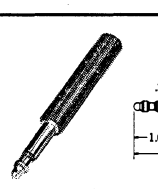
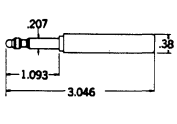
PJ-9 — Equivalent WE-338. Designed for applications requiring two separate 3 conductor circuits. Will mate with three-conductor jacks having 1/4" diameter sleeves. Molded insulation, black plastic handle notched to indicate polarity. Self-aligning plug sleeves on 5/8" centers. Has two separate cord entry holes and requires "Y" type cord or two separate cords.

PJ-051R — Equivalent WE-310. Formerly ADC PJ-3. Designed for use with 1/4" tip, ring and sleeve jacks. Molded insulation, red plastic shell, three conductor. Is in accordance with MIL-P-642B.

PJ-051B — Same as above except black plastic handle.

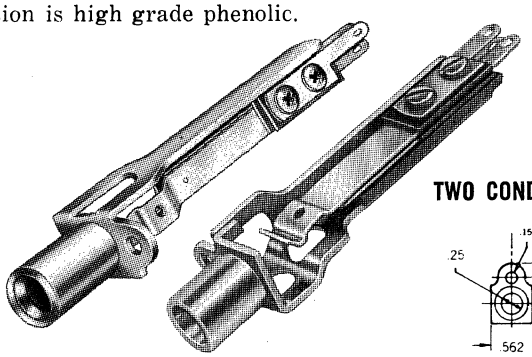
PJ-309 — Equivalent WE-309. Three conductor type. Has .207 diameter sleeve (small diameter). Intended for use with ADC PJ-246, PJ-249 and similar three circuit jacks which have .210 I.D. sleeves. Molded insulation — red plastic handle. Designed and constructed per MIL-P-642B.

FOR COMPLETE LINE OF COAXIAL PLUGS, SEE ADC COMMUNICATIONS COMPONENTS CATALOG.

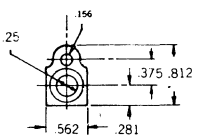
(ADC) Jacks

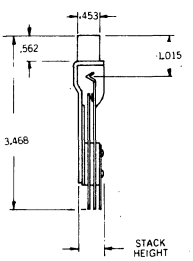
TELEPHONE TYPE

ADC is recognized as a leading supplier of long frame, telephone type jacks. As evidence of their outstanding quality, ADC jacks are used by the country's foremost manufacturers of communication equipment. The unique, ADC one-piece frame is strong, dimensionally stable and readily interchangeable both mechanically and electrically with commonly used jacks. Plating withstands 50-hour salt spray tests. W. E. #1 gold alloy contacts are welded to nickel silver springs. Lugs are hot tin dipped. Insulation is high grade phenolic.

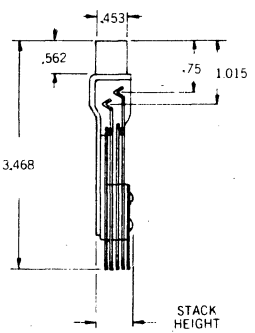


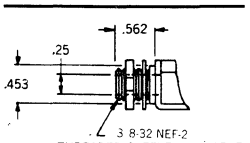
TWO CONDUCTOR





THREE CONDUCTOR





THREADED SLEEVE AVAILABLE ON SPECIAL ORDER

FRAME STYLE

Schematic Diagram	Jacks	WE Equiv.	Frame Style	Stack Height (Inches)
	PJ-115	215-A	A	5/8
	PJ-116	216-A	A	5/8
	PJ-117	217-A	A	9/16
	PJ-123	223-A	A	7/16
	PJ-125	225-A	A	21/32
	PJ-202	None	C	3/4
	PJ-203	303-A	A	9/16
	PJ-204**	None	A	3/4
	PJ-205**	240-A	A	3/4
	PJ-206**	242-A	A	3/4
	PJ-207**	285-A	A	27/32
	PJ-208**	284-A	A	63/64
	PJ-209**	411-A	A	27/32
	PJ-226	226-A	A	5/8
	PJ-237	237-A	A	15/32
	PJ-238	238-A	A	9/16
	PJ-240	240-C	C	3/4
	PJ-241**	241-A	A	3/4
	PJ-242	242-C	C	3/4
	PJ-280	280-C	C	23/32
	PJ-318	218-A	A	1/2
	PJ-336	236-C	C	19/32
	PJ-338	438-C	C	13/16
	PJ-339	239-A	A	9/16
	PJ-418	218-C	C	1/2
	PJ-246*	246-A	A	9/16
	PJ-248*	248-A	A	9/16
	PJ-249*	249-A	A	9/16

SPECIFICATIONS:

Frame: Steel, plated to withstand 50 hours salt spray per Mil-STD-202, Method.
Sleeve: Brass, nickle plated.
Springs: Nickle silver with tinned lugs.
Insulators: Phenolic, per Mil-P-3115 B type.

MILITARY JACKS

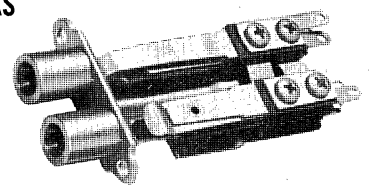
Designed to meet the rugged, exacting requirements of military applications. These ADC jacks are made in accordance with Mil-J-641B specifications. Highest quality materials and closely held tolerances on dimensions conform with military specifications.

Schematic Diagram	MIL Jacks	Frame Style	Stack Height (Inches)	Schematic Diagram	MIL Jacks	Frame Style	Stack Height (Inches)
	JJ-015	C	3/4		JJ-073**	A	3/4
	JJ-016	A	9/16		JJ-074	A	3/4
	JJ-017**	A	3/4		JJ-075**	A	3/4
	JJ-019	C	11/16		JJ-077	A	27/32
	JJ-022	A	9/16		JJ-078**	A	63/64
	JJ-024	A	1/2		JJ-084	A	5/8
	JJ-035	A	5/8		JJ-085	A	9/16
	JJ-042	A	9/16		JJ-086	A	7/16
	JJ-072	A	5/8		JJ-087**	A	27/32

*For use with PJ-309 or other similar type plugs having .207" diameter sleeves.

**Caution — Because of Stack Height these "A" frame jacks cannot be installed on 5/8" centers. "C" Frame version if not listed can be furnished on special order.

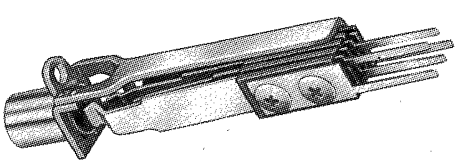
TWIN JACKS



ADC Twin Jacks are essentially two jacks with a common mounting frame. Jack sleeves are on 5/8" centers for vertical mounting in standard jack panels. Normal springs are cross-connected or strapped. Jack sleeves are brass, nickel plated. Die formed springs are nickel silver. Frame and hardware are steel, cadmium-chromate plated to withstand 50 hours salt spray.

Part No.	WE Equivalent	No. Conductors	Use With Plug
PJ-410	410A	2	PJ-047, PJ-1 and PJ-327
PJ-482	482A	3	PJ-051, PJ-7

WRAPID JACKS (For Wrapped Solderless Connections)



ADC offers a variety of Wrapid Jacks with .032" by .062" rectangular terminals for wrapped wire connections. These jacks feature cross-bar contacts. Overall length is 3.825" maximum, otherwise, dimensionally the same as telephone jacks.

Schematic Diagram	Wrapid Jack	Frame Style
	PJ-238W	A
	PJ-240W	C
	PJ-241W	A
	PJ-242W	C
	PJ-339W	A

FOR COMPLETE LINE OF COAXIAL PLUGS, SEE ADC COMMUNICATIONS COMPONENTS CATALOG.

(ADC) Jack Panels

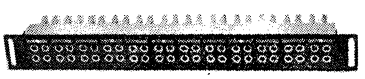
ADC offers the most complete assortment of jack panels available today. ADC panels are used in television and broadcasting stations, recording studios, industrial paging systems, and communication equipment of all kinds where there is a need to efficiently switch and distribute audio signals. Molded of solid phenolic, reinforced with steel to provide maximum rigidity and strength. Jacks are spaced to permit use of any standard double plug with 5/8" spacing. Mounting brackets and designation strips* furnished with each panel. All panels designed to fit standard 19" relay rack. Consult ADC for your standard and special jack panel requirements.

*The jack panels as illustrated are equipped with ADC standard designation strips as shown. PJ-30, PJ-35, PJ-36 and PJ-37 type panels can be supplied with the reinforcement strips drilled and tapped to accommodate the Western Electric equivalent designation strips (PJ-899A, PJ-899B, PJ-903A and PJ-903B). The suffix "A" added to the part number denotes panels which are modified to accommodate these alternate type designation strips. Designation strips are to be ordered separately.

SPECIFICATIONS

Panel: Molded, thermoset plastic per Mil-M-14F, Type CFG, black.
Mounting Brackets: PJ-31 and PJ-33: Die cast zinc, finished black lacquer. PJ-30, PJ-35, PJ-36, PJ-37: Steel, finished cadmium + chromate per Mil-F-14072 #M262, Type II.
Reinforcing Strips: PJ-31 and PJ-33: Steel, finished nickel plated. PJ-30, PJ-35, PJ-36, PJ-37: Steel, finished cadmium + chromate per Mil-F-14072 #M262, Type II.

PJ-30
Double Panel. Holds 52 jacks — requires 1¾" panel space. Double designation strip. Brackets for flush rack mounting. All jack mounting holes on 5/8" centers.



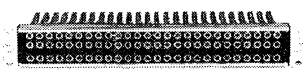
PJ-31
Double Panel. Holds 48 jacks. Holes are spaced to prevent patching adjacent circuits. Requires 2⅛" panel space.

PJ-33
Single Panel. Holds 24 jacks. Holes are spaced to prevent patching adjacent circuits. Requires 1¾" panel space.

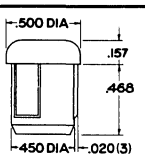
FOR LAMP SOCKET AND CAPS, SEE ADC COMMUNICATIONS COMPONENTS CATALOG.

PJ-35 Same as PJ-30, except has 7" standoff mounting brackets.

PJ-36
Single Panel. Holds 26 jacks — requires 1¾" panel space. Brackets for flush rack mounting. All jack mounting holes on 5/8" centers.



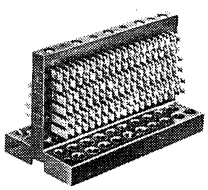
PJ-37
Triple - Row Panel. Holds 78 jacks. Requires 2⅝" panel space (1½" standard rack spaces). Provided with brackets for flush rack mounting and PJ-901 designation strips top and bottom.



HOLE PLUG
Molded of black polyethylene plastic. Fits all ADC standard jack panels. Made to plug unused jack mounting holes in jack panels. **PJ-29**

PANELS LESS JACKS	PJ-30	PJ-30A	PJ-31	PJ-33	PJ-35	PJ-35A	PJ-36	PJ-36A	PJ-37	PJ-37A
PANEL WITH PJ-318	PJ-340	PJ-340A	PJ-341	PJ-343	PJ-350	PJ-350A	PJ-360	PJ-360A	PJ-370	PJ-370A
PANEL WITH PJ-339	PJ-390	PJ-390A	PJ-391	PJ-393	PJ-395	PJ-395A	PJ-396	PJ-396A	PJ-397	PJ-397A

Molded Terminal Blocks 20 pin



Known for their ruggedness, ADC "Christmas Tree" Terminal Blocks have become standards in the Broadcast and Telecommunications Industries. The ADC 20-Pin Terminal Blocks are molded of durable, black, thermo-set plastic per Military specifications MIL-M-14F. Terminals are brass with a tin alloy plating for lasting solderability (see specifications below for details on solderability). The PJ-101 series blocks have terminals graduated in length for ease of wiring. The Figure 2 solderless terminals as furnished on the PJ-161 series blocks are designed to accommodate AMP No. 60197-1 Connectors as supplied by American Pamcor, Inc. or may be used as regular solder terminals. All Terminal Blocks are numbered along the top row for easy terminal identification.

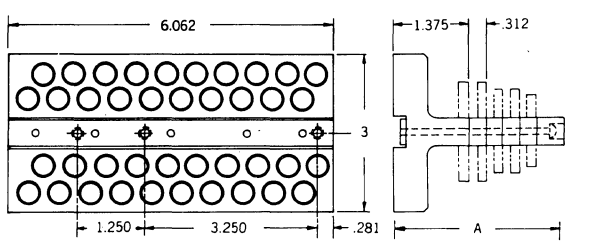


FIG. 1 Solder Type Mat'l. .040 Thick

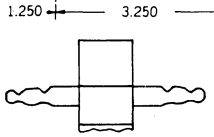
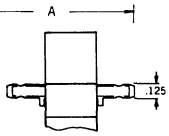


FIG. 2 Solderless or Solder Mat'l. .032 Thick



SPECIFICATIONS

Terminals: Brass, Tin alloy plated.

Insulated Strips and Base: Black Thermoset plastic per MIL-M-14F, Type CFG.

Mounting Strip: Steel, Cadmium-Chromate per MIL-F-14072, #M262, Type II.

Current Carrying Capacity: 5 Amperes.

Insulation Resistance: 1000 Megohms Min.

Dielectric Strength: 2500 V RMS 60 Hz. between terminals.

Solderability: Per MIL-STD-202C, Method 203A Initial: Excellent (over 95% coverage).
After 49 hours salt spray per MIL-STD-202C. Method 1013: good (90% coverage).
After 240 hours conditioning at +150°F and 95-98%. Relative Humidity: excellent.
After 90 days storage at room temperature: excellent.

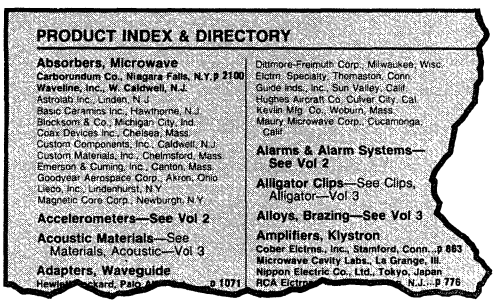
FOR WRAP TERMINAL BLOCK OR 26-PIN BLOCKS, SEE COMPLETE ADC CATALOG.

Catalog No.		No. Rows	No. Terminals	Dim. A
Terminal Fig. 1	Terminal Fig. 2			
PJ-101	PJ-161	1	20	1.906
PJ-102	PJ-162	2	40	2.250
PJ-103	PJ-163	3	60	2.593
PJ-104	PJ-164	4	80	2.937
PJ-105	PJ-165	5	100	3.281
PJ-106	PJ-166	6	120	3.625
PJ-107	PJ-167	7	140	3.968
PJ-108	PJ-168	8	160	4.312
PJ-109		9	180	4.656
PJ-110		10	200	4.968
PJ-111		11	220	5.281
PJ-112		12	240	5.593

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
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Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

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Acoustic Materials—See Materials, Acoustic—Vol 3

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Electm. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co., Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

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Cober Elctrns., Inc., Stamford, Conn. ..p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electron ... N.J. ... P 776

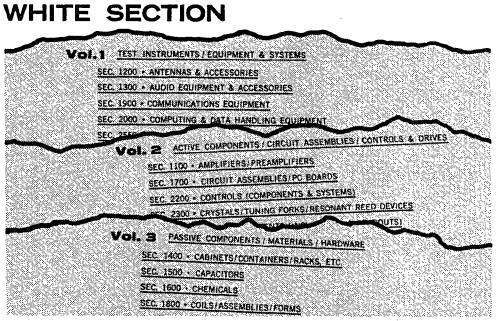
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

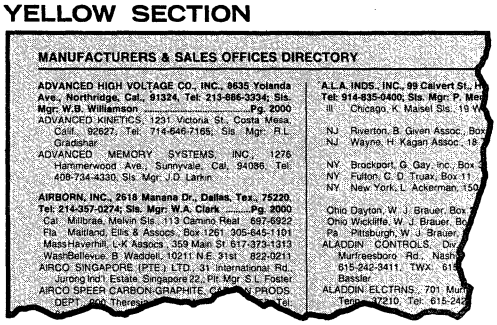
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Graesser
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin

AIRBORN, INC., 2518 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real, 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St, 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st, 822-0211
AIRCO, SINGAPORE (PTE.) LTD., 31 Internationar Rd., Jurong Ind'l. Estate, Singapore 22, Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA... PRODS. DEPT., 900 Theres... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mei...
Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Murf... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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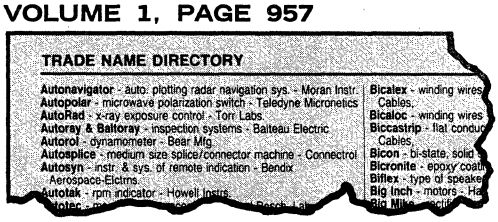

TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Tor Labs.
Autorey & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotec ... Rock... Tal...
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat condu... Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike ... Pacific

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

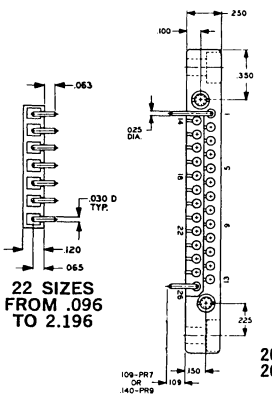
if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

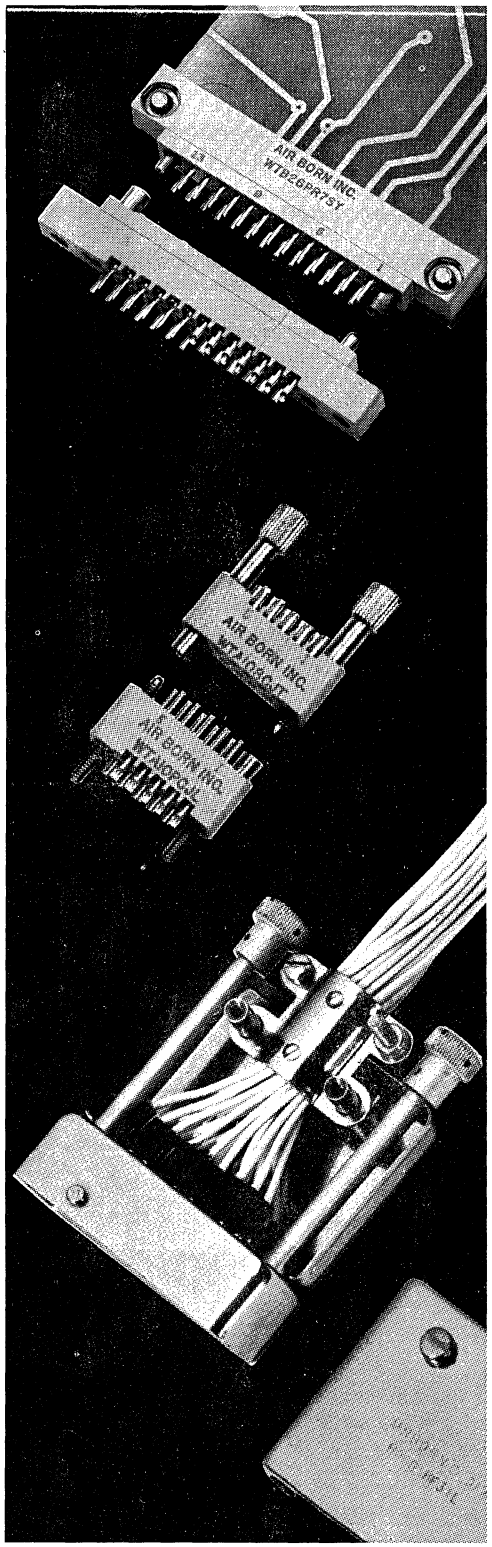
AirBorn Connectors...

for PC Card to Chassis or Mother Board Connections

Two series of subminiature, right-angle .030" dia. BeCu pin to socket connectors. **Series WT** single-row connectors on .100" centers. **Series WTB** double-row connectors on .100" centers, offset .050". Three or six 50-ohm Coax available with 20-contact connectors. **Terminations:** Soldercup, wave solder, wire-wrap, and crimp insertable.

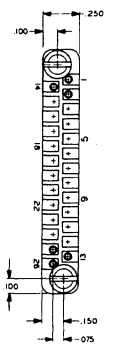


Contacts	Overall Length
10	1.350
14	1.550
20	1.850
24	2.050
26	2.150
30	2.350
36	2.650
40	2.850
44	3.050
50	3.350
54	3.550
56	3.650
60	3.850
66	4.150
70	4.350
90	5.650
100	6.150
120	7.150
20+3	2.850
20+6	4.050



for PC Board Input-Output, Cable to Panel and Cable to Chassis Connections

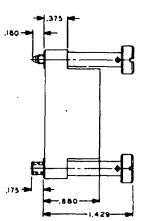
Series WTA subminiature, rectangular plug and receptacle, .100" centers, two rows offset .050", .030" dia. BeCu contacts. **Terminations:** soldercup, wave solder, and wire-wrap.



Contacts	Overall Length
10	.850
14	1.050
20	1.350
24	1.550
26	1.650
30	1.850
36	2.150
40	2.350
44	2.550
50	2.850
54	3.050
56	3.150
60	3.350
66	3.650
70	3.850

for Inter-equipment Connections — Cable to Panel, Cable to Cable, and Drawer to Cabinet

Two series of miniature, rectangular connectors with rugged .0625 dia. contacts. Stainless steel shells, mounting plates, split hoods, and environment-proof features. **Series K, EK, WK** feature crimp, removable contacts with 50 lb. minimum resistance to push-out. **Series P, EP, WP** feature soldercup contacts retained in molding.

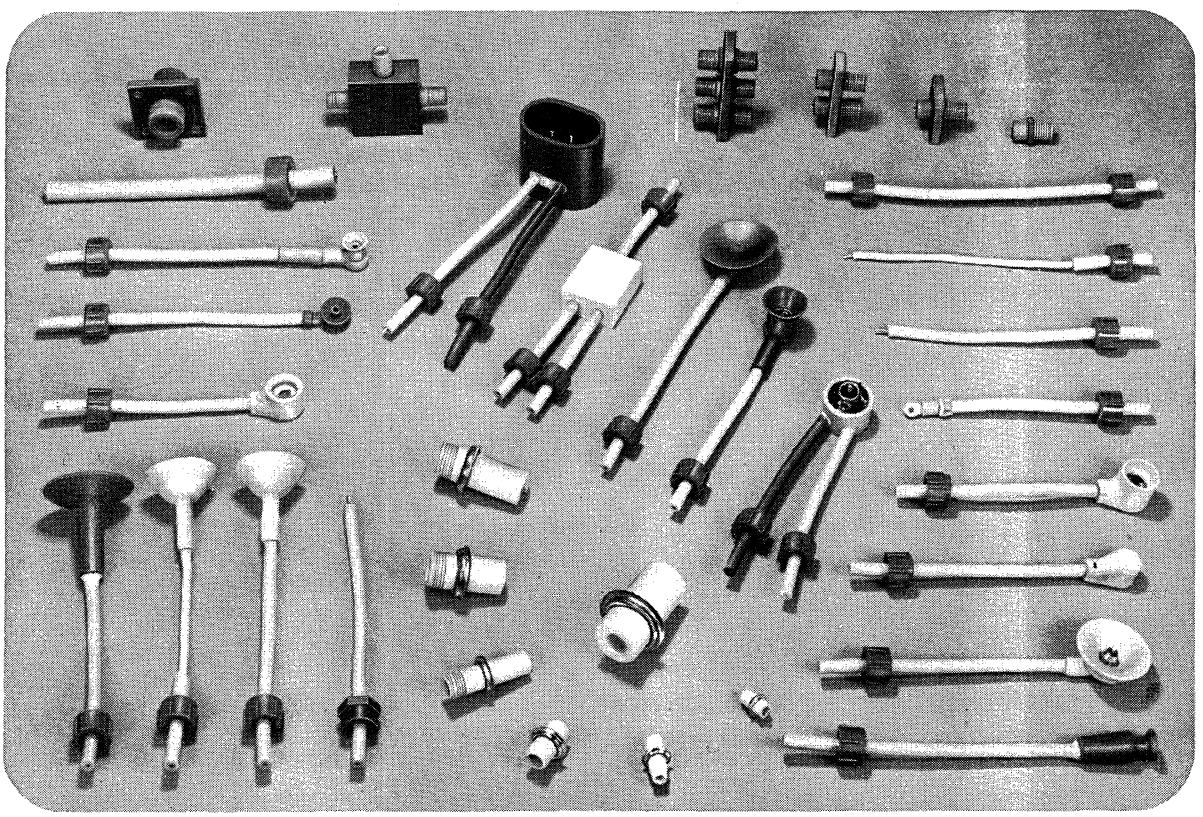


Contacts	Series	Overall Length
14	P	1.250
18	K	1.312
20	P	1.562
34	K&P	2.000
42	K&P	2.312
50	K&P	2.700
50-8	P	2.281
66	K&P	2.281
75	K&P	2.700
104	K&P	2.760

AirBorn, Inc.

2618 Manana Road, Dallas, Texas 75220, 214-357-0274

HIGH VOLTAGE LEAD ASSEMBLIES AND RECEPTACLES



The CAPITRON Division of AMP Incorporated is the leading manufacturer of high voltage, high altitude, high temperature lead assemblies and receptacles. Custom pre-engineered LGH*high voltage connector products incorporate the advantages of miniaturization and lightweight, and are ideal where reliability and peak performance are essential to the application. They are the result of continuing research and development activities in the connection of high voltage power supplies, modulators, pulse forming networks, high voltage transformers, magnetrons, klystrons, traveling wave tubes, and cathode ray tubes.

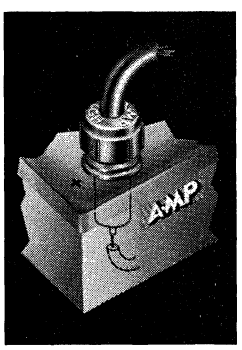
GENERAL FEATURES OF LGH COMPONENTS

- Lightweight, space saving, safe
- Wide temperature range: −55° C to +125° C (−67° F to +257° F)*
- Voltage ratings: to 50,000 volts DC†
- Easy to install—no tools needed
- Insulation: extruded silicone rubber
- Receptacles: ceramic or glass epoxy
- Quick disconnect
- High dielectric and mechanical strength
- Hermetically sealed and corona-resistant
- High altitude operation: up to 70,000 ft. without derating
- Meet applicable mil. specs. for shock and vibration resistance
- RFI shielding optional

*Higher temperature components up to +200°C (+392°F) on request

†Special designs to 200,000 volts DC on request

NOTE: See other CAPITRON High Voltage products under Catalog Sections 2100 and 4000.



Sizes and Ratings Available

TYPE	DC VOLTAGE Rating**	CURRENT RATING**
LGH ½	6,000	10 amps DC
LGH ½ L	12,000	10 amps DC
LGH 1	12,000	10 amps DC
LGH 1 L	25,000	10 amps DC
LGH 2	25,000	10 amps DC
LGH 3	35,000	10 amps DC
LGH 4	50,000	10 amps DC

**Peak AC and peak pulse voltage ratings will be somewhat less than DC ratings. Current rating is limited to 7.5 amps AC rms, 60 cycles.

Write on your letterhead for our LGH products catalog

CAPITRON DIVISION, AMP INCORPORATED
155 PARK STREET, ELIZABETHTOWN, PA. 17022.
TWX: 510-657-4561 • PHONE: 717-367-1105.

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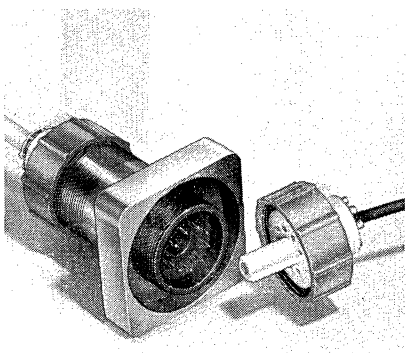
AMP INCORPORATED

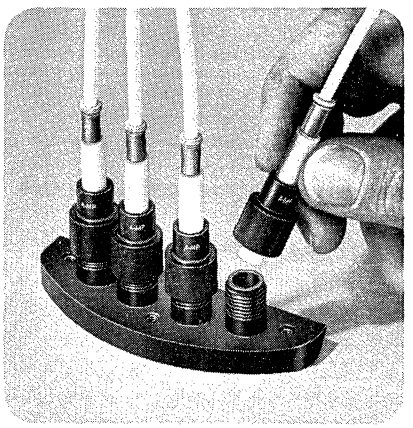
HERMETIC CONNECTORS UP TO 150,000 VOLTS D.C.

WJH* Connectors eliminate glass or ceramic insulators

10 PIN CONNECTOR

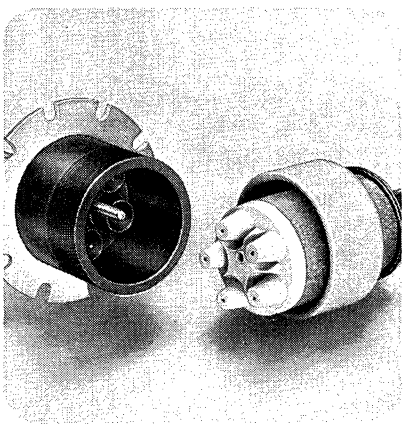


25,000 Volts D.C. center conductor and 9 low voltage pins



15,000 Volts D.C. Bulkhead Connector

5 PIN CONNECTOR



40,000 Volts D.C. Solder or "O" Ring Mounting

Features:

- Safe—no exposed high voltage parts
- Space saving—maximum performance from the minimum size and weight
- Color coded for easy identification
- Fast connect and disconnect
- Wide temperature range (–55°C to +125°C)
- Positive mating of lead into receptacle
- R F I shielding—optional
- Fungus, moisture, oil, and chemical resistant
- High altitude operation—up to 80,000 feet without voltage derating
- Excellent mechanical strength—resistant to vibration and shock
- High dielectric strength
- Preassembled—no tools required
- High reliability—operates under extreme environmental conditions
- Versatile—top access, splice, or bulkhead application
- Corona resistant—virtually unaffected by ozone or corona
- Radiation resistant
- Lead wire remains flexible from –62°C to +250°C
- Meets applicable military specifications
- Quick, easy installation

Suitable for:

- Industrial & Military Applications
- Power Supplies
- Radar
- Avionic Electronics
- CRT's
- Medical Electronics
- Laser
- Copying Machines
- Instrumentation
- Pulse Applications
- Oceanography

Let us design an assembly that meets or exceeds your requirements. We're the leading maker of customized connectors. Whatever your connection problem contact us today.

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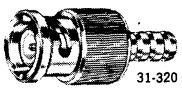
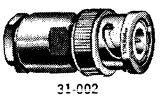
AMP INCORPORATED

NOTE: See other CAPITRON High Voltage products under Catalog Sections 1500 and 4000.

BNC RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL


31-320


31-002

BNC - Bayonet Coupled
Popular and Lightweight

Your choice of six different styles: Regular, Improved with Captivated Contacts and Improved in addition to the three "Crimp" versions described below.

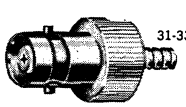
MIL-Crimp BNC's are recommended as the optimum BNC, giving optimum operating performance at low installed cost. Using standard crimping tools, these units can be assembled in a fraction of the time usually required for braid-clamp type connectors by eliminating critical assembly and soldering operations and reducing the parts to handle. Captivated center contacts prevent circuit discontinuity under environmental or mechanical stress. MIL-Crimps are weatherproof; their constant 50-ohm impedance provides excellent performance through X-band frequencies.

Quick-Crimp: gold-plated semi-captivated contacts, classed as weather proof. Heat shrink tubing for severe environmental conditions.

Original-Crimp: gold-plated contacts, classed as weatherproof. Each has a silicone rubber boot. For a complete listing of all BNC Connectors to the latest revision of MIL-C-39012/A, refer to your distributor or Amphenol.

ASTROplate®
Finish Available

Amphenol's exclusive, non-tarnish finish is available from stock on most popular rf connectors. **(See part numbers marked with ‡; others available on special order.)** ASTROplate® is corrosion and abrasion resistant. Mates safely with silver; is equally solderable. **To order: add suffix 1050 to part number.**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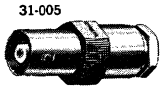

31-005

CHARACTERISTICS

ELECTRICAL: Impedance: unimproved BNC; non-constant; all others: 50 ohms. **Frequency range:** 0-10 GHz. **Voltage rating:** 500 volts peak. **Dielectric Withstanding Voltage:** 1500 volts rms. **SWR:** improved: 1.3; MIL-Crimps: 1.2 (solder), 1.3 per spec. **Other:** contact resistance: 2.1 mv; RF leakage: —55 db; insertion loss: .04 db; insulation resistance: 5000 megohms.

ENVIRONMENTAL: Thermal Limits: Teflon insulators: —67° to 390°F (—55° to 199°C); Rexolite insulators: —67° to 185°F (—55° to 85°C). **Weatherproof:** standards with clamp gaskets; MIL-Crimps with heat-shrink tubing. **Hermetic Seals:** pass helium leak test of 2×10^{-8} cc/sec. **Shock:** MIL-Std-202 method 202. **Vibration:** MIL-Std-202 method 204 (test cond. D). **Moisture Resistance:** MIL-Std-202 method 106. **Corrosion:** MIL-Std-202 method 101 (test cond. B). **Temperature Cycling:** MIL-Std-202 method 102 (test cond. D). **Altitude:** MIL-Std-202 method 105 (test cond. C).

MECHANICAL: Mating: BNC: 2-stud bayonet lock; TNC: 7/16-28 thread cplg. **Cable Affixment (Braid or Jacket):** standards: screw-thread nut and braid clamp: MIL-crimps: hex braid crimp. **Cable Affixment (Center Conductor):** MIL-Crimps: 4 indent crimp or solder; others: solder only. **Captivated Contact:** all MIL-Crimps; others: where specified. **Cable Retention:** standards: 20 to 50 lbs; crimps: 80 to 100 lbs.

MATERIAL: Contacts (Center): male: brass; female: beryllium copper or phosphor bronze (all MIL-Crimps). **Contacts (Outer):** MIL-Crimps: phosphor bronze; others: brass or beryllium copper where specified. **Other Metal Parts:** brass. **Plating:** center contacts, MIL-Crimps: .0001" gold over .0001" copper; all others: .0002" silver. **Insulators:** Teflon (all crimps); Rexolite; glass-Teflon (hermetically sealed). **Clamp Gaskets:** synthetic rubber; silicone rubber. **Heat-Shrink Tubing:** MIL-Crimps: Thermofit plastic. **Crimp Ferrule:** copper.

MILITARY SPECIFICATIONS: MIL-Crimps: MIL-C-23329A; Standard BNC: MIL-C-3608.

STRAIGHT PLUGS

RG/U Cable	Part No.	UG/U No. & M39012/	Insulation	Clamp Gasket	Dimensions, Inches Length	O.D.	Cable Entry	Notes
6	9350	—	Rexolite	syn. rubber	1¼	9/16	.348	—
8.9	6775	UG-959	Teflon	syn. rubber	1 23/32	1 1/16	.437	—
55, 142, 223	31-4326	16-0014	Teflon	—	1 3/32	5/16	.220	MIL-Crimp ■
55, 58, 141, 142, 223	31-002‡	UG-88	Teflon	syn. rubber	3 1/32	5/16	.212	—
	14525	UG-88A	Teflon	syn. rubber	1	5/16	.212	—
	14625	—	Teflon	syn. rubber	1	5/16	.212	female contact/polarized
	31-018‡	UG-88B	Teflon	—	3 1/32	5/16	.212	non-weatherproof
	31-202▲‡	UG-88C	Teflon	sil. rubber	1 1/16	5/16	.224	improved
	31-301▲	—	Teflon	sil. rubber	1 5/32	5/16	.219	improved/captivated contact
	31-2202▲	UG-88D	Teflon	sil. rubber	1 3/32	5/16	.224	improved/beryl. outer contact
	31-3202▲	UG-88E	Teflon	sil. rubber	1 3/32	5/16	.224	improved/beryl. outer contact
	84800▲	—	Teflon	sil. rubber	1 1/16	5/16	.224	improved/captivated contact
	31-3301	16-0001	Teflon	sil. rubber	1 1/16	5/16	.224	UG-Clamp
58, 141, 303	31-4320	16-0013	Teflon	—	1 3/32	5/16	.206	MIL-Crimp ■
59, 62, 71, 140, 210	31-4321	16-0015	Teflon	—	1 3/32	5/16	.261	MIL-Crimp ■
	31-012‡	UG-260	Rexolite	sil. rubber	3 1/32	5/16	.258	—
	31-021‡	UG-260A	Rexolite	—	1	5/16	.258	non-weatherproof
	31212▲‡	UG-260B	Teflon	sil. rubber	1 1/16	5/16	.255	improved
	31-304▲	—	Teflon	sil. rubber	1 5/32	5/16	.255	improved/captivated contact
59, 62, 71, 140, 210	31-2212▲	UG-260C	Teflon	sil. rubber	1 3/32	5/16	.255	improved/beryl. outer contact
	31-3212▲‡	UG-260D	Teflon	sil. rubber	1 3/32	5/16	.255	improved/beryl. outer contact
	70000	—	Teflon	syn. rubber	1	5/16	.258	female contact/polarized
	86475▲	—	Teflon	sil. rubber	1 1/16	5/16	.257	improved/75 ohm
	31-3302	16-0002	Teflon	sil. rubber	1 1/16	5/16	.255	UG-Clamp
71	31-4322	16-0017	Teflon	—	1 3/32	5/16	.275	MIL-Crimp ■
114A	17400	—	Teflon	syn. rubber	1 23/32	1 1/16	.437	"b" dim. is body od
122	31-4324	16-0016	Teflon	—	1 3/32	5/16	.175	MIL-Crimp ■
122, 180, 195,	31-323		Teflon	—	1 13/64	5/16	.175	Crimp ■
	12000	—	Teflon	syn. rubber	1	5/16	.177	
	84975	UG-1033	Teflon	sil. rubber	1 1/16	5/16	.177	improved
	31-3303	16-0003	Teflon	sil. rubber	1 5/32	5/16	.127	UG-Clamp
174, 179, 187, 188	31-242	—	Teflon	—	1 13/64	5/16	.115	MIL-Crimp ■
	31-315	—	Teflon	—	1 13/64	5/16	.115	MIL-Crimp ■
	69475	—	Teflon	sil. rubber	1 1/16	5/16	.116	improved
178, 196	15875	—	Teflon	syn. rubber	1	5/16	.094	—
180	16300	—	Teflon	syn. rubber	1	5/16	.150	—
Essex 21-597	31-325	—	Teflon	—	1 13/64	5/16	.175	MIL-Crimp ■
#18, 20, 22 H.V.	13925	—	Teflon	syn. rubber	1	5/16	.123	—

ANGLE PLUGS

55, 142, 223	31-3365	20-0003	Teflon	sil. rubber	1 3/32	5/16	.220	MIL-Crimp ■
55, 58, 141, 142, 223	31-204	UG-913	Teflon	sil. rubber	1 3/32	5/16	.224	
	31-2204▲	UG-913A	Teflon	sil. rubber	1 3/32	5/16	.224	improved/beryl. outer contact
	31-3361	20-0001	Teflon	sil. rubber	1 3/32	5/16	.224	UG-Clamp
		—						
	8525	—	Teflon	syn. rubber	1¼	5/16	.212	
	38250	—	Teflon	syn. rubber	2 9/32	5/16	.214	
58, 141	31-3364	20-0002	Teflon	sil. rubber	1⅛	5/16	.206	MIL-Crimp ■
59, 62, 71, 140, 210	31-336	—	Teflon	—	1 3/16	5/16	.261	MIL-Crimp ■
	31-850	—	Rexolite	syn. rubber	1¼	5/16	.258	
	8575	—	Teflon	syn. rubber	1¼	5/16	.259	
	33750	—	Teflon	syn. rubber	2 9/32	5/16	.259	
	86225▲	—	Teflon	sil. rubber	1 1/16	5/16	.257	improved
71	31-337	—	Teflon	—	1 3/16	5/16	.275	MIL-Crimp ■
122	31-339	—	Teflon	—	1 3/16	5/16	.175	MIL-Crimp ■
122, 180, 195,	31-338	—	Teflon	—	1 3/16	5/16	.175	MIL-Crimp ■
	33775	—	Teflon	syn. rubber	1¼	5/16	.177	—
174, 179, 187, 188	31-243	—	Teflon	—	1 3/16	5/16	.115	MIL-Crimp ■
	31-316	—	Teflon	—	1 3/16	5/16	.115	MIL-Crimp ■
	33275	—	Teflon	sil. rubber	1¼	5/16	.115	—
178, 196	21975	—	Teflon	syn. rubber	1¼	5/16	.096	—
180	16975	—	Teflon	syn. rubber	1¼	5/16	.150	—
Essex 21-597	31-340	—	Teflon	—	1 3/16	5/16	.175	MIL-Crimp ■

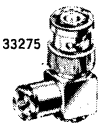
STRAIGHT JACKS

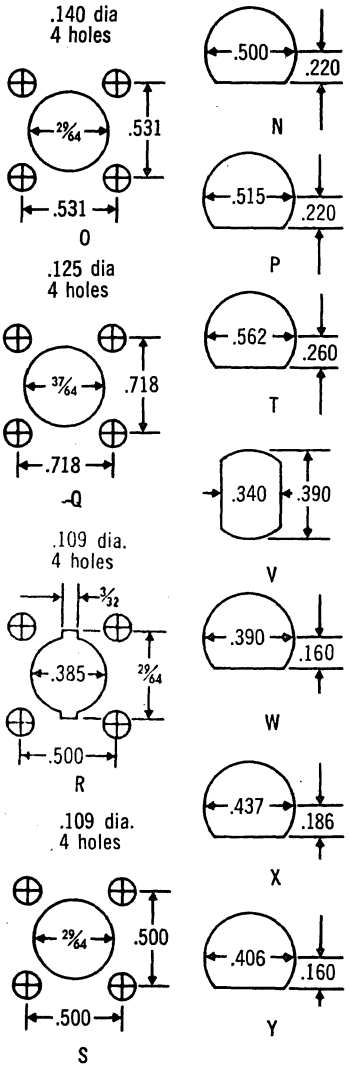
55, 142, 223	31-4333	17-0014	Teflon	—	1 11/64	5/16	.220	MIL-Crimp ■
55, 58, 141, 142, 223	31-005‡	UG-89	Teflon	syn. rubber	1⅛	5/16	.212	
	31-019	UG-89A	Teflon	—	1 5/64	5/16	.212	non-weatherproof
	31-205▲	UG-89B	Teflon	sil. rubber	1 5/64	5/16	.224	improved
	31-302▲	—	Teflon	sil. rubber	1 15/64	5/16	.221	improved/captivated contact
	31-2205▲	UG-89C	Teflon	sil. rubber	1 5/64	5/16	.224	improved
	31-3319	17-0001	Teflon	sil. rubber	1 5/64	5/16	.212	UG-Clamp
58, 141, 303	31-4327	17-0013	Teflon	—	1 11/64	5/16	.206	MIL-Crimp ■
59, 62, 71, 140, 210	31-4328	17-0015	Teflon	—	1 11/64	5/16	.261	MIL-Crimp ■
	31-015	UG-261	Rexolite	sil. rubber	1⅛	5/16	.258	70 ohm
	31-022	UG-261A	Rexolite	—	1 5/64	5/16	.258	non-weatherproof/70 ohm
	31-215▲	UG-261B	Teflon	sil. rubber	1 5/64	5/16	.258	improved
	31-305▲	—	Teflon	sil. rubber	1 15/64	5/16	.258	improved/captivated contact
	31-2215▲	UG-261C	Teflon	sil. rubber	1 5/64	5/16	.258	improved
	31-3320	17-0002	Teflon	sil. rubber	1 5/64	5/16	.258	UG-Clamp
71	31-4329	17-0017	Teflon	—	1 11/64	5/16	.275	MIL-Crimp ■
122	31-4331	17-0016	Teflon	—	1 11/64	5/16	.175	MIL-Crimp ■
122, 180, 195	31-3321	17-0003	Teflon	sil. rubber	1 5/64	5/16	.175	UG-Clamp
	84650	UG-1056	Teflon	sil. rubber	1 5/64	5/16	.177	improved
174, 179, 187, 188	31-244	—	Teflon	—	1 25/64	5/16	.115	MIL-Crimp ■
	31-317	—	Teflon	—	1 25/64	5/16	.115	MIL-Crimp ■
180	16925	—	Teflon	syn. rubber	1 5/64	5/16	.150	
Essex 21-597	31-332	—	Teflon	—	1 25/64	5/16	.175	MIL-Crimp ■

‡ See note on ASTROplate® Finish

BNC RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL





BULKHEAD JACKS (rear mounting, except where noted)

RG/U Cable	Part No.	UG/U No. & M39012/	Insulation	Clamp Gasket	Dimensions, Inches Length	O.D.	Cable Entry	Notes	Mounting Holes
55, 142, 223	31-4341	19-0014	Teflon	—	1 13⁄32	11⁄16	.220	MIL-Crimp ■	N-hole
55, 58, 141, 142, 223	31-206▲	UG-909	Teflon	sil. rubber	1 1⁄8	11⁄16	.212	improved	P-hole
	2475	—	Teflon	syn. rubber	1 1⁄16	5⁄8	.212	front mounting	T-hole
	2575	—	Teflon	syn. rubber	1 5⁄64	5⁄8	.212	—	T-hole
	31-2206▲	UG-909A	Teflon	sil. rubber	1 7⁄64	11⁄16	.224	improved	P-hole
	31-3206▲	UG-909B	Teflon	sil. rubber	1 7⁄64	3⁄4	.224	improved	P-hole
	17725	—	Teflon	sil. rubber	1 49⁄64	5⁄8	.219	improved hermetic	P-hole
	31-3347	19-0001	Teflon	sil. rubber	1 11⁄64	11⁄16	.224	UG-Clamp	
58. 141	31-4342	19-0013	Teflon	—	1 13⁄32	11⁄16	.206	MIL-Crimp ■	N-hole
59, 62, 71, 140, 210	31-4343	19-0015	Teflon	—	1 13⁄32	11⁄16	.261	MIL-Crimp ■	N-hole
	31-3348	19-0002	Teflon	sil. rubber	1 11⁄64	11⁄16	.258	UG-Clamp	
	31-207▲	UG-910	Teflon	sil. rubber	1 1⁄8	11⁄16	.258	improved	P-hole
	31-2207▲	UG-910A	Teflon	sil. rubber	1 7⁄64	11⁄16	.258	improved	P-hole
	31-3207▲	UG-910B	Teflon	sil. rubber	1 7⁄64	11⁄16	.258	improved	P-hole
	2075	624	Rexolite	syn. rubber	1 1⁄16	5⁄8	.258	front mounting	T-hole
	2675	—	Rexolite	syn. rubber	1 5⁄64	5⁄8	.258	—	T-hole
71	31-4344	19-0017	Teflon	—	1 13⁄32	11⁄16	.275	MIL-Crimp ■	N-hole
122	31-4346	19-0016	Teflon	—	1 13⁄32	11⁄16	.175	Crimp ■	N-hole
122, 180, 195	31-345	—	Teflon	—	1 3⁄8	11⁄16	.175	Crimp ■	N-hole
	84725	—	Teflon	sil. rubber	1 5⁄64	11⁄16	.177	improved	N-hole
174, 179, 187, 188	31-245	—	Teflon	—	1 3⁄4	11⁄16	.115	MIL-Crimp ■	N-hole
	31-318	—	Teflon	—	1 3⁄8	11⁄16	.115	MIL-Crimp ■	N-hole
178, 196	86850	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.098	improved	N-hole
Essex 21-597	31-347	—	Teflon	—	1 3⁄8	11⁄16	.175	MIL-Crimp ■	N-hole

ANGLE BULKHEAD JACKS (rear mounted)

55, 58, 141, 142, 223	14325	—	—	syn. rubber	1 11⁄32	3⁄64	.212	—	P-hole
59, 62, 71, 140, 210	14225	—	—	sil. rubber	1 11⁄32	3⁄64	.258	—	P-hole

PANEL JACKS (#3-56 tapped flange holes & rear mounted, except where noted)

RG/U Cable	Part No.	UG/U No.	Insulation	Clamp Gasket	Dimensions, Inches Length	Flange (Sq.)	Cable Entry	Notes	Mounting Holes
8	6750	—	Teflon	syn. rubber	1 13⁄32	1	.438	.125 dia. flange holes	Q-hole
55, 58, 141, 142 223	31-001	291	Teflon	syn. rubber	1 1⁄8	11⁄16	.214	△	R-hole
	31-020	291A	Teflon	—	1 5⁄64	11⁄16	.214	non-weatherproof/△	R-hole
	31-201▲	291B	Teflon	sil. rubber	1 7⁄64	11⁄16	.214	improved	S-hole
	31-300▲	—	Teflon	sil. rubber	1 13⁄64	11⁄16	.221	improved/captivated contact	S-hole
	31-2201▲	291C	Teflon	sil. rubber	1 7⁄64	11⁄16	.221	improved	S-hole
	1300	90	Teflon	syn. rubber	1 5⁄64	3⁄4	.214	.136 dia. flange holes	O-hole
	31-3333 —	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.221	MIL-C-39012/18-0002 UG-Clamp/△	R-hole
59, 62, 71, 140, 210	31-011	262	Rexolite	sil. rubber	1 1⁄8	11⁄16	.259	△	R-hole
	31-023	262A	Rexolite	—	1 5⁄64	11⁄16	.259	non-weatherproof/△	R-hole
	31-211▲	262B	Teflon	sil. rubber	1 7⁄64	11⁄16	.258	improved	S-hole
	31-303▲	—	Teflon	sil. rubber	1 13⁄64	11⁄16	.258	improved/captivated contact	S-hole
	31-2211▲	262C	Teflon	sil. rubber	1 7⁄64	11⁄16	.258	improved	S-hole
	71000	—	Teflon	syn. rubber	1 5⁄64	11⁄16	.259	male contact/polarized/△	R-hole
	31-3334	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.258	MIL-C-39012/18-0001/△	R-hole
122, 180, 195	31-3335	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.177	MIL-C-39012/18-0003/△	R-hole
	16475	—	Rexolite	syn. rubber	1 5⁄64	11⁄16	.177	△	R-hole
	86400	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.160	improved	S-hole
174, 179, 187, 188	86425	—	Teflon	sil. rubber	1 7⁄64	11⁄16	.117	improved	S-hole

▲ To adapt connector for use with **RG-141/142-type** CUJAK cable, specify accessory adapter kit 31-885.
△ May be front or rear mounted using "S" mounting hole, "R" hole for rear mounting only.
‡ Non-tarnish Astroplate finish available. To order: add suffix 1050 to part number. Other numbers also available on special order from factory.
■ Gold plated captivated contact.
☐ To ground cable shield, specify Amphenol Accessory Lug 31-759.

BULKHEAD RECEPTACLES (front mounted)

Part No.	UG/U No.	Insulation	Dimensions, Inches Length	O.D.	Max. Panel Thickness	Notes	Mounting Holes
5575‡	625	Rexolite	1 1⁄32	1⁄2	.155	☐	X-hole
31-236‡	625B	Teflon	1 1⁄16	1⁄2	.125	improved/☐	X-hole
31-3375	—	Teflon	1 1⁄16	1⁄2	.125	MIL-C-39012/21-0001	X-hole
31-102‡	657	Rexolite	1 13⁄64	37⁄64	.200	pressurized/☐	V-hole
31-239	657A	Teflon	1 13⁄64	37⁄64	.234	pressurized/☐	V-hole
31-238	912	glass-Teflon	1 13⁄64	19⁄32	.250	improved/herm. sealed/lug term./☐	Y-hole
31-2221‡	1094A	glass-Teflon	1 13⁄64	19⁄32	.250	improved/herm. sealed/lug term./☐	W-hole
31-221‡	1094	Teflon	1 1⁄16	1⁄2	.104	improved/☐	W-hole
31-3376	—	Teflon	1 1⁄16	1⁄2	.250	MIL-C-39012/21-0002	W-hole
11300	—	Teflon	1 1⁄32	1⁄2	.155	☐	X-hole
11325	—	Teflon	1 1⁄32	1⁄2	.155	male contact/polarized/☐	X-hole
78725	—	glass-Teflon	1 7⁄64	19⁄32	.145	improved/herm. sealed/gold plt.cont.	Y-hole

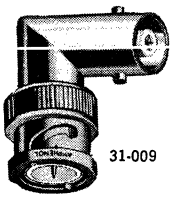
Part No.	UG/U No.	Insulation	Dimensions, Inches Length	O.D.	Max. Panel Thickness	Notes	Mounting Holes
86250	—	glass-Teflon	1 13⁄32	9⁄16	.148	herm. sealed/ polarized/plug (male) receptacle/☐	W-hole
87225	—	glass-Teflon	1 13⁄32	3⁄4	.323	herm. sealed/ lug terminal/☐	V-hole
31-016	254A	Rexolite	1 13⁄32	13⁄16	.152	pressurized/rear mounted	.516 dia.hole
31-4238	—	glass-Teflon	1 13⁄64	11⁄16	.250	improved/lug term./ herm. sealed M39012/24-0002	P-hole
31-4237	--	Teflon	1 13⁄64	11⁄16	.250	lug term/hermetic/ gold plt. cont./ rear mtd. M39012/24-0001	P-hole

ANGLE RECEPTACLES

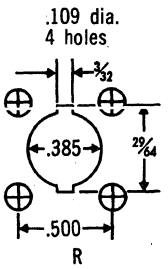
31-222	1098	Teflon	29⁄32	19⁄32	.168	improved/☐	Y-hole
31-2222	1098A	Teflon	29⁄32	19⁄32	.313	improved/☐	Y-hole
5075	—	Teflon	1 1⁄16	11⁄16	.150	#3-56 flange holes	S-hole
5675	535	Teflon	1 3⁄32	3⁄4	.150	.140 dia. flange holes	S-hole

BNC RF COAXIAL CONNECTORS

BUNKER RAMO **AMPHENOL**



31-009



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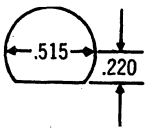

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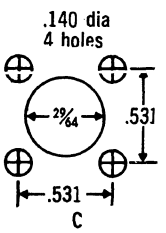

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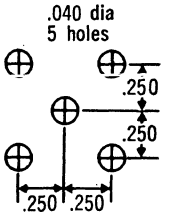

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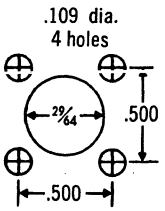
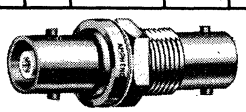


S

PANEL RECEPTACLES (#3-56 tapped flange holes, except as noted)

Part No.	UG/U No.	Insulation	Dimensions Inches Length	Flange (Sq.)	Notes	Mtg. Holes
31-003‡	290	Rexolite	1 1/32	1 1/16		R or S
31-104	—	Polystyrene	1 5/32	3/4	.140 dia. flange holes	O-hole
31-105	—	Rexolite	1 1/32	1 1/16	.120 dia. flange holes	R or S
31-203‡	290A	Teflon	1 1/16	1 1/16	improved	R or S
31-3377	—	Teflon	1 1/16	1 1/16	MIL-C-39012/22-0001	R or S
31-817	447	Rexolite	1 1/32	1 1/16	.109 dia. flange holes	R or S
31-842	—	Teflon	1 1/32	1 1/16		R or S
1100	928	Rexolite	27/32	3/4	spade term.	O-hole
2775	—	Teflon	1 1/16	1 1/16	turret terminal male recept./	R or S
3150	—	Teflon	1 1/4	3/4	.136 dia flange holes turret term./	O-hole
4500	185	Rexolite	1 5/64	3/4	.136 dia flange holes	O-hole
13550	—	Teflon	1 5/64	3/4	turret term./ .136 dia flange holes	O-hole
14275	—	Rexolite	1 1/32	3/4	.136 dia. flange holes	O-hole
14375	—	Rexolite	1 1/32	1 1/16	.136 dia. flange holes	O-hole
18225	—	Teflon	25/32	1 1/16	printed circuit/ .092 dia. flange holes	U-hole



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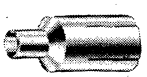

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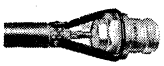


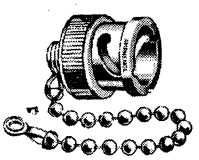
31-759

STRAIGHT ADAPTERS

Part No.	UG/U No.	Insulation	Adapter Ends	Dimensions, In. Length	O.D.	Notes
31-218‡	491A	Teflon	plug-plug	1 1/4	9/16	improved
31-219‡	914	Teflon	jack-jack	1 9/32	9/16	improved
31-2218	491B	Teflon	plug-plug	1 1/4	9/16	improved/beryl outer cont.
8425	491	Teflon	plug-plug	1 1/4	9/16	—
21925	—	Teflon	plug-jack	1 17/32	9/16	—
75000	—	Teflon	jack-jack	1 9/32	9/16	—

ANGLE ADAPTERS

31-009‡	306	Teflon	jack-plug	1	9/16	—
31-209	306A	Teflon	jack-plug	1 1/16	9/16	improved/beryl outer cont.
31-2209	306B	Teflon	jack-plug	1 1/16	9/16	improved/beryl outer cont.



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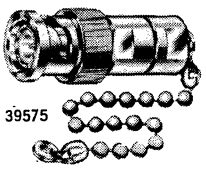


39575

BULKHEAD & PANEL ADAPTERS

Part No.	UG/U No.	Insulation	Adapter Ends	Dimensions, Inches Length	O.D.	Max. Panel Thickness	Notes	Mtg. Hole
31-220‡	492A	glass-Teflon	jack-jack	1 13/32	1 1/16	.181	improved/herm. seal	P-hole
31-2220	492B	glass-Teflon	jack-jack	1 25/64	1 1/16	.163	improved/herm. seal/O ring	P-hole
31-3220	492D	glass-Teflon	jack-jack	1 17/32	1 1/16	.275	improved/herm. seal/O ring	P-hole
4525	—	Teflon	jack-jack	1 13/32	1 1/16	.170	—	R-hole
47000	414	Teflon	jack-jack	1 9/32	1 1/16	.250	panel mount	R-hole
47025	414A	Teflon	jack-jack	1 9/32	1 1/16	.260	improved/panel mt.	R-hole
75500	—	glass-Teflon	plug-plug	1 1/16	13/16	.185	hermetically sealed	S-hole

MALE CAPS

Part No.	CW No.	Dimensions, Inches Length	O.D.	Chain Length	Notes
31-006	123	1 1/16	9/16	2 1/4	—
31-007	155	37/64	9/16	—	—
31-017	159	1 1/16	9/16	2 1/4	shorting male contact
31-026‡	123A	45/64	9/16	2 1/4	improved
31-027	155A	37/64	9/16	—	improved
900	—	23/32	9/16	3 1/2	—
5275	—	19/32	9/16	—	shorting male contact
87300	—	23/32	9/16	2 1/2	solder lug

TEE ADAPTERS

Part No.	UG/U No.	Insulation	Adapter Ends	Dimensions, Inches Length	O.D.	Notes
31-008‡	274	Rexolite	jack-plug-jack	1 9/32	9/16	—
31-208‡	274A	Teflon	jack-plug-jack	1 9/32	9/16	improved/beryl outer cont.
31-2208	274B	Teflon	jack-plug-jack	1 9/32	9/16	improved/beryl outer cont.
4725	—	Teflon	plug-plug-plug	1 13/16	9/16	—
17450	—	Rexolite	jack-jack-jack	1 9/32	1 1/16	panel mt. mounting hole R
21900	—	Teflon	plug-jack-jack	1 17/32	3/8	—
27750	—	Teflon	plug-jack-plug	1 13/16	7/16	—
33725	—	Teflon	cable-plug-cable	1 3/4	9/16	RG-58/U cable/syn rubber clamps

FEMALE CAPS

31-210	282	1 1/16	1/2	3	improved
1550	—	5/8	7/16	—	shorting female contact
1750	—	25/32	9/16	—	—
2025	—	25/32	9/16	3 1/2	—
15300	—	25/32	9/16	—	shorting female contact

RESISTOR TERMINATED CAPS

Part No.	MX No.	Insulation	Dimensions, Inches Length	O.D.	Chain Length	Notes
4700 ☐	554 (100 OHM)	Rexolite	1 1/4	9/16	3 1/2	—
39575	554A	Teflon	1 1/4	9/16	3 1/2	100 ohm resistor
35650 ☐	—	Teflon	1 1/4	9/16	3 1/2	—
35725 ☐	—	Teflon	1 13/64	9/16	—	—
40750 ☐	—	Rexolite	1 5/64	9/16	—	—
46650	—	Teflon	1 1/2	9/16	—	51 or 75 ohm 1 watt resistor

☐ To order without resistor, add 1 to part number; to order with resistor, add resistor value to part number. ½ watt 5% resistor values (ohms) stocked: 47, 51, 68, 75, 82, 91, 100, 120, 130, 150, 180, 240, 270, 300, 470, 510, 560, 680, 750, 820, 1000, 1500, 3900, 4700, 10000, 100000, 150000.

HOODS & ACCESSORIES

Part No.	MIL No.	Length Inches	Notes
HOODS			
10900	MX-195	7/8	RG-55, 58/U cable, square flange
10925	MX-367	7/8	RG-55, 62/U cable square flange
87175	MX-195A	13/16	RG-55, 58, 59, 62/U cables, plug-in
NUT STRAP			
1600	MT-412	3/4	4 holes with no. 4-40 NC-2B thds
SHIELD GROUNDING LUG			
31-759‡	—	29/32	used on front-mount receptacles

‡ ASTROplate® finish available, add -1050 to part number.

TNC RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Threaded Coupling RF Connectors — TNC

TNC's were developed by Amphenol for aircraft, missile and other applications in which extreme vibration may be encountered. The TNC threaded coupling mechanism eliminates "rock" under vibration — a characteristic of bayonet coupled connectors such as BNC that introduces noise into the system and causes erratic performance. Other than coupling, TNC's are dimentionally and electrically similar to BNC, and have a constant impedance of 50 ohms.

Their rugged mechanical construction makes them an excellent choice for applications requiring a high degree of vibration.

ASTROplate® Finish Available

Amphenol's exclusive, non-tarnish finish is available from stock on most popular rf connectors. **(See part numbers marked with ‡; others available on special order.)** ASTROplate® is corrosion and abrasion resistant. Mates safely with silver; is equally solderable. **To order: add suffix 1050 to part number.**

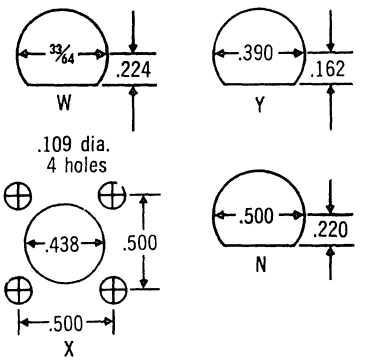
CHARACTERISTICS

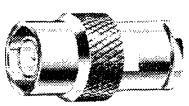
MECHANICAL: Mating: 7/16-28 thread coupling.

ALL OTHERS: Similar to BNC

Notes: GC - Gold-plated Contact; PM - Polarized Male Contact; PF - Polarized Female Contact; BOC - Beryllium Outer Contact; SW - Holes for Safety Wiring; H - Hermetically Sealed; FM - Front Mounting; T - Teflon; GT - Glass Teflon; P - Plug; J - Jack.

MOUNTING HOLES

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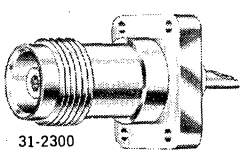
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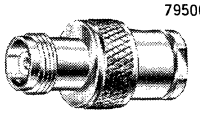
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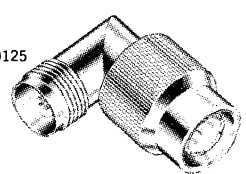

79125

50 ohm impedance • male contacts • weatherproof

STRAIGHT PLUGS

For RG-/U Cable	No.*	Ins.	Notes	Lgth.
55, 58, 141, 142, 223	77175‡	T	BOC	1 1/8
	79050	T	PF, BOC	1 1/8
	79875	T		1 1/16
	76175	T	GC, SW, BOC	1 1/8
59, 62, 71, 140, 210	79475	T	PF, BOC	1 1/8
	79525	T		1 1/8
122, 195	79725	T	BOC	1 1/8
180	78625	T		1
	79375	T	BOC	1 1/8
174, 179, 187, 188	73475	T		1 1/16

ANGLE PLUGS

55, 58, 141, 142, 223	79075	T	BOC	1 1/8
	79550	T	BOC	1 3/16
59, 62, 71, 140, 210	79400	T	BOC	1 3/32

*Add—1000 to part number to order connectors with safety wiring holes.

STRAIGHT JACKS

55, 58, 141, 142, 223	79600	T	GC	1 1/4
59, 62, 71, 140, 210	79450	T	PM	1 7/64
180	77050	T		1 3/64

BULKHEAD JACKS (mounting hole W)

55, 58, 141, 142, 223	79425	T	GC	1 3/64
59, 62, 71, 140, 210	77350	GT	H	1 27/32
180	77100	T		1 1/32

‡ See note on ASTROplate® Finish

50 ohm impedance • female contacts non-weatherproof

PANEL RECEPTACLES (mounting hole X)

No.	Ins.	Notes	Lgth.
31-2300‡	T	GC	1 1/16
78200	T	GC, PM	1 1/16
79650	T	GC	1 3/32
79750	GT	GC, H	3/4

BULKHEAD RECEPTACLES (mounting hole Y)

31-2301‡	T	GC, FM	1 1/16
77300	T	GC, *FM	27/32
79775	T	GC, FM	1 3/64
79800	GT	H, FM	1 1/16

*Gold Plated

50 ohm impedance • non-weatherproof

ANGLE ADAPTERS

No.	Ins.	Adapter Ends	Lgth.
79125	T	PJ	1 1/32

BULKHEAD ADAPTERS (Hermetically Sealed)

79100	GT	JJ (Mtg Hole W)	1 13/32

TEE ADAPTERS

79700	T	JPJ	1 9/32

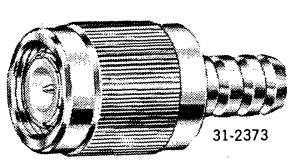
MALE CAPS non-weatherproof

No.	Lgth.
78750	3/8

FEMALE CAPS

78400	37/64

MIL-Crimp TNC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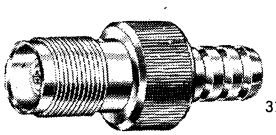

31-2375

STRAIGHT PLUGS

For RG-/U Cable	No.	MIL. No. M23329/	Ins.	Notes	Length
55, 142, 223	31-2373	4-02-04	T	GC	1 7/32
58, 141	31-2367	4-01-03	T	GC	1 7/32
59, 62, 140, 210	31-2368	4-05	T	GC	1 7/32
71	31-2369	—	T	GC	1 7/32
122	31-2371	—	T	GC	1 7/32
174, 188	31-2315	—	T	GC	1 7/32
179, 187	31-2242	—	T	GC	1 7/32
180, 195	31-2370	4-06	T	GC	1 7/32
Essex 21-597 or equiv.	31-2372	—	T	GC	1 7/32

STRAIGHT JACKS

55, 142, 223	31-2380	4-08	T	GC	1 3/8
58, 141	31-2374	4-07	T	GC	1 3/8
59, 62, 140, 210	31-2375	4-11	T	GC	1 3/8
71	31-2376	—	T	GC	1 3/8
122	31-2378	—	T	GC	1 3/8
179, 187	31-2244	—	T	GC	1 3/8
174, 188	31-2317	—	T	GC	1 3/4
180, 195	31-2377	4-12	T	GC	1 3/8
A 21-597	31-2379	—	T	GC	1 3/8

ANGLE PLUGS

For RG-/U Cable	No.	MIL. No. M23329/	Ins.	Notes	Length
55, 142, 223	31-2381	—	T	GC	1 3/16
58, 141	31-2382	—	T	GC	1 3/16
59, 62, 140, 210	31-2383	—	T	GC	1 3/16
71	31-2384	—	T	GC	1 3/16
122	31-2386	—	T	GC	1 3/16
179, 187	31-2243	—	T	GC	1 3/16
174, 188	31-2316	—	T	GC	1 3/16
180, 195	31-2385	—	T	GC	1 3/16
Essex 21-597 or equiv.	31-2387	—	T	GC	1 3/16

BULKHEAD JACKS (mounting hole N)

55, 142, 223	31-2388	4-14	T	GC	1 5/16
58, 141	31-2389	4-13	T	GC	1 5/16
59, 62, 140, 210	31-2390	4-17	T	GC	1 5/16
71	31-2391	—	T	GC	1 5/16
122	31-2393	—	T	GC	1 5/16
179, 187	31-2245	—	T	GC	1 5/16
174, 188	31-2318	—	T	GC	1 5/16
180, 195	31-2392	4-18	T	GC	1 5/16
Essex 21-597 or equiv.	31-2394	—	T	GC	1 5/16

UHF RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series UHF

Series UHF are low-cost, general purpose connectors for use in a wide variety of lower frequency applications (up to 300 mc) where constant impedance is not necessarily required. Available in small and large body sizes, they have a peak voltage rating of 500 volts.

While most UHF connectors have conventional solder-type cable affixment, Quick-Crimp UHF feature Amphenol's patented hex crimp design which permits faster, easier and more reliable assembly.

The 83-850 and 83-851 plugs eliminate one or both of two common soldering operations in assembly. The 83-850 has completely solderless braid and contact assembly; the 83-851 has solderless braid assembly.

CHARACTERISTICS

ELECTRICAL: Impedance: non-constant. **Frequency range:** 0-300 MHz. **Voltage rating:** 500v. peak.

ENVIRONMENTAL: Thermal limits: Teflon: —67°F to 390°F; Rexolite and polystyrene: —67°F to 185°F; mica-filled Bakelite: —67°F to 300°F. **Non-weatherproof,** except as noted.

MECHANICAL: Mating: 5/8-24 thrd. coupling (small body), 1-20 thrd. coupling (large body). **Cable affixment:** braid solder, Quick Crimp or Solderless.

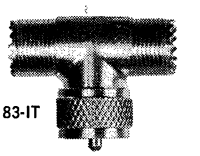
MATERIAL: Contacts: male: brass; female: beryllium copper. **Bodies:** die cast zinc or brass. **Plating:** .0002" silver min. **Insulators:** Teflon, Rexolite, polystyrene or mica-filled Bakelite.

OTHER DATA: small and large body types do not intermate. UHF connectors ordered will be small size body unless large is specified.

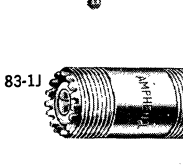
ASTROplate® Finish Available

Amphenol's exclusive, new non-tarnish finish is available from Distributor stock on all of our most popular rf connectors. **(See part numbers marked with ‡; other numbers are available on special order).** ASTROplate® is corrosion, heat and abrasion resistant. Mates with silver without danger of galvanic reaction; has equal solderability to silver's. **To order: add suffix 1050 to part numbers indicated below.**

83-ISP



83-IT



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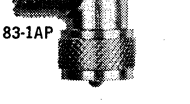

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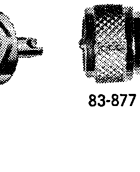
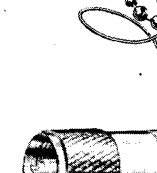


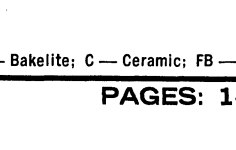
83-1R

83-877

83-1AC



83-1BC



58000

non-constant impedance • male contacts
non-weatherproof
small body, except as noted

STRAIGHT PLUGS

For RG-/U Cable	MIL No.	No.	Ins.	Notes	Lgth.
8, 9, 11, 13,	PL-259	83-822 ‡	T		1½
63, 87, 149,	PL-259	83-ISP ‡	FB		1½
213, 214, 216,	PL-259A	83-756	T		1⅜
225	PL-259A	83-ISPN ‡	FB		1⅜
	—	83-ISP-1002	FB		1½
	—	83-851	FB	SBC	1 43/64
8, 11, 149, 213	—	83-87	B	QC	1 23/32
11, 149	—	83-850	FB	SC, SBC	1 43/64
17, 218	—	83-86	T		2⅛
	—	10450	R		2⅛
34	UG-358/U	83-21SP	FB	LB, W	1 13/16
55, 142, 223	—	83-90	B	QC	1 23/32
58, 141	UG-203/U	83-776	FB		1⅜
	—	83-89	B	QC	1 23/32
59, 62, 71,	UG-111/U	83-750 ‡	FB		1 11/16
140, 210	—	83-88	B	QC	1 23/32

small body

ANGLE PLUGS

For RG-/U Cable	MIL No.	No.	Ins.	Notes	Lgth.
8, 9,11 13, 63	—	83-67	T		1⅜
87, 149, 213, 214, 216, 225	—	83-59	PST		1⅜

non-constant impedance
female contact • non-weatherproof
small body, except as noted

PANEL RECEPTACLES

MIL No.	No.	Ins.	Notes	Lgth.
SO-239	83-1R ‡	FB		1 1/16
SO-239A	83-798 ‡	T		1 1/16
UG-357/U	83-21R	FB	LB	1 5/64
—	83-716	C	Pressurized	1 3/16
—	83-876	B	—	1 1/16
—	83-878‡	—	Single Hole	—

small body

BULKHEAD RECEPTACLES

UG-266/U	4575	R	Pressurized	1 13/32
—	83-875	R, T	FM	1 3/32
—	74525	GT	H, RM	1 13/32
—	83-875-1002	RT	FM	1 3/32

‡ ASTROplate® finish available, add -1050 to part number.

non-constant impedance • non-weatherproof
small body, except as noted
adapter ends are Jack-Jack

STRAIGHT ADAPTERS

UG-/U No.	No.	Ins.	Notes	Lgth.
224	29500	R		1⅜
PL-258	83-1J‡	PST		1⅛
360	83-21J	PST	LB	1⅛
363	83-1F‡	PST		2
—	11850	T		1⅛
—	13725	T		1⅜
—	83-877‡	—	Plug/Plug	—

small body

ANGLE ADAPTERS

MIL No.	No.	Ins.	Adapter Ends	Lgth.
M-359A	83-58	PST	JP	1 27/32
UG-646/U	83-1AP‡	PST	PJ	1 3/32

small body

TEE ADAPTERS

M-358	83-1T‡	PST	JPJ	1⅝

small body

REDUCING ADAPTERS

For RG-/U Cable	UG-/U No.	No.	Length
55, 58, 141, 142	175	83-185 ‡	1
59, 62, 71, 140, 210	176	83-168 ‡	1

non-weatherproof • small body

HOODS

For RG-/U Cable	MIL No.	No.	Lgth.
8, 9, 10, 11, 12,	MX-543	5475	1
63, 79, 87, 115,	UG-106/U	83-1H ‡	¾
149, 213, 215	UG-372/U	83-1HP	⅞
58, 141	UG-177/U	83-765‡	¾
55, 59, 140, 142, 223	MX-539	5375	1

weatherproof • small body

MALE CAPS

No.	Length
83-1AC ‡	15/32

FEMALE CAPS

83-1BC	1 1/16

non-weatherproof • male contact

BINDING POST

UG-/U No.	No.	Ins.	Length
332	58000	R	1⅞

NOTES: B — Bakelite; C — Ceramic; FB — Filled Bakelite; FM — Front Mounted; G — Glass; H — Hermetic Sealed; J — Jack; LB — Large Body; P — Plug; PST —

SERIES "C" RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series C

Constant 50-ohm impedance C series connectors are design-matched to 50-ohm cables. They may be used with 75-ohm cable, at lower frequencies (below 300 MHz) where the connector introduces no serious mismatch. Standard connectors have a peak voltage rating of 1500 volts and provide low SWR up to 10 GHz; 4000-volt units are also available with good performance up to 2 GHz. The improved cable clamp provides excellent cable grip and weatherproof seal with a minimum of cable indentation; it utilizes a "V" groove split silicone rubber gasket and peaked braid clam. Accessory Clamping Adapter Kits are available for metal jacketed cables (AK). For armored cables, see armor clamp (AC).

ASTROplate® finish available, add -1050 to part number.

CHARACTERISTICS

ELECTRICAL: Impedance: 50 ohm constant. **Frequency Range:** 0-10 GHz, 1,500 volt type; 0-2 GHx, 4,000 volt type. **Voltage Rating:** 1,500 volts peak—standard; 4,000 volts peak as noted. **Dielectric Withstanding Voltage:** 3,000 volts RMS, 1,500 volt type; 6,000 volts RMS, 4,000 volt type. **SWR:** 1.25.

ENVIRONMENTAL: Thermal Limits: —67° to 390°F (—55° to 199°C). **Weatherproof:** except as noted, all C Series connectors are Weatherproof. **Hermetic Seals:** pass helium leak test of 2×10^{-8} cc/sec. **Pressurized:** compression seal.

MECHANICAL: Mating: 2-stud bay net lock. **Cable Affixment:** Improved: screw-thread nut and braid clamp.

MATERIAL: Contacts: male: brass; female and outer: beryllium copper. **Other Metal Parts:** brass. **Plating:** .0002" silver min. **Insulators:** Teflon, glass-Teflon (herm. sealed). **Weatherproof Gaskets:** silicone rubber.

MILITARY SPECIFICATIONS: Meet applicable sections of MIL-C-3989.

50 ohm impedance • male contacts
weatherproof

STRAIGHT PLUGS

For RG-/U Cable	UG-/U No.	No.	Ins.	Notes	Lght.
5, 21, 143, 212, 222	626A	80025	T		1 31/64
8, 9, 87, 213, 214, 225	573A	82-530	T	AK	1 31/64
	573B	28650	T	AK	1 31/64
	628A	82-532	T	4000, AK	1 3/4
	—	79150	T	4000*	1 3/4
10, 12, 116, 215, 227	943A	82-538	T	AC, AK	2 1/8
14, 217	707A	82-533	T		1 3/16
17, 218	708A	80075	T		2 5/32
55, 58, 141, 142, 223	709A	82-534	T		1 3/8
59, 62, 71, 140, 210	—	81650	T	4000	1 3/16
	—	80375	T	4000	1 3/16
	627A	82-548	T		1 11/32
63, 114	—	80300	T		1 31/64
117, 118	711A	80200	T		2 5/32

* Polarized Female Contact

ANGLE PLUGS

8, 9, 87, 213, 214, 225	710A	82-531	T		1 3/8
55, 58, 141 142, 223	—	80775	T		1 5/16

female contacts • 50 ohm impedance
weatherproof

PANEL RECEPTACLES

UG-/U No.	No.	Ins.	Notes	Lgth.
568	82-504	T		1 3/32
—	82275	T		1 5/16

BULKHEAD RECEPTACLES (rear mtd.)

569	82-505	T		1 3/32
634	82-515	T	4000	1 5/16
705	82-511	GT	Hermetic	1 7/16
706	82125	T	Front Mt.	1 5/32

male contact • weatherproof

RESISTOR TERMINATED CAP

MX No.	No.	Notes	Length
—	83925	*	1 5/16

* Add resistor value (ohms) to part no. when ordering: 47, 51, 75, 82, 91, 100, 120, 130, 150, 180, 240, 270, 300, 470, 510, 560, 680, 750, 820, 1000, 1500, 3900, 4700, 10000, 150000.

MALE CAPS weatherproof

1142	82-512	—	51/64
—	83675	*	7/8

FEMALE CAPS

1143	82-513	—	27/32
—	83700	**	1 3/16

* Shorting Male Contact
** Shorting Female Contact

STRAIGHT JACKS

For RG-/U Cable	UG-/U No.	No.	Ins.	Notes	Lght.
8, 9, 87, 213, 214, 225	572	82-503	T		1 13/32
55, 58, 141, 142, 223	—	81575	T		1 1/4
59, 62, 71, 140, 210	—	81550	T		1 1/4

BULKHEAD JACKS (Rear Mtd.)

8, 9, 87, 213, 214, 225	570	82-502	T	AK	1 13/32
	570A	82-614	T		1 13/32
	632	82-521	T	4000, AK	1 11/16
10, 12, 116, 215, 227	937	82-522	T		2
55, 58, 141, 142	704	81175	T		1 1/4
	704A	74475	T	Ft. Mt.	1 1/4
	—	81425	GT	Herm.	1 3/8
	—	81400	T		1 1/4
59, 62, 71, 140, 210	—	81600	T	Ft. Mt., 4000	1 15/32

PANEL JACKS (rear mtd.)

8, 9, 87, 213, 214, 225	571	82-501	T	AK	1 13/32
10, 12, 116, 215, 227	938	82-523	T	AC, AK	2
	—	81275	T		2
55, 58, 141, 142	—	74675	T	Ft. Mt.	1 1/4
	—	81150	T		1 1/4
59, 62, 71, 140, 210	—	81100	T	Ft. Mt.	1 1/4

50 ohm impedance • weatherproof

STRAIGHT ADAPTERS

UG-/U No.	No.	Ins.	Adapter Ends	Notes	Lgth.
642A	83150	T	PP		1 29/64
643	82-514	T	JJ	Non-W	1 3/32

ANGLE ADAPTERS (Non-weatherproof)

567A	82-535	T	JP	Non-W	1 1/4

TEE ADAPTERS

566A	82-536	T	JPJ		1 33/64
—	83525	T	CJC	RG-13/U	2 3/4

BULKHEAD ADAPTERS (Hermetic Sealed)

701	83050	GT	JJ		1 3/16
—	82250	GT	JJ	4000	2 1/32

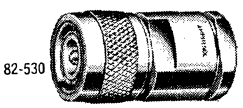
weatherproof • improved N type

ARMOR CLAMPS

For RG-/U Cable	MX No.	No.	Length
10, 12, 79, 116, 215, 227	1286	82-517	1 1/8
18, 219	1441	92100	1 3/8
74, 224	1462	16850	1 3/16

HOODS non-weatherproof

MX No.	No.	Notes	Length
—	82-510	—	3/4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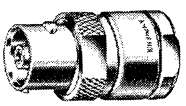
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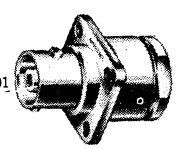
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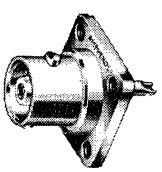
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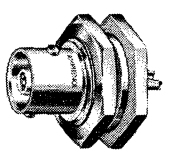
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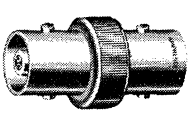
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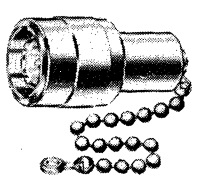
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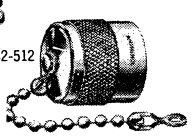
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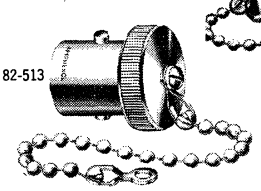
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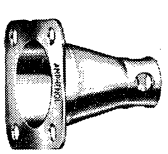
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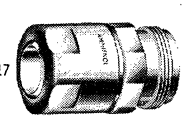

82-517

Polystyrene; QC — Quick Crimp; R — Rexolite; RM — Rear Mounted; SBC — Solderless Braid Clamp; SC — Solderless Contact; T — Teflon; W — Weatherproof.

TYPE "N" RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

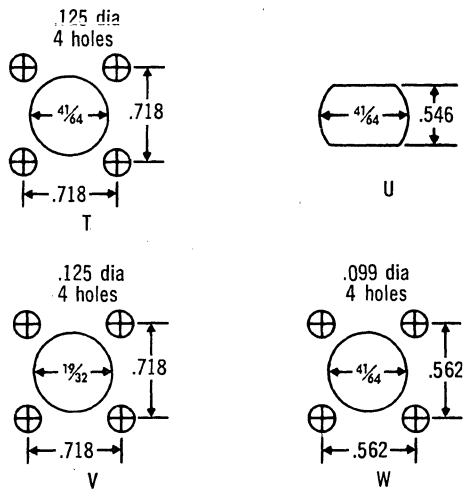
Series N

Medium-size, weatherproof, threaded coupling units that may be used in systems up to microwave. This series was the original microwave connector developed during World War II and SWR is consistently low across this broad frequency spectrum. Available in Regular, Improved and Improved/Captivated Contact constructions and have the MIL-Crimp/MIL-Clamp designs to MIL-C-39012. For further information, request Coaxial Connectors Catalog CC-7, or contact your distributor.

ASTROplate® Finish Available

Amphenol's exclusive, non-tarnish finish is available from stock on most popular rf connectors. **(See part numbers marked with ‡; others available on special order.)** ASTROplate® is corrosion and abrasion and heat resistant. Mates safely with silver; has equal solderability. **To order: add suffix 1050 to part number.**

MOUNTING HOLES



CHARACTERISTICS

ELECTRICAL: Impedance: as noted, 50 or 70 ohms. **Frequency Range:** 0-11 GHz. **Voltage Rating:** 1,500 volts peak. **Dielectric Withstanding Voltage:** 2,500 volts rms. **SWR:** MIL-Crimp/MIL-Clamp: 1-15 (solder) 1.35 per spec; others; 1.25. **Other:** contact resistance 1.0 mv, RF leakage —90db, insertion loss .15 db, insulation resistance 5,000 megohms.

ENVIRONMENTAL: Thermal Limits: Teflon: —67°F to 390°F (—55° to 199°C); Rexolite: —67°F to 185°F (—55° to 85°C). **Weatherproof:** all Series N with gaskets are weatherproof. **Hermetic Seals:** pass helium leak test of 2×10^{-8} cc/sec. **Pressurized:** compression seal. **Shock:** MIL-Std. 202 method 202. **Vibration:** MIL-Std. 202 method 204 (test cond. B). **Moisture Resistance:** MIL-Std. 202 method 106. **Corrosion:** MIL-Std. 202 method 101 (test cond. B). **Temperature:** MIL-Std. 202 method 102 (test cond. C). **Altitude:** MIL-Std. 202 method 105 (test cond. C).

MECHANICAL: Mating: 5/8-24 threaded coupling. **Cable Affixment (Braid or Jacket):** MIL-Crimp: hex crimp; all others: screw-thread nut and braid clamp. **Cable Affixment (Center Conductor):** MIL-Crimp/MIL-Clamp: 4 indent crimp, hex crimp or solder. All others: solder. **Captivated Contact:** all MIL-Crimp/MIL-Clamp; others, where specified. **Cable Retention:** MIL-Crimp/MIL-Clamp 90-120 lbs. (70 lb. per MIL-Spec). All others 30-70 lbs.

MATERIAL: Contacts: male: brass; female: MIL-Crimp/MIL-Clamp phosphor bronze; all others: beryllium copper; Outer: MIL-Crimp/MIL-Clamp. Improved phosphor bronze, all others: brass or phosphor bronze. **Other Metal Parts:** brass. **Plating:** center contacts, MIL-Crimp/MIL-Clamp: .0001" gold over .0001" copper, all other: .0002" silver. **Insulators:** Teflon (all MIL-Crimp/MIL-Clamp) Rexolite, glass-Teflon (herm. seal). **Weatherproof Gaskets:** silicone rubber (all MIL-Clamp) synthetic rubber. **Crimp Ferrule:** copper.

MILITARY SPECIFICATIONS: MIL-Crimp: MIL-C-39012A Category C. MIL-Clamp & UG-Clamp: MIL-C-39012A Category A. All others: MIL-C-71B where applicable.

MIL-Crimp N

weatherproof • captivated center contact
50 ohms impedance • male contacts

82-340

82-349

82-343

82-337

82-346

STRAIGHT PLUGS

For RG-/U Cable	Part No.	MIL. No. M39012/	UG-/U No.	Ins.	Lgth.
5, 21, 143, 212, 222	82-4341	01-0016	—	T	1 29/64
8, 213	82-4340	01-0017	—	T	1 29/64
9, 214	82-4332	01-0018	—	T	1 29/64
11, 149	82-342	—	1695	T	1 31/64
55, 142, 223	82-5370	—	—	T	1 31/64
58, 141	82-5375	—	—	T	1 31/64
59, 62, 71, 140, 210	82-5380	—	—	T	1 31/64

ANGLE PLUGS

5, 21, 143, 212, 222	82-5350	—	—	T	1 5/16
8, 213	82-4349	05-0004	—	T	1 5/16
9, 214	82-4336	05-0005	—	T	1 5/16
11, 149	82-5351	—	—	T	1 5/16
55, 142, 223	82-5374	—	—	T	1 5/16
58, 141	82-5379	—	—	T	1 5/16

female contacts

STRAIGHT JACKS

5, 21, 143, 212, 222	82-338	—	1687	T	1 5/16
8, 213	82-4337	02-0020	—	T	1 17/32
9, 214	82-4333	02-0021	—	T	1 17/32
11, 149	82-339	—	1694	T	1 5/16
55, 142, 223	82-5371	—	—	T	1 5/16
58, 141	82-5376	—	—	T	1 5/16

PANEL JACKS (mounting hole T)

5, 21, 143, 212, 222	82-344	—	1696	T	1 5/16
8, 213	82-4343	02-0028	—	T	1 17/32
9, 214	82-4334	02-0029	—	T	1 17/32
11, 149	82-5345	—	—	T	1 5/16
55, 142, 223	82-5372	—	—	T	1 5/16
58, 141	82-5377	—	—	T	1 5/16

BULKHEAD JACKS (mounting hole U)

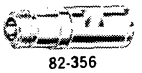
5, 21, 143, 212, 222	82-347	—	1699	T	1 27/32
8, 213	82-4346	03-0014	—	T	1 15/64
9, 214	82-4335	03-0015	—	T	1 15/64
11, 149	82-348	—	1706	T	1 27/32
55, 142, 223	82-5373	—	—	T	1 27/32
58, 141	82-5378	—	—	T	1 27/32

MIL-Clamp N

weatherproof • captivated center contact
50 ohm impedance • male contacts

82-357

82-360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32-364

STRAIGHT PLUGS

For RG-/U Cable	Part No.	MIL. No. M39012/	UG-/U No.	Ins.	Lgth.
5, 21, 143, 212, 222	82-354	—	18F	T	1 3/32
8, 9, 213, 214	82-352	01-0005	—	T	1 25/32
	82-352-1	01-0002	—	T	1 25/32
8, 9, 213, 214, 225	82-4352-1	01-0002	UG-Clamp	T	1 25/64
	82-4352	01-0005	UG-Clamp	T	1 25/64
11, 13, 149, 216	82-5355	—	—	T	1 25/32
55, 58, 141, 142, 223	82-5381	—	—	T	1 25/32
59, 62, 71, 140, 210	82-5386	—	—	T	1 25/32

ANGLE PLUGS

5, 21, 143, 212, 222	82-5361	—	—	T	1 1/2
8, 9, 213, 214	82-357	05-0001	—	T	1 1/2
8, 9, 87, 213, 214, 225	82-4357	05-0001	UG-Clamp	T	1 15/32
11, 13, 149, 216	82-5353	—	—	T	1 1/2
55, 58, 141, 142, 223	82-5385	—	—	T	1 1/2

female contacts

STRAIGHT JACKS

5, 21, 143, 212, 222	82-358	—	20F	T	1 7/8
8, 9, 213, 214	82-356	02-0003	—	T	1 7/8
	82-356-1	02-0002	—	T	1 7/8
8, 9, 87, 213, 214, 225	82-4356-1	02-0002	UG-Clamp	T	1 39/64
	82-4356	02-0003	UG-Clamp	T	1 39/64
11, 13, 149, 216	82-5359	—	—	T	1 7/8
55, 58, 141, 142, 223	82-5382	—	—	T	1 7/8

PANEL JACKS (mounting hole T)

5, 21, 143, 212, 222	82-362	—	19F	T	1 17/32
8, 9, 213, 214	82-360	02-0006	—	T	1 17/32
	82-360-1	02-0005	—	T	1 17/32
8, 9, 87, 213, 214, 225	82-4360-1	02-0005	UG-Clamp	T	1 39/64
	82-4360	02-0006	UG-Clamp	T	1 39/64
11, 13, 149, 216	82-5363	—	—	T	1 17/32
55, 58, 141, 142, 223	82-5383	—	—	T	1 17/32

BULKHEAD JACKS (mounting hole U)

5, 21, 143, 212, 222	82-366	—	159D	T	1 51/64
8, 9, 213, 214	82-364	03-0002	—	T	1 51/64
8, 9, 87, 213, 214, 225	82-4364	03-0002	UG-Clamp	T	1 53/64
11, 13, 149, 216	82-5365	—	—	T	1 51/64
55, 58, 141, 142, 223	82-5384	—	—	T	1 51/64

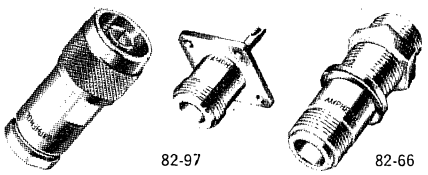
SERIES N CONTINUED

NOTES: AC — Armored Clamp: AK — Adapter Kit: CC — Captivated Contact; FM — Front Mounted; I — Improved Construction; SW — Safety Wire Holes; H — Hermetic

TYPE "N" RF COAXIAL CONNECTORS

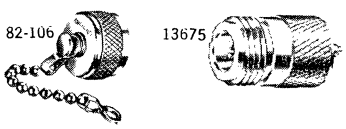
BUNKER RAMO AMPHENOL

Standard Type N

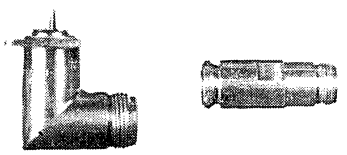


82-97 82-66

82-86



82-106 13675



male contacts • weatherproof

STRAIGHT PLUGS

For RG-/U Cable	UG-/U No.	Part No.	Imp. Ohms.	Ins.	Notes	Lgth.
5, 21, 143 212, 222	18	3400	50	R	Non-W	2
	18B	82-86	50	T		1 7/8
	18C	82-203	50	T	I	1 1/2
	18D	82-3203	50	T	I, SW	1 1/2
6	91A	7200	70	T		1 3/4
8, 9, 213, 214	21	3900	50	R		2
8, 9, 87, 213, 214, 225	21B	82-61‡	50	T	AK	1 7/8
	21C	82-96	50	T	AK	1 7/8
	21D	82-202‡	50	T	I, SW, AK	1 1/2
	21E	82-3202	50	T	I, SW, AK	1 1/2
	1185	82-312	50	T	I, CC, AK	1 1/2
	1185A	82-3312	50	T	I, CC, AK	1 1/2
10, 12, 116, 215, 227	941A	82-204	50	T	I, AC, AK	2 1/8
	941B	82-3204	50	T	I, AC, AK	2 1/8
11, 13. 149, 216	94A	82-84	70	T	AK	1 7/8
	—	91150	75	T	I	1 1/2
14, 217	204A	82-105	50	R		2
	204C	82-214	50	T	I	1 31/32
17, 218	167A	82-104	50	T		2 3/8
	167D	82-215	50	T	I, SW	2 1/8
	167F	82-3215	50	T	I, SW	2 1/8
18, 219	982	92125	50	T	I	3
55, 58, 141, 142	188	23250	50	R	Non-W	1 3/4
	536	34000‡	50	R		2 1/8
	536B	24025‡	50	T	I	1 3/8
35	—	82-113	70	T		2 3/8
59, 62, 71, 140, 210	603	34500	50	R		1 25/32
	603A	34525	50	T	I	1 3/8
	—	34750	70	T	I	1 5/8
	—	91300	70	T	I	1 3/8
63, 114	1003	12400	50	T		1 3/4

ANGLE PLUGS

5, 21, 143, 212, 222	—	15950	50	T	I	1 3/8
8, 9, 87, 213, 214, 225	594A	15425	50	T		1 7/16
	—	82-326	50	T	I, CC	1 13/64
	—	82-835	50	T		1 7/16
	—	6875	50	T		1 5/8
	—	15975	50	T	I	1 31/32
11, 13, 149, 216	—	17025	70	T		1 5/8

ANGLE PLUGS CONTINUED

For RG-/U Cable	UG-/U No.	Part No.	Imp. Ohms.	Ins.	Notes	Lgth.
55, 58, 141, 142	—	18750	50	T		1 5/8
59, 62, 71, 140, 210	—	19250	50	T		1 5/8

female contacts • weatherproof

STRAIGHT JACKS

5, 21, 143, 212, 222	20	42000	50	R		2
	20B	82-88	50	T		1 15/16
	20C	82-210	50	T	I	1 9/16
	20D	82-3210	50	T	I	1 9/16
6	92A	7700	70	T		1 7/8
	—	91225	75	T	I	1 9/16
8, 9, 213, 214	23	48000	50	R	Non-W	2
8, 9, 87, 213, 214, 225	23A	7600	50	R		1 7/8
	23B	82-63	50	T		1 15/16
	23C	82-94	50	T	I	1 13/16
	23D	82-209	50	T	I	1 9/16
	23E	82-3209	50	T	I	1 9/16
	1186	82-313	50	T	I, CC	1 9/16
10, 12, 116, 215, 227	940A	82-212	50	T	I, AC	2 1/4
	940B	82-3212	50	T	I, AC	2 1/4
11, 13, 149, 216	95A	82-89	70	T		1 15/16
17	—	14850	50	T		2 3/16
55, 58, 141 142	—	35000	50	R		1 13/16
	—	35025	50	T	I	1 1/2
59, 62, 71, 140, 210	602	36500	50	R		1 5/8

PANEL JACKS (mounting hole T)

5, 21, 143, 212, 222	19	3500	50	R		2
	19B	82-87	50	T		1 13/16
	19C	82-207	50	T		1 9/16
	19D	82-3207	50	T	I	1 9/16
6	93A	7800	70	T		1 7/8
8, 9, 87, 213, 214, 225	22B	82-62	50	T		1 13/16
	22C	82-95	50	T		1 13/16
	22D	82-208	50	T		1 9/16
	22E		50	T	I	1 9/16
	1187	82-314	50	T	I, CC	1 9/16
10, 12, 116, 215, 227	935A	82-211	50	T	I	2 1/4
	935B	82-3211	50	T	I	2 1/4
11, 13, 149, 216	96A	82-90	70	T		1 13/16
55, 58, 141, 142	1052	36000	50	R		1 13/16
55, 58, 141, 142, 223	1095A	36250	50	T	I	1 1/2
59, 62, 71, 140, 210	593	35500	50	R		1 13/16
	—	35550	70	T		1 13/16
	—	91250	70	T	I	1 1/2

BULKHEAD JACKS (mounting hole U)

5, 21, 143, 212, 222	159B	15550	50	T	I	1 3/4
8, 9, 87, 213, 214, 225	160A	82-67	50	T		1 13/16
	160B	82-93	50	T		1 13/16
	160D	91025	50	T	I	1 3/4
8, 9, 213, 214	—	23025	50	gT	H	2 5/32
55, 58, 141, 142	556	35250	50	T		1 13/16
55, 58, 141, 142, 223	556B	35275	50	T	I	1 43/64
59, 62, 71, 140, 210	—	18250	50	R		1 27/32

male • male contact • weatherproof

PANEL RECEPTACLES (mounting hole V)

UG-/U No.	Part No.	Imp. Ohms	Ins.	Notes	Lgth.
—	49000	50	R	FM	1 3/32

PANEL RECEPTACLES (mounting hole T)

female • female contacts • weatherproof

UG-/U No.	Part No.	Imp. Ohms	Ins.	Notes	Lgth.
58	82-24‡	50	T		1 7/64
58A	82-97‡	50	T		1 7/64
—	82-368	50	T	M39012/ 04-0002	1 7/64
231	2750	50	R	RG-58/U	1 3/4
—	82-112	70	T		1 7/64
—	9575	50	T	(Mtg Hole W)	1 7/64

BULKHEAD RECEPTACLES (mtg hole U)

680	82-811	50	GT	H, FM	1 37/64
—	82-369	50	G	M39012/ 04-0001	1 37/64
—	13275	50	gT	H, FM	1 3/8
—	31150	50	T	W, FM	1 15/32
—	19550	50	GT	H, FM	1 7/16

ANGLE RECEPTACLES (mounting hole V)

997A	8975	50	T		1 7/16
—	23775	50	T		1 7/16

weatherproof

STRAIGHT ADAPTERS

UG-/U No.	Part No.	Imp. Ohms.	Ins.	Notes	Adapter Ends	Lgth.
29	15000	50	R		JJ	1 3/4
29A	82-65	50	T		JJ	1 3/4
29B	82-101	50	T		JJ	1 3/4
57A	45250	50	T		PP	1 13/32
57B	82-100‡	50	T		PP	1 13/32
—	17075	70	T		PP	1 13/32
—	21650	70	T		JJ	1 3/4

ANGLE ADAPTERS

27A	82-64	50	T		JP	1 7/16
27B	82-98	50	T		JP	1 13/32
27C	82-213	50	T		JP	1 5/16

BULKHEAD ADAPTERS (mounting hole U)

30	82-66	50	R	P	JJ	1 5/8
30C	82-201	50	G	H	JJ	1 3/4
30D	91100	50	G	H	JJ	1 17/32
—	82-849	50	T	P	JJ	1 5/8
—	90950	50	G	H	JJ	1 15/16

EXCEPTION: 82-201 mounts in .630 dia. hole.

TEE ADAPTERS

28A	82-99	50	T		JJJ	1 3/4
107	4800	50	R		JPJ	3
107A	82-36	50	T		JPJ	2
107B	82-102	50	T		JPJ	1 3/4
—	4850	50	R		PPP	3 1/32

CROSS ADAPTERS

—	17125	50	T		JJJJ	2 1/4

weatherproof

MALE CAPS

MX No.	Part No.	Notes	Length
913	82-106‡		5/16
—	9225		7/16
—	13700	SMC	27/32
—	18575		5/16

FEMALE CAPS

—	6950		31/32
—	13675	SFC	1

non-weatherproof

ARMOR CLAMPS

For RG-/U Cable	MX No.	Part No.	Notes	Lgth.
10, 12, 79, 116, 215, 227	564	82-48	N or HN	7/8
	564A	82-109	N or HN	1 1/16
	25-0013	82-3517	I	1 1/8
18, 219	25-0014	99175	I	1 3/8
74, 224	1462	16850	I, W	1 3/16

‡ See note on ASTROplate® Finish

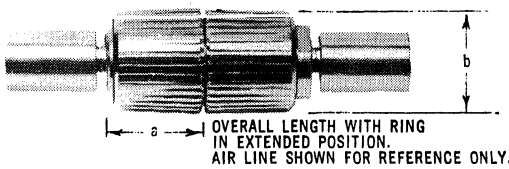
Sealed; P — Pressurized; SMC — Shorting Male Contact; SFC — Shorting Female Contact.

PRECISION RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series 131 Precision 7mm Connectors TWO DISTINCTLY DIFFERENT LINES

— APC-7 with sexless coupling

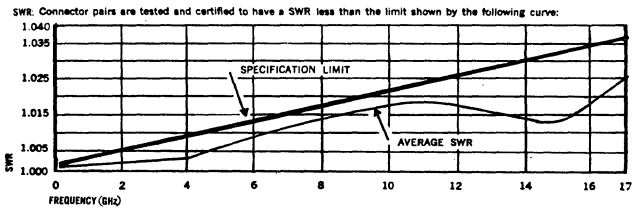


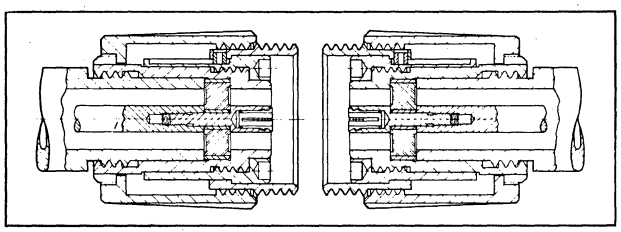
APC-7. Precision 50-ohm connector for use with 7mm (inner diameter of outer conductor) rigid air line and semi-rigid (ALJAK) coaxial cable.

Sexless coupling permits interconnection of any two APC-7's. Identical plane of electrical and mechanical contact permits accurate determination of the electrical length of a mated pair or of an air line assembly with a connector at each end. All components held captive.

Connectors packaged in pairs in protective wooden box; assembly instructions and certified SWR test report included with each pair.

Specially designed for microwave and precision test equipment — Component manufacturers now using APC-7 fittings include: Alford, Alfred, EG&G, Hewlett-Packard, Maury Microwave, Microlab/FXR, Narda, PRD, Rantec, and Weinschel Engineering.





APC-7 components. Both connectors are identical and completely sexless.

CHARACTERISTICS (TYPICAL)

ELECTRICAL (for mated pair): **Impedance:** 50 ohm ±0.1 ohms. **Frequency Range:** 0-18 GHz. **SWR:** 1.039 max. to 18 GHz. **Insertion loss (in db):** $< 7 \times 10^{-3} \sqrt{\text{Freq. GHz}}$ (example: 0.028 db at 16.0 GHz). **RF Leakage:** < signal inside coaxial line by ratio > 120 db▲. **Electrical length:** 0.723 ±0.001 inches (1.836 ±.00254 cm). **Contact Resistance:** inner: < 1.0 milliohm, outer: < 0.1 milliohm.

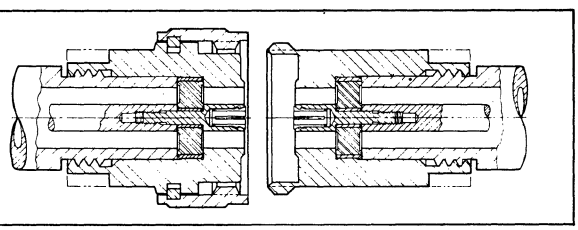
▲ RF leakage: Until satisfactory test methods are developed, the maximum frequency of measurement is limited to 6.0 GHz.

ENVIRONMENTAL: **Thermal Limits:** storage: −67° to 158°F (−55° to 70°C) operating: 55° to 91°F (13° to 33°C). **Humidity:** 20 to 80% RH. **Pressure:** 590 to 780 mm Hg. MECHANICAL: **Mating:** sexless, coplanar by means of threaded ring housed within coupling nut. **Life:** > 5000 connect/disconnect operations. MATERIAL: **Coupling Mechanism:** stainless steel. **Body:** gold plated beryllium copper. **Center Contact:** gold plated beryllium copper. **Bead Assembly:** Rexolite insulation.

For use with	APC-7 Maximum SWR for a mated pair	APC-7 (13/16" max. dia.) (b) Part No.	Lgth. (in.) (a)
7mm Air Line	1.039 to 18 GHz	131-1050	5/64
131-182 (.325 dia. semi-rigid Aljak)	1.10 to 12.4 GHz	131-1019	1 5/64
.250 dia. Cujak cable	1.10 to 12.4 GHz 1.13 to 18 GHz	131-10020	1 1/64
RG-214/U	1.15 to 12.4 GHz Crimp	131-1031	2 1/32
	1.15 to 12.4 GHz Clamp	131-1032	2 1/32

TOOL KIT 131-2025

For disassembly; assembly to air line. Contains collet extractor, spanner wrench, torque wrench & line wrench.



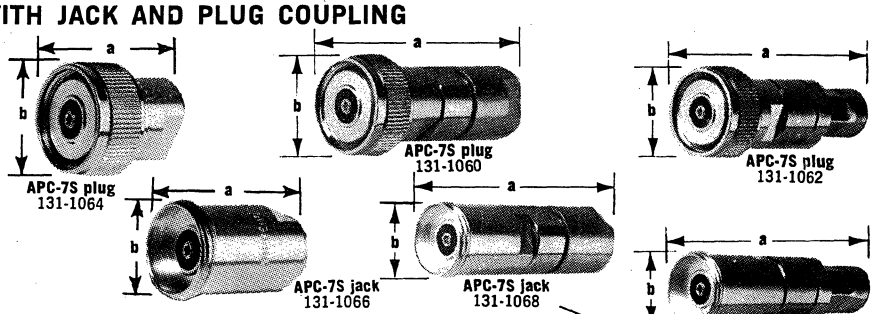
APC-7S components. Center contact, sexless; female threads on Jack; male coupling ring on Plug.

— APC-7S Economy Family WITH JACK AND PLUG COUPLING

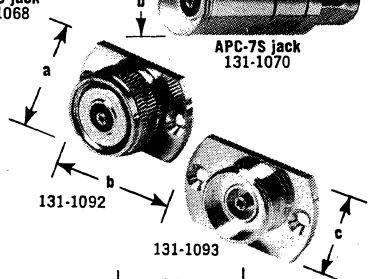
APC-7S, the newest addition to Amphenol's expanding precision connector family was created to meet the need for an economical but equally reliable precision connector. Except for the coupling mechanism all other characteristics are identical to APC-7. Performance is equal, yet APC-7S costs almost two-thirds less than the original precision 7mm connector.

CHARACTERISTICS (Same as APC-7) except:)

MECHANICAL: Mating: 1/16-24 threaded coupling. APC-7S plus and jacks also mate with APC-7 connectors. **MATERIAL:** Same as APC-7 except: Coupling nut: nickel plated brass.

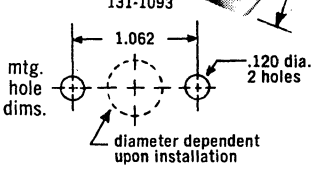


For use with	APC-7S Maximum SWR for a mated pair	Plugs (13/16" max. dia.) (b) Part No.	Plugs Lgth. (in.) (a)	Jacks (1/16" max. dia.) (b) Part No.	Jacks Lgth. (in.) (a)
7mm Air Line	1.039 to 18 GHz	131-1064	13/16	131-1066	15/16
131-182 (.325 dia. semi-rigid Aljak)	1.10 to 12.4 GHz	131-1060	1 51/64	131-1062	1 29/64
.250 dia. Cujak cable	1.10 to 12.4 GHz 1.13 to 18 GHz	131-10024	1 13/16	131-10025	2 1/32
RG-214/U	1.150 to 12.4 GHz Crimp	131-1068	2 7/64	131-1070	2 1/32
	1.150 to 12.4 GHz Clamp	131-1072	2 13/32	131-1073	2 11/64



PANEL RECEPTACLES

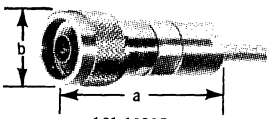
Configuration	Maximum SWR for a mated pair	Part No.	Dimensions a	b	c
Plug	1.039 to 18 GHz	131-1092	13/16	15/16	13/16
Jack	1.039 to 18 GHz	131-1093	5/16	15/16	13/16



PRECISION N AND SMA RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series 131 Precision N Connectors — APC-N

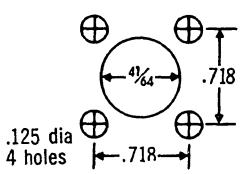


131-10005

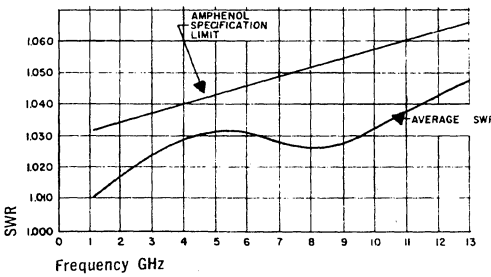
131-10006

131-10003

131-10004



APC-N, 50-ohm connectors. Use interchangeably with APC-7; mate with all other type N's. Their excellent electrical performance will make them an "industry standard" for future equipment. SWR for mated pairs: only 1.06 through 12 GHz; 1.08 through 18 GHz.



CHARACTERISTICS (TYPICAL)

ELECTRICAL (for mated pair APC-N connectors). **Impedance:** 50 ohm ±0.2 ohms. **Frequency Range:** 0-18 GHz. **SWR:** 1.08 max. to 18 GHz. **Insertion Loss (in db):** $< 3 \times 10^{-2} \sqrt{\text{Freq. GHz}}$. **RF Leakage:** < signal inside coaxial line by ratio > 90 db▲. **Contact Resistance:** inner: < 1.0 milliohm; outer: < 1.1 milliohm.

▲**RF Leakage:** Until satisfactory test methods are developed, the maximum frequency of measurement is limited to 6.0 GHz.

ENVIRONMENTAL: **Thermal Limits:** storage: −67 - 158°F (−55 - 70°C); operating: 55 - 91°F (13 - 33°C). **Humidity:** 20 to 80% RH. **Pressure:** 590 to 780 mm Hg.

MECHANICAL: **Mating:** 5/8-24 threaded coupling. Mating dimensions are MIL-C-39012 Class II nominal with tighter tolerances. The APC-N mates with all existing Type N connectors including MIL-C-71.

MATERIAL: **Body and Coupling Nut:** stainless steel. **Center Contacts:** gold plated beryllium copper. **Bead Assembly:** Rexolite Insulation.

		APC-N					
		Plugs (13⁄16" max. dia.) (b)		Jacks (5⁄8" max. dia.) (b)		Panel Jacks (1" sq. fl.)	
For use with	Maximum SWR for a mated pair	Part No.	Lgth. (in.)(a)	Part No.	Lgth. (in.)(a)	Part No.	Lgth. (in.)(a)
7mm Air Line	1.08 to 18 GHz	131-10003	1 1⁄64	131-10004	1 3⁄32	—	—
131-182 (.325 dia. semi-rigid Aljak	1.125 to 12.4 GHz	131-10005	2 5⁄32	131-10006	2 3⁄16	131-10013	2 1⁄8
.250 dia. Cujak cable	1.125 to 12.4 GHz 1.19 to 18 GHz	131-10021	2 3⁄8	131-10022	2 1⁄32	131-10023	2 1⁄32
RG-214/U	Crimp 1.175 to 12.4 GHz	131-10009	2 37⁄64	131-10010	2 7⁄8	131-10014	2 7⁄8
	Clamp	131-10011	2 39⁄64	131-10012	2 7⁄8	131-10015	2 7⁄8

SMA Sub-miniature Semi-precision Coaxial Connectors

500 MATING CYCLES AND STILL REPEATABLE PERFORMANCE

Amphenol's SMA connector is a semi-precision, sub-miniature (3mm), high frequency connector giving repeatable electrical performance from DC to 18 GHz, with exacting mechanical integrity and simplified low-cost assembly.

They are made of high strength, heat treated beryllium copper. Use of this alloy assures rugged mechanical performance, even though the "thin wall" design of the connector results in an interface mating cross-section area of only 0.00452 inch. The yield strength of the beryllium copper is three times that of stainless steel; use of this alloy also allows twice the coupling nut torque of other SMA designs. The "thin wall" design approach assures better compatibility with existing SMA designs, semi-rigid cable and the standard adapter connector specified by MIL-C-39012.

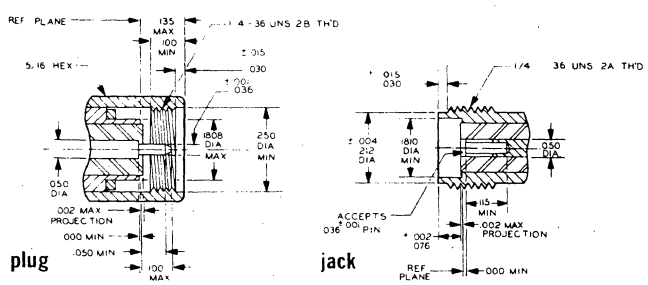
Electrical Performance Improved. Since the new connectors perform well mechanically, excellent electrical performance, even after 500 mating cycles, is assured. For example, the maximum SWR for a mated pair of Amphenol SMA solder type for 0.141 inch semi-rigid cable is 1.09 to 12.4 GHz and 1.13 through 18 GHz. This is below the limit of 1.05 plus 0.005f (GHz) as specified in MIL-C-39012 for SMA connectors.

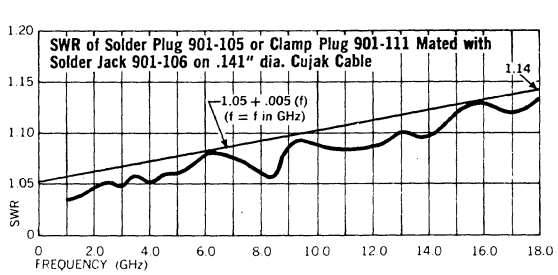
Low Cost Assembly. All Amphenol SMA connectors can be assembled with a $12.50 tool kit. In addition, "factory assembled subassemblies" reduce the number of parts that have to be handled. The 0.141 inch semi-rigid Cujak cable solder connector which uses the cable as a contact and insulator has only one part; the solder and clamp type containing contact and insulator have four parts. The larger diameter flexible cable connectors such as RG-58, 223 — crimp type has three parts; clamp type five parts. Sub-miniature flexible cable such as RG-174, 188 and 195 — clamp connector has a unique patented design allowing for only three parts.

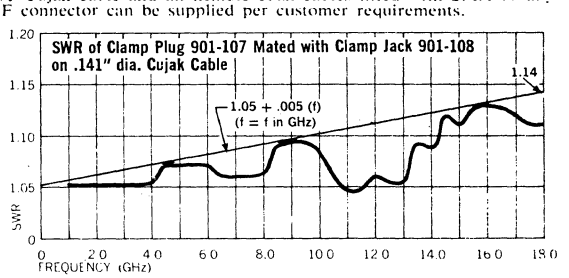
Wide Variety Available. For the popular 0.141 inch semi-rigid Cujak cable, solder and clamp types, straight and right angle plugs and jacks are available. For sub-miniature 0.085 inch semi-rigid Cujak, there is a complete line of solder type connectors. For flexible cables, both standard and sub-miniature, crimp and clamp type plugs and jacks are included plus a complete line of receptacles, including stripline, hermetic seal, P.C. mount, two-hole trim-line flange, and right angle. Between Series Adapters for BNC, TNC, APC-7 and Precision N connectors, along with a complete line of Within Series Adapters.

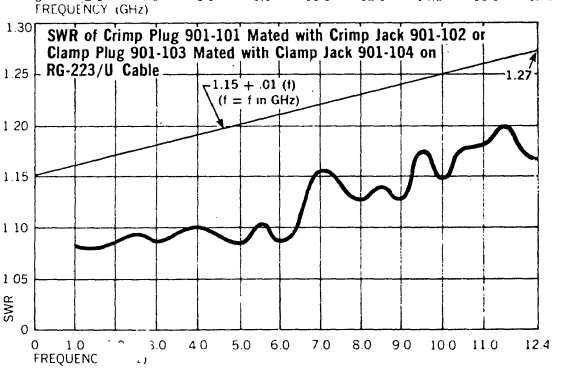
Cable Assemblies. Custom designed cable assemblies for semi-rigid 0.141 and 0.085 Cujak cable and all flexible coax cables fitted with SMA or any other RF connector can be supplied per customer requirements.

SMA MATING FACE DIMENSIONS









SUB-MINIATURE SMA RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

SMA Sub-miniature Semi-precision Coaxial Connectors (cont'd)

GENERAL CHARACTERISTICS

ELECTRICAL

Impedance	50 ohm
Frequency	.141″ and .085″ O.D. Copper jacket semi-rigid cable: 0-18 GHz Flexible cables: 0-12.4 GHz
Voltage Rating	RG-55, 58, 141, 142, 223, 303: 500 V RMS max. @ sea level RG-122, 174, 188, 316: 375 V RMS max. @ sea level
Dielectric Withstanding Voltage	RG-55 group: 1000 V RMS max. @ sea level RG-122 group: 750 V RMS max. @ sea level
SWR	.141″ O.D. Copper jacket cable: 1.05 + .005 f (GHz) RG-55 group: 1.15 + .01 f (GHz) RG-122 group: 1.15 + .02 f (GHz)
Contact Resistance	Center: 2.0 milliohms Body: 2.0 milliohms Braid to body: 0.5 milliohms
Insulation Resistance	5000 megohms
R.F. Leakage	60 dB minimum

ENVIRONMENTAL

Thermal Limits	−67° to 390°F (−55° to 199°C)
Weatherproof	Clamp type: with clamp gaskets Crimp type: with heat shrink tubing Solder type: with gaskets
Hermetic Seals	Pass Helium leak test of 10^{-5} cc/sec.
Shock	MIL-STD-202 method 202; acceleration: 50 G at 7 milliseconds
Vibration	MIL-STD-202 method 204 (test cond. D)
Moisture Resistance	MIL-STD-202 method 106 (high humidity meaturements do not apply)
Corrosion	MIL-STD-202 method 101 (test cond. B); 5% salt solution
Temperature Cycling	MIL-STD-202 method 102 (test cond. C)
Altitude	MIL-STD-202 method 105 (test cond. C); no corona at 70,000 ft. RG-55 group: 250 V RMS RG-122 group: 190 V RMS

MECHANICAL

Mating	¼-36 threaded coupling
Mating Torque	Recommended: 7-10 inch-pounds Non-destructive: 25 inch-pounds max.
Cable Affixment to Braid or Jacket	Clamp type: field serviceable with screw thread nut and braid clamp Crimp type: hex braid crimp Solder type: screw thread solder nut
Cable Affixment to Center Conductor	All types: solder only
Captivated Contact	Crimp type and clamp type for flexible cable
Cable Retention	Clamp type for RG-58, 141 = 40 lbs. min. for RG-55, 142, 223 = 60 lbs. min. for .141 copper jacket cable = 60 lbs. min. Crimp type for RG-58, 141, 303 = 60 lbs. min. for RG-55, 142, 223 = 80 lbs. min.
Cable Assembly	Instructions are packaged with each tool kit shipped

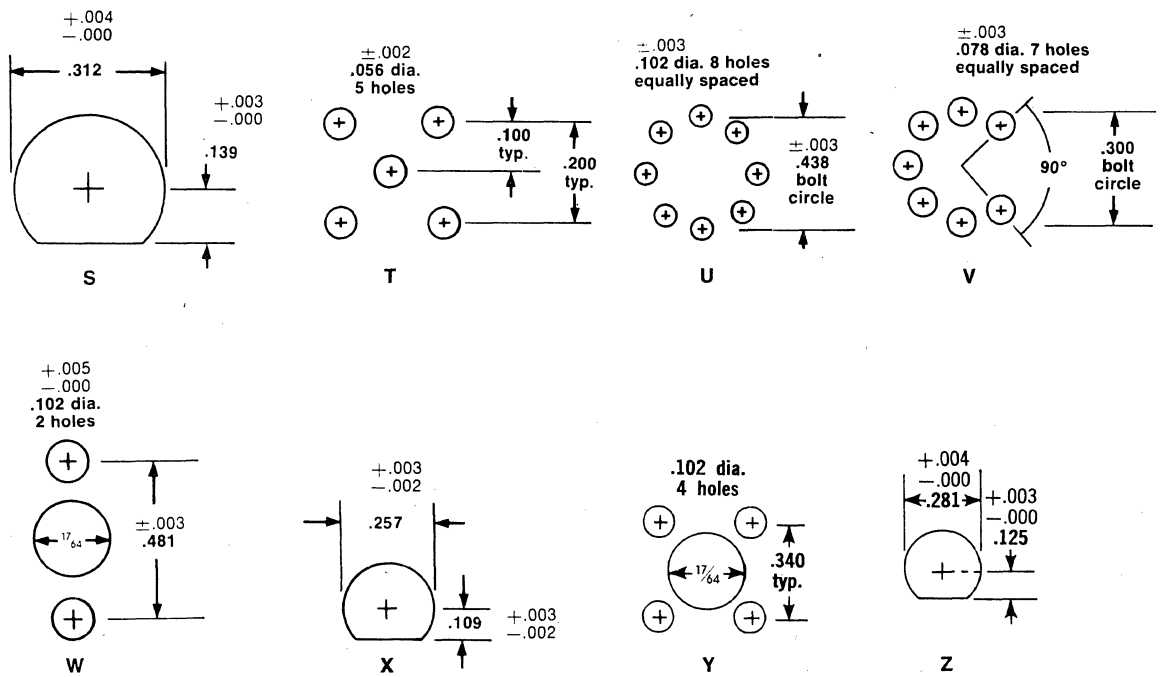
MATERIAL

Contacts, Bodies, Cplg. Nuts	Berryllium copper per QQ-C-530, heat treated per MIL-H-7199
Other Metal Parts	Half hard brass
Plating	Center Contacts, .0001 gold per MIL-C-45204 Type II, Class 2. Other metal parts gold plated and meet corrosion requirements of MIL-C-39012
Insulators	TFE Fluorocarbon per MIL-P-19468
Weatherproof Gaskets	Silicone rubber
Lockwashers	Phosphor bronze, internal tooth supplied with all bulkhead mounted connectors
Crimp Ferrules	Copper

MILITARY SPECIFICATIONS

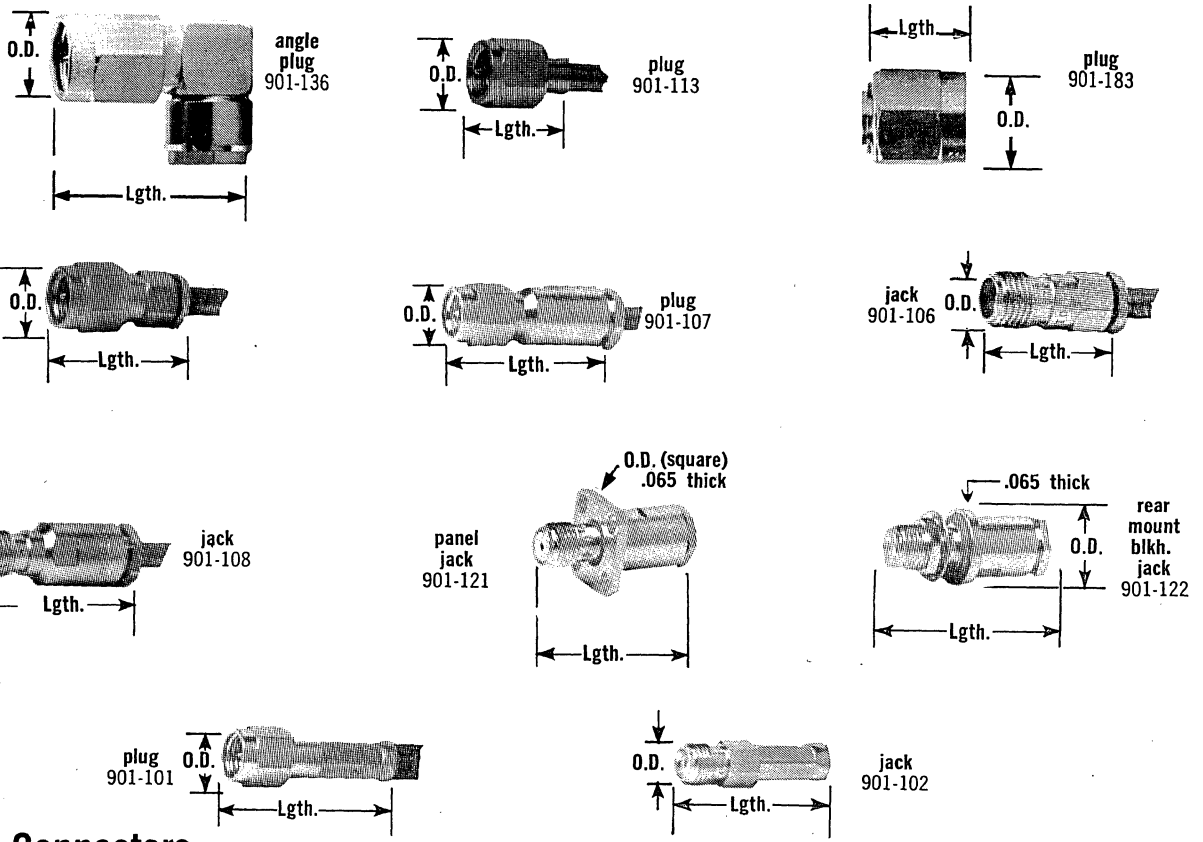
MIL-C-39012 SMA Specification Sheets

Mounting Hole Dimensions



SUB-MINIATURE SMA RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL



Cable Connectors

Configuration	Cable Affixment	Description	Part No.	Dimensions (Inches) Lgth.	O.D.	Cable Entry	Mtg. Hole
.085 DIA. SEMI-RIGID CUJAK CABLE							
Plug	Solder	With contact & insulator	901-126	43/64	5/16 hex	.088	—
Plug	Solder	Angle	901-136■	11/16	5/16 hex	.088	—
Jack	Solder	Straight	901-127	41/64	1/4 hex	.088	—
Jack	Solder	Panel mounted	901-151	41/64	1/2 sq.	.088	Y
Jack	Solder	Bulkhead mounted, rear	901-158	41/64	7/16 hex	.088	Z
Jack	Solder	Bulkhead mounted, rear	901-193	57/64	3/8 hex	.088	X
.141 DIA. SEMI-RIGID CUJAK CABLE							
Plug	Solder	Less Contact & insulator	901-113■	1/2	5/16 hex	.144	—
Plug	Solder	Less C & I, short skirt	901-183■	21/64	5/16 hex	.144	—
Plug	Solder	With contact & insulator	901-105■	43/64	5/16 hex	.144	—
Plug	Solder	Angle, with C & I	901-142	21/32	5/16 hex	.144	—
Plug	Clamp	Less contact & Insulator	901-111	63/64	11/32 dia.	.144	—
Plug	Clamp	With contact & insulator	901-107■	63/64	11/32 dia.	.144	—
Jack	Solder	Straight	901-106■	41/64	1/4 hex	.144	—
Jack	Solder	Panel mounted	901-141	41/64	1/2 sq.	.144	Y
Jack	Solder	Bulkhead mounted, rear	901-157	41/64	7/16 hex	.144	Z
Jack	Solder	Bulkhead mounted, rear	901-195	57/64	3/8 hex	.144	X
Jack	Clamp	Straight	901-108■	59/64	11/32 dia.	.144	—
Jack	Clamp	Bulkhead mounted, rear	901-159	59/64	7/16 dia.	.144	Z

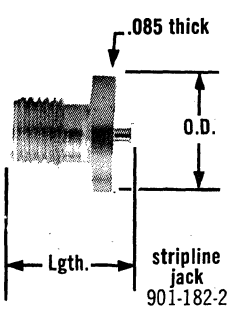
■ Illustrated.

Configuration	Cable Affixment	Description	Part No.	Dimensions (Inches) Lgth.	O.D.	Cable Entry	Mtg. Hole
RG-55, 58, 141, 142, 223/U CABLE (Clamp Type)							
Plug	Clamp	Straight	901-103	31/32	11/32 dia.	.219	—
Plug	Clamp	Angle	901-130	11/16	5/16 hex	.220	—
Jack	Clamp	Straight	901-104	15/16	11/32 dia.	.219	—
Jack	Clamp	Panel mounted	901-121■	15/16	1/2 sq.	.219	Y
Jack	Clamp	Bulkhead mounted, rear	901-122■	15/16	7/16 dia.	.219	Z
RG-55, 142, 223/U CABLE (Crimp Type)							
Plug	Crimp	Straight	901-101■	1 1/32	5/16 hex	.220	—
Jack	Crimp	Straight	901-102■	1	1/4 hex	.220	—
Jack	Crimp	Panel mounted	901-152	1	1/2 sq.	.220	Y
RG-58, 141, 303/U CABLE(Crimp Type)							
Plug	Crimp	Straight	901-109	29/32	5/16 hex	.206	—
Jack	Crimp	Straight	901-110	7/8	1/4 hex	.206	—
Jack	Crimp	Panel mounted	901-153	1	1/2 sq.	.206	Y
RG-174, 188, 316/U CABLE							
Plug	Clamp	Straight	901-129	15/16	11/32 dia.	.114	—
Plug	Clamp	Straight	901-128	63/64	11/32 dia.	.114	—
Plug	Clamp	Angle	901-140	11/16	5/16 hex	.114	—
RG-180, 195/U CABLE							
Plug	Clamp	Straight	901-139	63/64	11/32 dia.	.158	—
Plug	Crimp	Straight	901-192	3/4	5/16 hex	.175	—
Jack	Clamp	Panel mounted	901-220	15/16	1/2 sq.	.158	Y
DOUBLE BRAIDED RG-188 TYPE (.126 Max. Dja.)							
Plug	Clamp	Straight	901-174	63/64	11/32 dia.	.130	—
Plug	Clamp	Angle	901-172	11/16	5/16 hex	.130	—
Jack	Clamp	Bulkhead mounted, rear	901-173	1 3/32	3/8 hex	.130	X

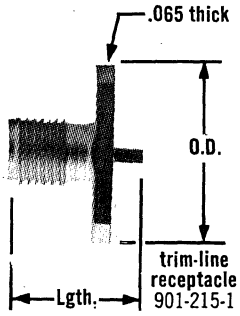
SUB-MINIATURE SMA RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

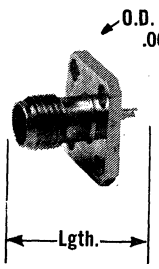
SMA Receptacles



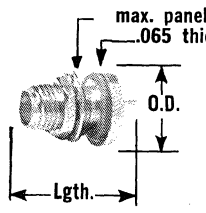
stripline jack 901-182-2



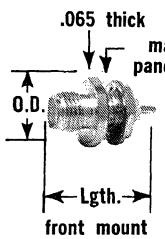
trim-line receptacle 901-215-1



receptacle 901-112



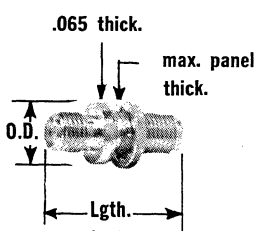
rear mount receptacle 901-116



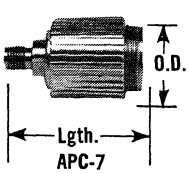
front mount receptacle 901-117

Description	Part No.	Dimensions, Inches: Lgth.	O.D.	Max. Panel Thickness	Mtg. Hole
STRIP TRANSMISSION LINE					
Plug for .031 board	901-132-1	.548	5/16 dia.	—	U
Plug for .063 board	901-132-2	.580	5/16 dia.	—	U
Plug for .125 board	901-132-3	.642	5/16 dia.	—	U
Angle jack .031 board	901-133-1	47/64	1/4 dia.	—	U
Angle jack .063 board	901-133-2	47/64	1/4 dia.	—	U
Angle jack .125 board	901-133-3	47/64	1/4 dia.	—	U
Jack for .031 board	901-131-1	.416	5/16 dia.	—	U
Jack for .063 board	901-131-2	.448	5/16 dia.	—	U
Jack for .125 board	901-131-3	.510	5/16 dia.	—	U
Jack for .031 board	901-182-1	.416	13/32 dia.	—	V
Jack for .063 board	901-182-2■	.448	13/32 dia.	—	V
Jack for .125 board	901-182-3	.510	13/32 dia.	—	V
PRINTED CIRCUIT RECEPTACLES					
Straight receptacle	901-144	17/32	1/4 sq.	5/32 pins	T
Angle receptacle	901-143	.585	1/4 sq.	5/32 pins	T
RECEPTACLES/PANEL MTD. (Std. Square Flange)					
.590 insulated blunt terminal	901-176-1	13/64	1/2 sq.	—	Y
with captivated contact	901-176-2	13/64	1/2 sq.	—	Y
Plug, .330 insulated blunt term.	901-196-1	1	1/2 sq.	—	Y
with captivated contact	901-196-2	1	1/2 sq.	—	Y
Tab terminal	901-197-1	15/32	1/2 sq.	—	Y
with captivated contact	901-197-2	15/32	1/2 sq.	—	Y
Solder cup, capt. contact	901-112■	9/16	1/2 sq.	—	Y
Angle solder cup	901-124	45/64	1/2 sq.	—	Y
RECEPTACLES/PANEL MTD. (Trim-Line Flange)					
Slotted terminal	901-213	5/8	5/8	—	W
Solder cup, captivated contact	901-214	37/64	5/8	—	W
Tab terminal	901-215-1■	15/32	5/8	—	W
with captivated contact	901-215-2	15/32	5/8	—	W
RECEPTACLES/BULKHEAD MOUNTED					
Rear, solder cup, gasket	901-116■	21/32	7/16 dia.	.103	Z
Rear, solder cup	901-134	21/32	7/16 dia.	.103	Z
Rear, solder cup	901-190	43/64	5/16 hex	.125	X
Rear, hermetic, flat & pierced	901-161	21/32	7/16 dia.	.103	Z
Front, hermetic, flat & pierced	901-162	1 1/16	7/16 dia.	.103	Z
Front, solder cup, gasket, cc	901-117■	1 1/16	7/16 dia.	.103	Z
Front, blunt term, 1/4-36 th'd, cc	901-206	21/32	5/16 hex	—	1/4-36

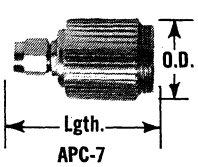
SMA Adapters and Accessories



adapter 901-120



APC-7 adapter 131-1028



APC-7 adapter 131-1038

Description	Part No.	Dimensions, Inches: Lgth.	O.D.	Max. Panel Thickness	Mtg. Hole
ADAPTERS WITHIN SERIES					
Straight, plug-plug	901-118	57/64	5/16 hex	—	—
Straight, jack-jack	901-119	19/32	1/4 dia.	—	—
Bulkhead, jack-jack	901-120■	13/16	3/8 dia.	.103	Z
Bulkhead, jack-jack	901-191	7/8	3/8 hex	.250	Z
Bulkhead, hermetic, jack-jack	901-160	7/8	7/16 hex	.187	S
Angle, plug-jack	901-125	5/8	5/16 hex	—	—
ADAPTERS BETWEEN SERIES					
APC-7 — SMA jack	131-1028■	1 11/32	13/16	—	—
APC-7 — SMA plug	131-1038■	1 3/8	13/16	—	—
APC-N plug — SMA plug	131-1074	1 3/4	13/16	—	—
APC-N plug — SMA jack	131-1075	1 5/8	13/16	—	—
APC-N jack — SMA plug	131-1076	1 23/64	5/8	—	—
APC-N jack — SMA jack	131-1077	1 19/32	5/8	—	—
BNC plug — SMA plug	901-164	1 3/32	9/16	—	—
BNC plug — SMA jack	901-165	1 1/16	9/16	—	—
BNC jack — SMA plug	901-166	1 5/32	9/16	—	—
BNC jack — SMA jack	901-167	1 1/8	9/16	—	—
TNC plug — SMA plug	901-168	1 1/8	1 9/32	—	—
TNC plug — SMA jack	901-169	1 3/32	1 9/32	—	—
TNC jack — SMA plug	901-170	1 5/32	9/16	—	—
TNC jack — SMA jack	901-171	1 1/8	9/16	—	—
CAP AND CHAIN					
Non-shorting, plug	901-163	29/64	5/16 hex	2″ chain, .130 dia. eyelet	

■ Illustrated.

TOOL KIT AND CABLE ASSEMBLIES

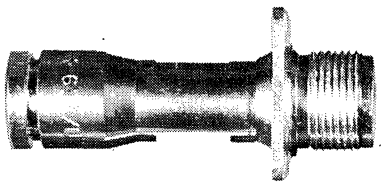
TOOL KIT P/N 901-2500. Contains recommended jacket and dielectric trim tools for precise cable preparation required to obtain the electrical performance specified. Accessory Tool P/N 901-2400 available for Cujak center conductor trimming.

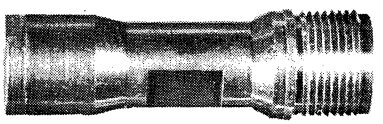
CABLE ASSEMBLIES. Custom semi-precision cable assemblies are available with .141″ and .085″ dia. semi-rigid Cujak cable fitted with SMA connectors. Contact factory with your specifications.

RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series HN





Amphenol HN Series are constant 50 ohm impedance connectors designed for high voltage applications. Connectors are weatherproof and are available in Regular, Improved and Improved/Captivated Contact constructions.

Amphenol's patented Captivated Contact Design prevents possible contact recession under temperature extremes. Contacts are fixed within the connector body by front and rear contact insulators that butt against metal body parts.

CHARACTERISTICS, TYPICAL

ELECTRICAL: Frequency range: 0 — 4GHz. **Voltage rating:** 1,500 volts peak; **dielectric withstanding voltage:** 5,000 volts rms. **SWR:** 1.3.

ENVIRONMENTAL: Thermal limits: Teflon insulation: —67° to 390°F (—55° to 199°C); Rexolite insulation: —67° to 185°F (—55° to 85°C). **Weatherproof:** all HN Series are weatherproof. **Hermetic seals:** pass helium lead test of 2×10^{-8} cc/sec. **Pressurized:** Compression seal.

MECHANICAL: Mating: ¾ —20 threaded coupling. **Cable affixment:** screw-thread nut and braid clamp.

MATERIALS: Contacts: male: brass; female: beryllium copper; outer: brass; **other metal parts:** brass. **Plating:** .0002" silver min. **Insulators:** Teflon, Rexolite, glass-Teflon (hermetic seal). **Weatherproof gaskets:** synthetic rubber; silicone rubber.

MILITARY SPECIFICATIONS: HN Connectors meet applicable sections of MIL-C-3643.

STRAIGHT JACKS

RG/U Cable	Part No.	UG/U No.	Insulation	Clamp Gasket	Dimensions, Inches Length	O.D.	Diam.	Notes
8, 9, 87, 213, 214, 225	82-39	60A△	Rexolite	syn. rubber	2½	1¾₆	.444	—
	82-814	60B△	Teflon	sil. rubber	2½	1¹⁄₁₆	.444	modified cable clamp
	82-321	1214△	Teflon	sil. rubber	2⅞	1¹⁄₁₆	.444	improved/captivated contact
10, 12, 116, 215, 227	33250	927	Teflon	sil. rubber	3	¾	—	armor clamp
17, 218	82-107	333A	Rexolite	syn. rubber	2⁷⁄₁₆	1⅝	.900	modified cable clamp
	44025	333B	Teflon	sil. rubber	2½	1⅝	.900	improved
18	82-56	333	Rexolite	syn. rubber	2¾	1⅞	.900	armor clamp
	82-175	—	Teflon	nat. rubber	2½	¾	.333	82-887 kit clamping

PANEL JACKS

8, 9, 87, 213, 214, 225	82-40	61A△	Rexolite	syn. rubber	2½	1¾₆	.444	—
	11150	61C△	Teflon	sil. rubber	2⅝₆	1¾₆	.444	improved
	82-815	61B△	Teflon	sil. rubber	2½	1¾₆	.444	modified cable clamp
	82-324	1215△	Teflon	sil. rubber	2¹⁵⁄₁₆	1¾₆	.444	improved/captivated contact
17	82-108	334A	Rexolite	syn. rubber	2⁷⁄₁₆	1⅝	.960	modified cable clamp
18	82-57	334	Rexolite	syn. rubber	2¾	2	.984	armor clamp/.257 dia. flange holes

△ Amphenol adapter kit 82-887 will adapt connector for use with ALJAK/CUJAK metal jacketed cables.

STRAIGHT PLUGS

8, 9, 87, 213 214, 225	82-38	59A△	Rexolite	syn. rubber	2⅜	⅞	.444	—
	82-804	59B△	Teflon	sil. rubber	2⅜	⅞	.444	modified cable clamp
	82-320	1213△	Teflon	sil. rubber	2¾	⅞	.444	improved/captivated contact
	17900	59D△	Teflon	sil. rubber	2³⁄₃₂	⅞	.444	improved/beryl. outer contact
10, 12, 116, 215, 227	9375	925	Teflon	sil. rubber	2⁴⁹⁄₆₄	2³⁄₃₂	.511	armor clamp
14, 217	8125	494	Rexolite	sil. rubber	2	1	.562	—
17, 218	82-111	495A	Rexolite	syn. rubber	2¹¹⁄₁₆	1⅝	.900	—
	82-325	—	Rexolite	syn. rubber	2¹¹⁄₁₆	1⅝	.900	captivated contact
	30350	495D	Teflon	sil. rubber	2¹³⁄₃₂	1⅜	.900	improved/beryl. outer contact
54A	82-816	—	Teflon	sil. rubber	1¹³⁄₁₆	⅞	.257	—
55, 58, 141 142	16750	—	Teflon	syn. rubber	1¹³⁄₁₆	2³⁄₃₂	.214	—

ANGLE PLUGS

RG/U Cable	Part No.	Insulation	Cable Clamp	Dimensions, Inches Length	O.D.	Cable Diam.	Notes
8, 9, 87, 213, 214, 225	82-833	Rexolite	sil. rubber	1½	⅞	.444	—
	82-856	Teflon	sil. rubber	1½	⅞	.444	—
55, 58, 141 142	19625	Teflon	syn. rubber	1⅜	⅞	.214	1500 VRMS

PANEL RECEPTACLES

Part No.	UG/U No.	Insulation	Dimensions, Inches Length	O.D.	Max. Panel Thickness
82-92	496	Rexolite	1¹⁷⁄₃₂	1¾₆	—
82-805	560	Teflon	1⅞	1¾₆	—
45750	—	Teflon	1½	1¾₆	—

female contacts • hermetically sealed

BULKHEAD RECEPTACLES

82-836	—	glass-Teflon	1¾	¹³⁄₁₆	.187
82-843	—	glass-Teflon	1⁴⁹⁄₆₄	1¼	.187

plug ends • weatherproof • 50 ohm impedance

STRAIGHT ADAPTER

16800	—	Teflon	2⅛	⅜	—

ANGLE ADAPTERS

Part No.	UG/U No.	Insulation	Adapter Ends	Dimensions, Inches Length	O.D.	Notes
82-91	212A	Rexolite	jack-plug	1¹⁵⁄₃₂	⅞	—
82-115	212C	Teflon	jack-plug	1¹⁵⁄₃₂	⅞	beryl. outer contact
12100	212B	Teflon	jack-plug	1⁷⁄₁₆	⅞	modified const.

BULKHEAD ADAPTER

Part No.	UG/U No.	Insulation	Dimensions, Inches Length	O.D.	Max. Panel Thickness
11050	1019	Teflon	1³¹⁄₃₂	1	.343

TEE ADAPTERS

Part No.	UG/U No.	Insulation	Length In Inches
9950	413	Rexolite	1¹³⁄₁₆
11950	—	Teflon	1¹³⁄₁₆

ARMOR CLAMPS

RG/U Cable	Part No.	MX No.	Dimensions, Inches Length	O.D.	Cable Entry	Notes
10, 12, 79, 116, 215, 227	82-48	564	⅞	1¹⁄₁₆	.470	use with regular const.
	82-109	564A	1¹⁄₁₆	1¹⁄₁₆	.511	use with regular const.
	82-517	1286	1⅛	¾	.511	use with improved connectors
18, 219	92100	1441	1⅜	1⁵⁄₁₆	.963	use with improved connectors
74, 224	16850	1462	1¾₆	⅞	.625	use with improved connectors

male contact • weatherproof • ½ watt ± 5% resistor • 48 ohms impedance

RESISTOR TERMINATED CAP

Part No.	DA No.	Insulation	Dimensions, Inches Length	O.D.	Chain Length
9550	12A	Rexolite	1¼	2³⁄₃₂	2¼

MALE CAPS • weatherproof

Part No.	Dimensions, Inches Length	O.D.	Chain Length	Notes
82-130	1³⁄₃₂	⅞	2⁹⁄₁₆	—
9900	7⁄₁₆	⅞	—	cap only
10250	7⁄₁₆	⅞	2¼	—

FEMALE CAPS

13650	2³⁄₃₂	⅞	4	—

27 SERIES SUBMINAX RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series 27 — SUBMINAX with three types of low cost assembly

The original **quality** rf subminiature, designed for more critical electrical applications. These connectors are available in three types of cable affixment: **Radial Crimp,** a unique Amphenol low cost crimp design; **Quick Crimp,** a standard tex type crimp; and **Field Serviceable,** a design which is the easiest in the industry to assemble and contains the fewest parts. All have soldered centered contacts.

Two types of coupling mechanism. Specify push-on (snap-on) for frequent fast mating or screw-on for vibration type applications.

CHARACTERISTICS

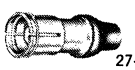
ELECTRICAL: **Impedance:** 50 ohm, 75 ohm. **Frequency Range:** 0-10 GHz. **Voltage Rating:** 500 volts peak. **Dielectric Withstanding Voltage:** 1,500 volts rms. **SWR (50 ohm):** 1.2 (0-4 GHz); 1.5 (4-10 GHz); 1.3 (UG's) (0-6 GHz); 1.5 (UG's) (6-10 GHz). **Other:** multivolt drop 6 MV. insulation resistance 1,000 megohms.

ENVIRONMENTAL: **Thermal Limits:** −67° to 390°F (−55° to 199°C). **Weatherproof:** all 27 series are non-weatherproof, radial crimp have plastic boot or optional heat shrink tubing. **Hermetic Seals:** pass helium leakage test of 2 x 10^{-8} cc/sec. **Thermal Shock.** Mil. Std. 202 method 107. **Shock:** Mil. Std. 202 method 202. **Vibration:** Mil. Std. 202 method 204 (test cond. D). **Moisture Resistance:** Mil. Std. 202 method 106A. **Corrosion:** Mil. Std. 202 method 101 (test cond. B).

MECHANICAL: **Contacts:** radial crimp, not captivated; quick crimp, full captivated; field serviceable, semicaptivated. **Mating:** push-on (snap-on) and screw-on, (50 ohm have 10-32 threaded coupling; 75 ohms, 5/16-32). **Cable Affixment (Braid or Jacket):** radial crimp: Quick-Crimp (hex crimp); field serviceable clamp mechanism. **Cable Affixment (Center Conductor):** solder only. **Coupling Nut:** recommended torque (hex nuts); 50 inch-ounces. Axial pull-off force: Withstand up to 50 lbs.

MATERIAL: **Contacts:** male and outer (push-on): brass female: beryllium copper. **Other Metal Parts:** brass. **Plating (All Metal Parts):** .000050 gold over copper, (UG's .0001" gold over copper). **Insulators:** Teflon, Kel-F-Teflon, glass Teflon (hermetically sealed) as specified.

MILITARY SPECIFICATIONS: UG items fully comply with MIL-C-22557A.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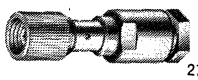
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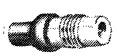
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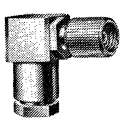
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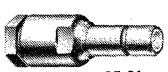
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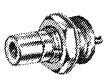
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27-4

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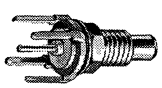
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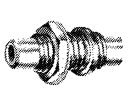
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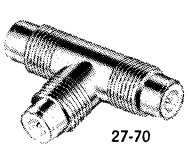
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27-5

NOTES:

Radial Crimp:

Connector is gently squeezed for a reliable mechanical and electrical connection. See "RC" in notes below.

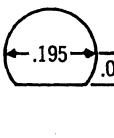
Quick Crimp:

No need to comb braid; assembles faster than any other subminiature. Has captivated contact, termination stronger than cable itself. See "QC" in notes below.

Field Serviceable:

Needs no crimping tool. Has semi-captivated contact. UG connectors comply with MIL-C-22557A. See "FS" below.

CC = Captivated Contacts; HOC = Hooded Outer Contact; RM = Rear Mounted.



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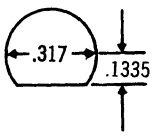

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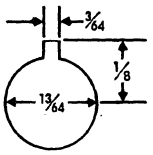

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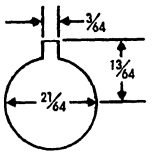

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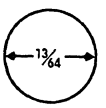

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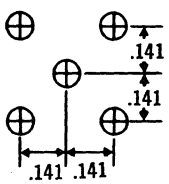

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PUSH-ON STRAIGHT PLUGS SCREW-ON

For RG-/U Cable	No.	Imp. Ohms	Notes	Lgth.	Mtg. Hole	For RG-/U Cable	No.	Imp. Ohms	Notes	Lgth.	Mtg. Hole
174, 179, 187, 188	27-841	50	QC, CC	1		174, 179, 187, 188	27-844	50	QC, CC	1 1/32	
	27-1	50	RC	19/32			27-7	50	RC	19/32	
180, 195	27-828	75	QC, CC	1 5/64			†27-106	50	FS, CC	23/32	
	27-13	75	RC	5/8		180, 195	27-835	75	QC, CC	1 3/64	
178, 196	37-30	50	FS,CC	23/32			27-19	75	RC	19/32	
				* UG-1460		178, 196	27-34	50	FS, CC	25/32	
				† UG-1465			*27-104	50	FS, CC	23/32	

PUSH-ON ANGLE PLUGS SCREW-ON

174, 179, 187, 188	27-843	50	QC, CC	41/64		174, 179, 187, 188	27-846	50	QC, CC	19/32	
	27-6	50	RC	7/16			27-26	50	RC	35/64	
180, 195	27-834	75	QC ,CC	41/64		180, 195	27-836	75	QC ,CC	41/64	
	27-18	75	RC	37/64			27-25	75	RC	5/8	
178, 196	27-33	50	FS, CC	9/16		178, 196	27-37	50	FS, CC	23/64	
	27-823	50	FS,CC,HOC	19/32							

PUSH-ON STRAIGHT JACKS SCREW-ON

174, 179, 187, 188	27-849	50	QC, CC	1		174, 179, 187, 188	27-8	50	RC	19/32	
	27-2	50	RC	35/64			*27-105	50	FS, CC	3/4	
180, 195	27-837	75	QC, CC	1		178, 196	27-35	50	FS, CC	3/4	
	27-14	75	RC	9/16			†27-107	50	FS, CC	3/4	
178, 196	27-31	50	FS, CC	47/64		180, 195	27-20	75	RC	19/32	
										* UG-1467	† UG-1462

PUSH-ON BULKHEAD JACKS SCREW-ON

174, 179, 187, 188	27-842	50	QC, CC	1 1/16	W	174, 179, 187, 188	27-845	50	QC, CC	1 1/16	W
	27-4	50	RC	41/64	U		27-10	50	RC	21/32	U
180, 195	27-838	75	QC, CC	1 7/64	X		†27-103	50	FS, CC	7/8	W
	27-16	75	RC	41/64	V	180, 195	27-839	75	QG, CC	1 1/8	X
178, 196	27-32	50	FS, CC	13/16	U		27-22	75	RC	23/32	V
				†UG-1468		178, 196	27-36	50	FS, CC	51/64	U

PUSH-ON BULKHEAD RECEPTACLES SCREW-ON

—	27-3	50	T	—	37/64	U	—	27-9	50	I	—	19/32	U
							—	27-12	50	GT	Hermetic	41/64	Y
—	27-15	75	T	—	37/64	V	—	27-21	75	T	—	19/32	V
							—	27-24	75	GT	Hermetic	11/16	21/64 dia.
—	27-57	50	GT	Hermetic	45/64	Y							
							—	27-800	50	T	Prtd. Ckt.	43/64	Z
—	27-45	75	GT	Hermetic	23/32	21/64 dia.	UG1619	27-101	50	T	RM, FS, CC	5/8	W
							UG1464	27-108	50	T	FM, FS, CC	41/64	W

PUSH-ON BULKHEAD ADAPTERS SCREW-ON

Part No.	Impedance Ohms	Adapter Ends	Length (Inches)	Mounting Hole	Part No.	Impedance Ohms	Adapter Ends	Length (inches)	Mounting Hole
27-5	50	Jack/Jack	5/8	V	27-11	50	Jack/Jack	21/32	U
27-17	75	Jack/Jack	5/8	V	27-23	75	Jack/Jack	21/32	V

SCREW-ON TEE ADAPTERS

No.	Impd. Ohms	Adapter Ends	Lgth.
27-70	75	Jack/Jack/Jack	1.050

5116 SERIES SUBMINAX RF COAXIAL CONNECTORS

BUNKER RAMO AMPHENOL

Series 5116 — SUBMINAX with low cost QUICK CRIMP assembly

WITH TWO MATING STYLES — FULLY CAPTIVATED CONTACTS

Series 5116 combines good electrical performance with fast, economical cable assembly. Plugs and jacks, for example, have only four parts, including body assembly. Cable stripping is easier, with less critical dimensions. Ultra-reliable, gold-plated contacts are fully captivated, can be crimped or soldered. Extremely low cost of the crimping tool (Amphenol No. 227-911) makes field use of this connector series feasible.

Two types of coupling mechanism are available. Specify push-on (snap-on) for frequent fast mating, or screw-on for vibration-applications. Push-on will not mate with screw-on types; 50 ohm, 75 ohm and 95 ohm types mate only with like types.

ABBREVIATIONS:
Insulation: T — Teflon, gT — glass-Teflon.
Notes: W — Weatherproof, SMC — Shorting Male Contact, PC — Used on printed-circuit boards, H — Hermetically Sealed, MLC — Male Contact

CHARACTERISTICS

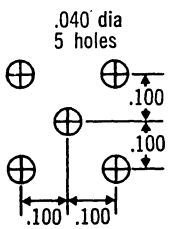
ELECTRICAL
Impedance: 50, 75 or 95 ohm.
Frequency range: 0-4 Gc.
Voltage: 500 v. peak.
High potential: 1500 v. rms. 60 cycles, 1 min.

ENVIRONMENTAL
Thermal limits: —67°F to 390°F.
Weatherproof: screw-on types.
Hermetic seals: pass helium leak test of 2 x 10^{-8} cc/sec.

MECHANICAL
Mating: push-on or screw-on.
Cable affixment: Quick-Crimp.

MATERIAL
Contacts: male: brass; female: beryllium copper.
Other metal parts: brass.
Contact plating: .0002" gold-over-silver min.
Other plating: .0002" silver min.
Insulators: Teflon or glass-Teflon.

MOUNTING HOLES



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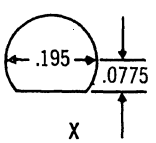

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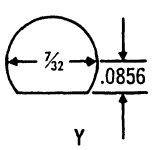

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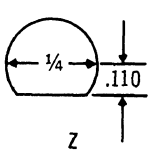

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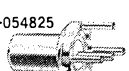
5116-037050

5116-037475

5116-037275



5116-054825

5116-054850

PUSH-ON STRAIGHT PLUGS — SCREW-ON

For RG-/U Cable	No. 5116-	Imp. Ohms	Notes	Lgth.	Mtg. Hole	For RG-/U Cable	No. 5116-	Imp. Ohms	Notes	Lgth.	Mtg. Hole
178A, 178B, 196, 196A	-037050	50		1 3/32		178A, 178B, 196, 196A	-037475	50	W	1	
179A, 179B, 187, 187A	-037100	75		1 3/32		179A, 179B, 187, 187A	-037525	75	W	1	
180, 180A. 180B, 195, 195A	-037125	95		1 3/32		180, 180A. 180B, 195, 195A	-037550	95	W	1	
188, 188A, 316	-037075	50		1 3/32		188, 188A, 316	-037575	50	W	1	

PUSH-ON ANGLE PLUGS — SCREW-ON

178A, 178B, 196, 196A	-037150	50		45/64		178A, 178B, 196, 196A	-037600	50	W	5/8	
179A, 179B, 187, 187A	-037200	75		25/32		179A, 179B, 187, 187A	-037625	75	W	41/64	
180, 180A. 180B, 195, 195A	-037225	95		25/32		180, 180A, 180B, 195, 195A	-037650	95	W	45/64	
188, 188A, 316	-037175	50		25/32		188, 188A, 316	-037675	50	W	41/64	

PUSH-ON STRAIGHT JACKS — SCREW-ON

178A, 178B, 196, 196A	-037275	50		1		178A, 178B, 196, 196A	-037700	50	W	1	
179A, 179B, 187, 187A	-037325	75		1		179A, 179B, 187, 187A	-037725	75	W	1	
180, 180A, 180B, 195, 195A	-037350	95		1		180, 180A, 180B, 195, 195A	-037750	95	W	1	
188, 188A, 316	-037300	50		1		188, 188A, 316	-037775	50	W	1	

PUSH-ON BULKHEAD JACKS — SCREW-ON

178A, 178B, 196, 196A	-037375	50		29/32		178A, 178B, 196, 196A	-037800	50	W	25/32	
179A, 179B, 187, 187A	-037425	75		29/32		179A, 179B, 187, 187A	-037825	75	W	25/32	
180, 180A, 180B, 195, 195A	-037450	95		29/32		180, 180A, 180B, 195, 195A	-037850	95	W	25/32	
188, 188A, 316	-037400	50		29/32		188, 188A, 316	-037875	50	W	25/32	

PUSH-ON STRAIGHT RECEPTACLES — SCREW-ON

No. 5116-	Imp. Ohms	Ins.	Notes	Lgth.	Mtg. Hole	No. 5116-	Imp. Ohms	Ins.	Notes	Lgth.	Mtg. Hole
-054825	50	T	PC	15/32	W	-058375	50	T	PC, W	15/32	W
						-054875	95	T	PC, W	15/32	W
						-057350	50	gT	H, W	9/16	.195dia.
						-057375	95	gT	H, W	9/16	.250dia.

PUSH-ON ANGLE RECEPTACLES — SCREW-ON

-054850	50	T	PC	9/16	W	-054900	50	T	PC, W	15/32	
						-054925	95	T	PC, W	15/32	W

PUSH-ON BULKHEAD RECEPTACLES — SCREW-ON

-054300	50	T	MLC	45/64	.221	-058350	50	T		1/4	X
-054325	50	T		23/32	dia.	-056825	75	T		9/32	Y
						-057400	95	T		5/16	Z

SCREW-ON BULKHEAD ADAPTERS

No. 5116-	Imp. Ohms	Ins.	Adapter Ends	Lgth.	Mtg. Hole
-054475	50	T	Jack/Jack	19/32	5/16 dia.
-054525	75	T	Jack/Jack	19/32	
-054550	95	T	Jack/Jack	19/32	

SCREW-ON MALE CAPS

No. 5116-	Imp. Ohms	Notes	Lgth.	Mtg. Hole
-054575	50	SMC	3/8	
-054650	50		13/64	
-054600	75	SMC	5/16	
-054675	75		13/64	
-054625	95	SMC	5/16	
-054700	95		13/64	

RF COAXIAL BETWEEN SERIES ADAPTERS

AMPHENOL
THE BUNKER-RAMO CORPORATION

Adapters Between Series

Amphenol series-to-series adapters are of non-constant impedance, but designed so that inherent electrical discontinuities are minimal. They are built to the same precision tolerances as the rest of our coaxial line. For typical characteristics, see pages describing the connector series.

CHARACTERISTICS

ELECTRICAL: Impedance: non-constant. **Frequency:** per cable used. **Voltage:** per cable used.

ENVIRONMENTAL: Thermal Limits: Teflon: −67°F to 390°F; Rexolite: −67°F to 185°F; Kel-F: −67° to 390°F; mica-filled; Bakelite: −67°F to 300°F; polyethylene: −67°F to 185°F. **Weatherproof:** except as noted. **Hermetic Seals:** pass helium leakage test of 2 x 10^{-6} cc/sec. P = Pressurized; H = Hermetic Sealed.

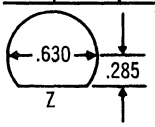
MECHANICAL: Mating: per series.

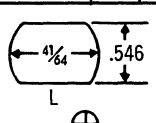
MATERIAL: Contacts: male: brass; female: beryllium copper. **Other Metal Parts:** brass. **Plating:** .0002" silver min. **Insulators:** Teflon, Rexolite, Kel-F, mica-filled Bakelite, polyethylene or glass-Teflon, as specified.

83175

BNC TO C
weatherproof

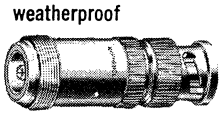
UG-/U No.	No.	Ins.	Imp. Ohms/Notes	BNC	C	Lgth.
635	83175	T	50	Plug	Jack	1 9/32
636A	83200	T	50	Jack	Plug	1 15/64



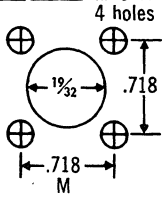


.125 dia 4 holes

BNC TO N
weatherproof



31-217



UG-/U No.	No.	Ins.	Imp. Ohms/Notes	BNC	N	Lgth.
201	31-830	T	—	Jack	Plug	1 15/32
201A	21-216‡	T	Improved	Jack	Plug	1 5/16
335	3025	T-R	50 hole M	Plug	Jack	1 3/4
349	2975	T-R	50	Plug	Jack	1 3/4
349A	31-217‡	T	Improved	Plug	Jack	1 5/16
1034	5225	T	50	Plug	Plug	1 1/2
—	2800	T	50/* hole M	Jack	Jack	1 7/16
—	4250	T	70	Jack	Plug	1 5/16
—	4900	T	50	Plug	Plug	1 1/2
—	5850	T-R	50/P hole Z	Jack	Jack	1 27/32
—	21850	T	50 hole M	Jack	Jack	1 1/2
—	93075	GT	—/H hole L	Jack	Jack	1 11/16

82350

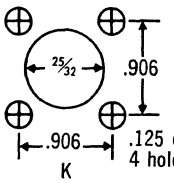
C TO LC
weatherproof

UG-/U No.	No.	Ins.	Imp. Ohms/Notes	C	LC	Lgth.
—	82350	T	—	Jack	Jack	3 23/64

C TO N
weatherproof

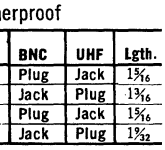
82-508

UG-/U No.	No.	Ins.	Imp. Ohms/Notes	C	N	Lgth.
564	82-508	T	50	Jack	Plug	1 3/8
565A	82-540	T	50	Plug	Jack	1 17/32
—	83875	T	50/*	Jack	Plug	1 9/32



BNC TO HN
weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	BNC	HN	Lgth.
309	8900	T	50	Jack	Plug	1 1/2
559	17750	R	50/*	Plug	Jack	1 1/2
—	32750	T-R	—	Plug	Jack	1 3/8
—	35050	T	50 hole K	Jack	Jack	1 3/8

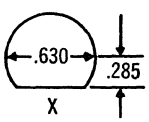


BNC TO SM non-weatherproof

UG-/U No.	Part No.	Ins.	Notes	BNC	SM	Lgth.
691	89250	GT	H hole Y	Jack	Jack	1 1/8

BNC TO UHF non-weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	BNC	UHF	Lgth.
255	2900‡	R	50	Plug	Jack	1 5/16
273	31-028‡	R	—	Jack	Plug	1 3/16
—	2925	T	50	Plug	Jack	1 5/16
—	12025	T	50	Jack	Plug	1 9/32



83950

C TO MB
weatherproof (Mounting hole X)

UG-/U No.	Part No.	Ins.	Notes	C	MB	Lgth.
—	83950	GT	H	Jack	Jack	1 1/32

47400

MB TO UHF
non-weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	MB	UHF	Lgth.
—	47400	T	—	Jack	Plug	1 11/32

MHV TO UHF weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	MHV	UHF	Lgth.
—	28050	T	—	Jack	Plug	1 9/32
—	28075	T	—	Plug	Jack	1 3/8

BNC TO SUBMINAX 27
non-weatherproof

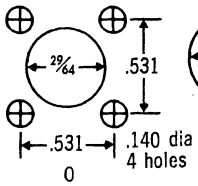
27-29

Part No.	Ins.	Imp. Ohms/ Notes	Mates With Sub. 27 Plug	Used In BNC UG-/U	Lgth.
27-28	T	50	50 ohm, Screw-On	88	1 5/16
27-29	T	50	50 ohm, Push-On	88	1 5/16
27-40	T	50/GC	50 ohm, Screw-on	89, 291	1 5/16
27-41	T	75	75 ohm, Push-On	260B	1 1/4
27-42	T	75	75 ohm, Screw-On	261B, 262B	1.355
27-805	T	75	75 ohm, Screw-On	260B	1 17/64

20625

HN TO MHV
weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	HN	MHV	Lgth.
—	20625	T	50	Plug	Jack	1 1/2



47275

BNC TO MB
weatherproof

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	BNC	MB	Lgth.
—	33200	T-K	50 hole O	Jack	Jack	1 5/32
—	47200	GT	50/H hole Y	Jack	Jack	1 1/8
—	47250	T-K	50	Jack	Plug	1 5/16
—	47275	T-K	50	Plug	Jack	1

BNC TO TNC
non-weatherproof

76400

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	BNC	TNC	Lgth.
—	76400	T	50	Jack	Jack	1 3/32
—	79025	T	50	Plug	Jack	1 1/4
—	79675‡	T	50	Jack	Plug	1 1/4

C TO HN
non-weatherproof

83350

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	C	HN	Lgth.
702	83350	T	—	Jack	Plug	1 1/2
703A	83400	T	—	Plug	Jack	1 1/2

C TO UHF
non-weatherproof

83225

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	C	UHF	Lgth.
637	83225	T	—	Jack	Plug	1 3/8

N TO TNC
non-weatherproof

78800

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	N	TNC	Lgth.
—	78800	T	50	Plug	Jack	1 5/16
—	78825	T	50	Jack	Jack	1 25/64
—	78875	T	50/W	Plug	Plug	1 9/32
—	79825	T	50	Jack	Plug	1 27/32
—	79850	T	50/W	Plug	Plug	1 9/32

N TO UHF
weatherproof

34125

UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	N	UHF	Lgth.
83	14000	T-R	—	Jack	Plug	1 5/16
83B	34125	T	—	Jack	Plug	1 13/16
146	4400‡	R	Non-W	Plug	Jack	1 13/32
318	26700	R	—	Plug	Plug	1 47/64
—	14650	T	Non-W	Plug	Jack	1 13/32

HN TO N
weatherproof

16050

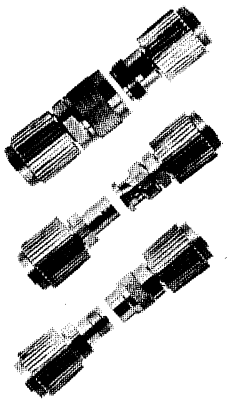
UG-/U No.	Part No.	Ins.	Imp. Ohms/Notes	HN	N	Lgth.
—	16050	T	50	Plug	Jack	1 5/16
—	16075	T	50	Jack	Plug	1 5/16
—	16100	T-R	50	Jack	Jack	1 49/64

‡Non-tarnish Astroplate finish available. To order: add suffix 1050 to part number. Other numbers also available on special order from factory. * Angle Body.

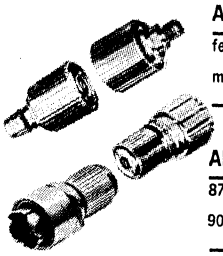
PRECISION ADAPTERS AND RF CRIMPING TOOLS

BUNKER RAMO AMPHENOL

Precision Adapters For APC-7



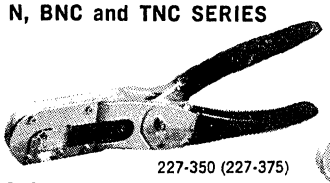
	Part No.	Maximum SWR For a Single Adapter	Dimens., Ins. Length	O.D.
APC-7 TO N				
female	131-1025	1.03 @ 4 GHz	1 43/64	13/16
male	131-1035	1.04 @ 9 GHz	1 13/16	13/16
		1.08 @ 18 GHz		
APC-7 TO BNC				
female	131-1027	1.035@ 4 GHz	1 39/64	13/16
male	131-1037	1.045@ 9 GHz	1 23/32	13/16
		1.08 @12 GHz		
		1.12 @18 GHz		
APC-7 TO TNC				
female	131-1026	same as BNC	1 39/64	13/16
male	131-1036		1 3/4	13/16



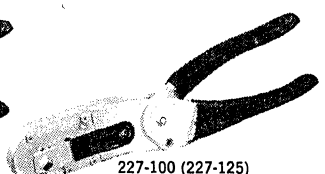
	Part No.	Maximum SWR For a Single Adapter	Dimens., Ins. Length	O.D.
APC-7 TO SMA				
female	131-1028	1.07 @12.4 GHz	1 1/32	3/16
male	131-1038	1.15 @18 GHz	1 3/8	3/16
APC-7 TO GR				
874	131-1022 or GR874-QAP7L*	1.04 @ 4 GHz 1.06 @ 9 GHz	2 1/16	1
900	131-1023 or GR900-QAP7*	1.011@ 4 GHz 1.021@ 8.5 GHz	2 3/16	1 1/16

* Available from General Radio and Amphenol.

N, BNC and TNC SERIES



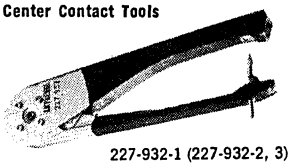
227-350 (227-375)



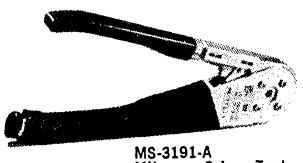
227-100 (227-125)
Usable only with N connectors

Braid Crimp Tools
Meet MIL-T-55619 (proposed) for MIL-C-39012 Crimp Connectors.

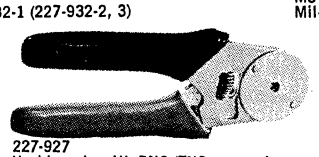
N, BNC and TNC SERIES
Center Contact Tools



227-932-1 (227-932-2, 3)



MS-3191-A
Mil-spec Crimp Tool



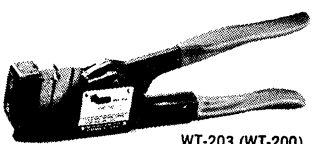
227-927
Usable only with BNC/TNC connectors

Crimp Tools

The crimp tools selected for use with Amphenol crimp connectors have been designed for superior performance over a considerable period. The most commonly used crimp tools are shown below. The Amphenol Tool Number is given first and in parentheses, other tools which are very similar in appearance. Refer to the Tool Summary for detailed application for each tool.

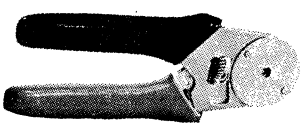
SUBMINAX 27 SERIES

227-900 (227-901)
Radial Crimp Tool

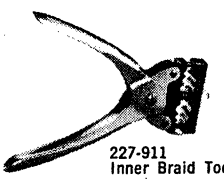


WT-203 (WT-200)
Quick-Crimp Tool

SUBMINAX 5116 SERIES



227-926
Center Contact Tool



227-911
Inner Braid Tool

BRAID CRIMP TOOL SUMMARY

Series	type of crimp Description &	Tool No.	Die No.	Die Cavity No.	Die Setting ±.003"	For use with RG-/U Cables
N	MIL-Crimp (Hex)	227-350▲	227-920-1	A	.213	55, 58, 141, 142, 223
		227-375▲	227-920-2	D	.255	59, 62, 140, 210
				C	.268	71
		227-100▲■	227-920-3	E	.415	8, 9, 11, 149, 213, 214
		227-125▲■	227-920-4	G	.324	5, 21, 143, 212, 222
BNC and TNC	MIL-Crimp and Quick-Crimp (Hex)	227-350▲	227-920-1	A	.213	55, 58, 141, 142, 223
				B	.178	122, 174, 179, 180, 187, 188, 195
		227-375▲	227-920-2	D	.255	59, 62, 140, 210
				C	.268	71
	Original Crimp*(Hex)	WT-200(T&B)	—	—	.128	174, 179, 187, 188
SUB-Minax 27	Radial Crimp	227-900	May Require Adapter - see p. 27-9, Cable Ass'y Instr.	—	—	174, 179, 187, 188
		227-901		—	—	180, 195
	Quick-Crimp (Hex)	WT-200(T&B)	—	—	.128	174, 177, 187, 188
		WT-203(T&B)	—	—	.178	180, 195, 21-597
SUB-Minax 5116	Quick-Crimp (Inner Braid)	227-911	—	—	Contact Factory	174, 178, 179, 180, 187, 188, 195, 196
MB, SM	Crimp (Inner Braid)	Standard Pliers	—	M	M	174, 178, 179, 180, 187, 188, 195, 196
MHV	Original Crimp (Hex)	Same as BNC/TNC	—	—	—	55, 58, 141, 142, 223
UHF	Quick-Crimp (Hex)	WT-218(T&B)	—	—	.384	8, 11, 149, 213
		227-350▲	227-920-1	A	.213	55, 58, 141, 142, 223
		227-375▲	227-920-2	D	.255	59, 62, 140, 210

Notes: * Original Crimp, same as MIL- and Quick-Crimp except for the cables shown (T&B) Manufactured and available from Thomas & Betts Co., Elizabeth, New Jersey
▲ Same tool frame no. 227-921 may be used with any intechrangeable 227-920- type die
■ Tool and appropriate die have capability as well of hex crimping center contacts for all the cables listed here for the N Series
All Tools are supplied with Dies or Bushings unless noted otherwise

CENTER CRIMP TOOL SUMMARY

Series	Description & type of crimp	Tool No.	Bushing No.	Die Cavity No.	Die Setting (+.001)	For use with RG-/U Cables
N	MIL-Crimp (4-Indent)	227-932-3△	—	—	.087	5, 8, 9, 11, 21, 55, 58, 59, 62, 71, 140, 141, 142, 143, 149, 210, 212, 213, 214, 222, 223
	MIL-Crimp (Hex)	227-100☐	227-920-3	F	(±.002) .100	
		227-125☐	227-920-4	H		
BNC and TNC	MIL-Crimp and Quick-Crimp (4-Indent)	227-932-1△	227-1157	—	.058	55, 58, 59, 62, 71, 122, 140, 141, 142, 174, 179, 180, 187, 188, 195, 210, 223
		227-927°	—	—	.058	
		MS-3191A (Mil. Spec. Tool) (not avail. RF)	order separately 227-918 (MIL-Crimp Male) 227-919 (MIL-Crimp Female) 227-1156 (Quick-Crimp M & F)	—	.058	
5116	Quick-Crimp (4-Indent)	227-926	—	—	.034	174, 178, 179, 180, 187, 188, 195, 196

☐ Tool and appropriate die have capability as well of braid crimping certain cable sizes — see Braid Crimp Tool Summary
△ Same tool frame no. 227-1189, may be used with either Bushing no. 227-1194, 227-1157 or 227-1199

MICROPHONE CONNECTORS

BUNKER RAMO AMPHENOL

NEW! Excellite© Microphone Plugs & Connectors

A low cost, dependable audio-type connector with latchlock coupling. Made of sturdy ABS molded plastic with lustrous nickel plating. Excellite connectors resist denting, chipping, peeling or tarnishing. They are available in cable plugs and panel receptacles with 3, 4 and 5 contacts.

Features

- **ECONOMICAL** — Lower initial procurement cost, less downtime for installation, rewiring, field repairs.
- **LIGHTWEIGHT** — Considerable weight savings over comparable die-cast zinc configurations.
- **WIRING** — Unitized inserts (shell, button and insert are all one assembly) are easily removed and feature screw-machined solder cup type contacts for quick, efficient termination.
- **POSITIVE GROUND** — In all Excellite latchlock-type connectors, contact #1 engages first for use as ground — eliminating chance of accidental electrical damage to solid-state equipment or microphones.
- **POLARIZATION** — Key on female connector, lock-in keying on male to prevent mismating.

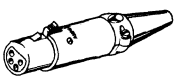
SPECIFICATIONS

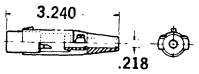
- **SHELL AND CABLE CLAMP** — Molded plateable grade ABS (acrylonitrile butadiene styrene) with nickel plate over copper finish.
- **INSERT DIELECTRIC** — Molded type 6 nylon.
- **CONTACTS** — Copper alloy, silver plated and chromate dipped. Screw machine design with solder cup termination.
- **CABLE RELIEF** — General purpose 40-60 durometer neoprene rubber.
- **CABLE CLAMP** — Cable clamp and gland accepts commonly used .250" to 0.313" diameter cable.
- **ELECTRICAL CHARACTERISTICS**

	3 Contact	4 Contact	5 Contact
Voltage	133 V (RMS)	133V (RMS)	133V (RMS)
Current	15 A.	10 A.	7.5 A

- **TEMPERATURE RATING** — −20°F to 160°F
- **DIELECTRIC WITHSTANDING VOLTAGE** — 1400 V at 60 Hz for one minute between any two contacts or between any contact and connector shell.

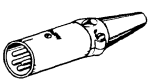
Straight Cord Plugs





Socket Contacts

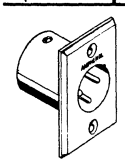
Number of Contacts		3	4	5
Part Number		91-454	91-458	91-462
Electrical	Cannon	XLR-3-11C	XLR-4-11C	XLR-5-11C
Equivalent	Switchcraft	A3F	A4F	A5F

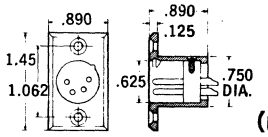


Pin Contacts

Number of Contacts		3	4	5
Part Number		91-453	91-457	91-461
Electrical	Cannon	XLR-3-12C	XLR-4-12C	XLR-5-12C
Equivalent	Switchcraft	A3M	A4M	A5M

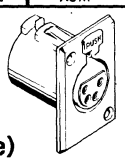
Wall Mounting Receptacles

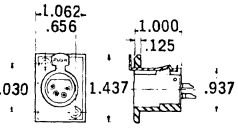




Pin Contacts (mates with above)

Number of Contacts		3	4	5
Part Number		91-455	91-459	91-463
Electrical	Cannon	XLR-3-32	XLR-4-32	XLR-5-32
Equivalent	Switchcraft	D3M	D4M	D5M



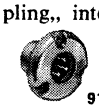


Socket Contacts (mates with above)

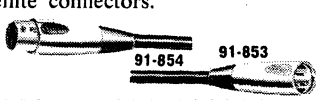
Number of Contacts		3	4	5
Part Number		91-456	91-460	91-464
Electrical	Cannon	XLR-3-31	XLR-4-31	XLR-5-31
Equivalent	Switchcraft	D3F	D4F	D5F

91 Series Qwik Connectors

Similar to above except constructed of die-cast zinc with satin nickel plate. Bronze contacts are gold-plated over silver. Dielectric is blue diallyl phthalate. Features easy push-button coupling,, intermates with Excellite connectors.


91-855

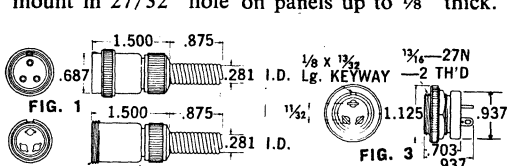
91-856



Description	3 Contacts	4 Contacts
Plug, Pin Contacts	91-853	91-857
Jack, Socket Contacts	91-854	91-858
Chassis Receptacle, Pin Contacts	91-855	91-859
Chassis Receptacle, Stocket Contacts	91-856	91-860

91 Series Threaded Coupling

Popular style connector for 2-way radios, P.A. systems, etc. Threaded coupling provides positive mating. Brass shell with bright chrome plating, black phenolic dielectric. Receptacles mount in 27/32" hole on panels up to ⅛" thick.



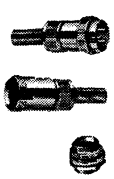


Fig.	Description	3 Contacts	4 Contacts	6 Contacts
1	Plug, Pin Contacts	91-MC3M	91-MC4M	91-MC6M
1	Plug, Socket Contacts	91-MC3F1	91-MC4F1	—
2	Jack, Socket Contacts	91-MC3F	91-MC4F	91-MC6F
2	Jack, Pin Contacts	91-MC3M1	91-MC4M1	—
3	Receptacle, Socket Contacts	91-PC3F	91-PC4F	91-PC6F
3	Receptacle, Pin Contacts	91-PC3M	91-PC4M	91-PC6M
—	Cap & Chain for Receptacle	91-CCC3	91-CCC3	91-CCC3

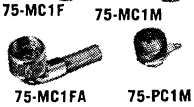
Also available in nickel plating. Substitute N for C in part number.

75 Series Single Contact

Standard type used on microphones, amplifiers, speakers, transmitters, etc. Brass machined shells with chrome finish. Threaded coupling and unique button contact permits plugs to be converted to jacks by removal of coupling ring. Receptacles mount in .385" holes when grounding. .500" holes for ungrounded two circuit operation. Spring cord protection for ¼" cable.

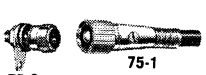
Description	Part No.
Chassis Receptacle	75-PC1M
Chassis Receptacle, Closed Circuit	75-CL-PC1M
Straight Plug	75-MC1F
Cable Jack	75-MC1M
Angle Plug	75-MC1FA
Cap & Chain	75-CCC1
Phone Plug Adapter	75-MC1P
Microphone Switch	75-MC1S

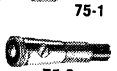
75-MC1F 75-MC1M


75-MC1FA 75-PC1M

Miniature 75 Series

Miniature version of the above, receptacle mounts in 13/64" chassis hole. Machined brass shell with satin-nickel plating.


75-3 75-1


75-2

Description	Part No.
Plug	75-1
Jack	75-2
Receptacle	75-3

80 Series Single & Double Contacts

Solid brass shells with polished chrome finish. Single or double pin type contacts for shielded cables, etc. Receptacles mount in ⅝" hole in panels up to 11/32"

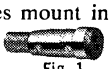


Fig. 1

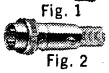


Fig. 2

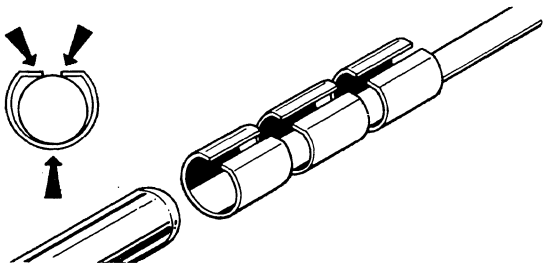
Fig. 3

Fig.	Description	1 Contact	2 Contacts
2	Plug, Pin Contacts	80-M	80-MC2M
2	Plug, Socket Contacts	80-F1	80-MC2F1
1	Jack, Socket Contacts	80-F	80-MC2F
1	Jack, Pin Contacts	80-M1	80-MC2M1
3	Recept., Socket Contacts	80-C	80-PC2F
3	Recept., Pin Contacts	80-C1	80-PC2M
—	Cap & Chain for Recept.	75-CCC1	75-CCC1

MICROPHONE CONNECTORS

BUNKER RAMO AMPHENOL

91 Series Miniature Connectors



These miniature audio/electronic cable to panel connectors are available with up to 12 contacts in straight or right angle plug styles. Approximately 33% smaller than Amphenol's standard 91 Series coupling ring connectors, these miniatures are intermateable with some types of imported European electronic equipment. They provide high density, low cost, top quality interconnections for many modern equipment requirements.

Screw-Lock Coupling Style

SPECIFICATIONS

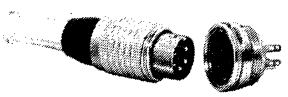
Current Rating: 3 amps per contact

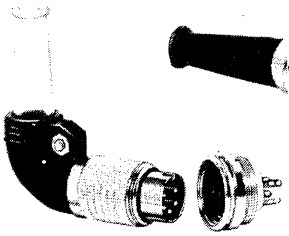
Voltage Rating: 2, 3, 4, 5, 6, & 7 contacts — 120V 12 contact — 60V

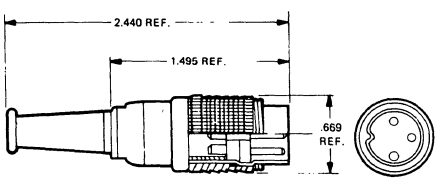
Dielectric: Black polycarbonate

Contacts: Pin — Silver plated brass Socket—Silver plated phosphor bronze

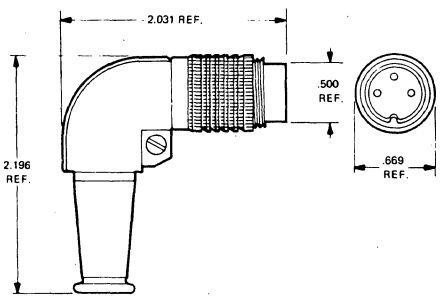
Wire Size: 20 ga.



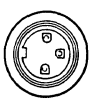


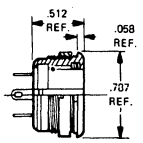


STRAIGHT PLUG

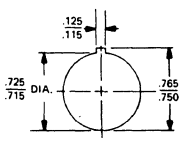


RIGHT ANGLE PLUG





RECEPTACLE



PANEL CUTOUT

Friction Lock Coupling Style

SPECIFICATIONS

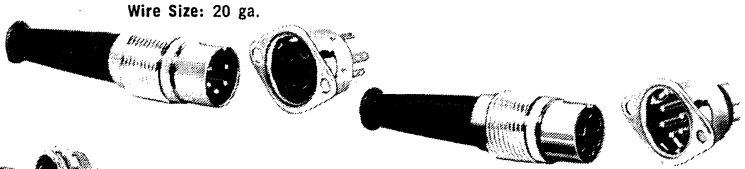
Current Rating: 3 amps per contact

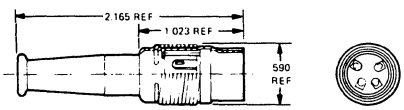
Voltage Rating: 1 contact — 750V; All others — 120V

Dielectric: Black molded polycarbonate

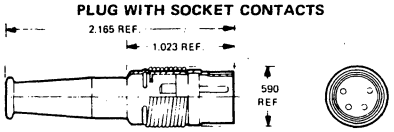
Contacts: Pin — Silver plated brass contacts with solder pot tails Socket — Silver plated phosphor bronze spring type contact with pre-tinned solder eyelet tails

Wire Size: 20 ga.

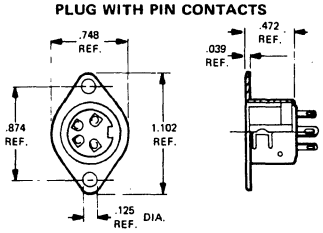




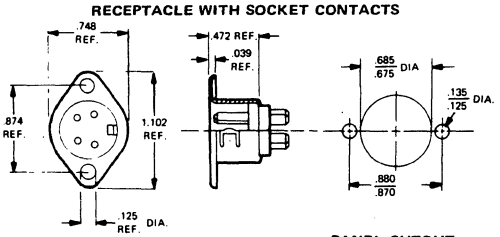
PLUG WITH SOCKET CONTACTS



PLUG WITH PIN CONTACTS

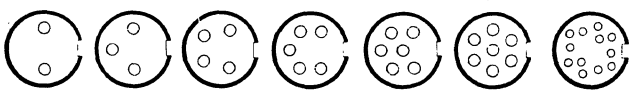


RECEPTACLE WITH SOCKET CONTACTS



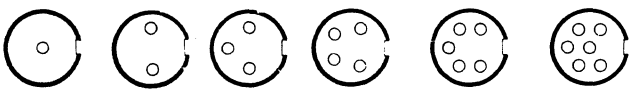
RECEPTACLE WITH PIN CONTACTS

PANEL CUTOUT



Ordering Information

Number of Contacts	Part Numbers		
	Cable Plugs		
	Straight	Right Angle	Panel Receptacles
2	91-T-3200-1	91-T-3200-6	91-T-3203
3	91-T-3260-1	91-T-3260-6	91-T-3263
4	91-T-3300-1	91-T-3300-6	91-T-3303
5	91-T-3360-1	91-T-3360-6	91-T-3363
6	91-T-3400-1	91-T-3400-6	91-T-3403
7	91-T-3475-1	91-T-3475-6	91-T-3478
12	91-T-3635	91-T-3635-6	91-T-3638



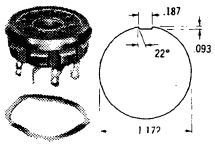
Ordering information

Number of Contacts	Part Numbers			
	Cable Plug With Pin Contacts	Panel Receptacle With Socket Contacts	Cable Plug With Socket Contacts	Panel Receptacle With Pin Contacts
1	91-T-3165	91-T-3168	91-T-3166	91-T-3167
2	91-T-3205	91-T-3208	91-T-3206	91-T-3207
3	91-T-3265	91-T-3268	91-T-3266	91-T-3267
4	91-T-3305	91-T-3308	91-T-3306	91-T-3307
5	91-T-3365	91-T-3368	91-T-3366	91-T-3367
6	91-T-3405	91-T-3408	91-T-3406	91-T-3407

TUBE/RELAY SOCKETS

BUNKER RAMO AMPHENOL

S Type



Retainer ring mounting. Black Phenolic and Mica Filled Phenolic. For 22 gauge (.031") to 18 gauge (.050") panel thickness. May be grooved on special order up to 13 gauge (.093"). Steatite fits .031" to .093" panels.

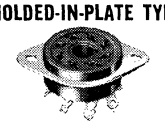
Contacts	Contacts	Black Phenolic	Mica Filled	Steatite
4	Brass	78-S4	—	49-SS4
5	Brass	78-S5	—	49-SS5
6	Brass	78-S6	—	49-SS6
7	Brass	78-S7S	—	49-SS7S
8 Octal	Luballoy	78-S8	78-S8T*	49-SS8
8 Loctal	Luballoy	78-S8L	—	—
9	Luballoy	78-S9	—	—
11	Luballoy	78-S11	78-S11T*	—
12	Luballoy	78-S12	—	—
16	Luballoy	78-S16	—	—

Mounting Plate Type

REPLACEMENT TYPE S

Same as Type S, but with mounting plate assembled with retainer ring. Mounting plate slotted holes for 1½" to 1 55/64" centers. Use 6-32 screw.

MOLDED-IN-PLATE TYPE



5/32" mtg. holes on 1½" centers

Contacts	Black Phenolic	Mica Filled	Steatite #	Black Phenolic	Mica Filled
4	78-RS4*	—	49-RSS4	77-MIP-4	77-MIP-4T*
5	78-RS5*	—	49-RSS5	77-MIP-5	77-MIP-5T*
6	78-RS6	—	49-RSS6	77-MIP-6	77-MIP-6T*
7	78-RS7S	—	49-RSS7S	77-MIP-7S	77-MIP-7ST
8 Octal	78-RS8*	78-RS8T*	49-RSS8	77-MIP-8	77-MIP-8T*
8 Loctal	78-RS8L	—	—	—	—
9	78-RS9	—	—	77-MIP-9	77-MIP-9T
11	78-RS11	78-RS11T*	—	77-MIP-11	77-MIP-11T*
12	—	—	—	77-MIP-12	77-MIP-12T*
16	78-RS16	—	—	—	—
20	—	—	—	77-MIP-20	—

** Military version available with silver plated contacts and, where applicable, stainless steel mounting plate. Add suffix "M" to catalog number. Example: 77-MIP-8TM.*

 # Bottom mounted, requires 1¼" chassis holes;

Printed Circuit Sockets

Standard socket series 77MIP and 78S of eight or more contacts for mounting directly to printed circuit boards. Luballoy contact tails are ⅛" long and mount through 1/16" diameter holes.

TO ORDER

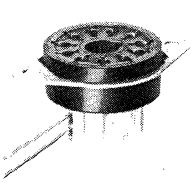
Add suffix -W-0125 to part number, i.e. 77MIP(X)-W-0125 or 78S(X)-W-0125.

Wire Wrap Sockets

Standard socket series 77MIP and 78S of eight contacts or more have ½" long contact tails for wire wrap termination. Standard contacts are .016" thick, rated 3 amps for 22 ga. wire. Heavy duty contacts are .025" thick, rated 7.5 amps, for 16 ga. wire.

TO ORDER

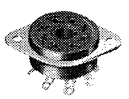
Add suffix -W-0500 to part number, i.e. 77MIP(X)-W-0500 or 78S(X)-W-0500 for standard contact. Add -W-0525 for heavy duty contact.



Compact "MIP" Sockets

Similar to standard MIP, but smaller. 1⅛" mounting hole. Two .136" screw holes on 1 7/16" centers. 8 contacts only. Phosphor bronze contacts.

*88-8	Octal, Black Phenolic
*88-8T	Octal Mica Filled Phenolic
*88-8TM	Octal Mica Filled Phenolic with silver plated contacts and stainless steel mounting plate
88-8X	Loctal Black Phenolic



Saddle Type Octal

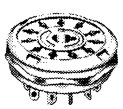
Octal socket with 4 ground lugs for below chassis mounting and 2 9/64" holes on 1.312" centers for above chassis mounting. Black phenolic dielectric.

168-001	Wrap around contacts, Brass
*168-015	Tuning fork contacts, Luballoy

* Also available with printed circuit or wire wrap terminals

Steatite Magnal Socket

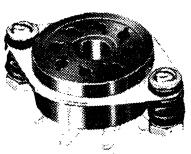
49-SS11L	11 contacts for TV or CRT. Retainer ring mounted in 1 5/8" chassis hole. 1 1/16" pin circle



Floating MIP Sockets

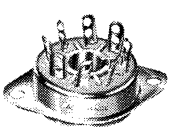
For vibration-free operation.

77-MIP-8FK	Octal. Complete with 4 rubber grommets, 2 mounting screws, nuts and washers.
77-3K	Kit for making any "MIP" into floating socket. 4 grommets, 2 mounting screws, nuts and washers. MIP screw holes must be enlarged to ¼" diameter.
77-MIP-8F	Socket only. Same as 77-MIP-8, but with ¼" mounting holes.



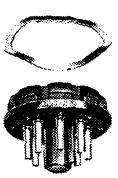
MIP, Cloverleaf Contacts

59-103	Octal. Same dimensions as standard MIP. Mica-filled phenolic, stainless steel mounting plate, cloverleaf contacts hot tinned dipped.



Plugs*

Phenolic bodies, nickel plated brass contacts. Polarized to prevent mismating. Mate with tube sockets shown on this page.



CP TYPE
Use with plug caps or mount on panel with retainer ring. Same grooves as 78S tube sockets.

REPLACEMENT TYPE
Removable plate.

SPEAKER
For cable mounting only.

Contacts	Black Phenolic	Mica Filled	Black Phenolic	Black Phenolic
4	86-CP-4	—	86-RCP-4	71-4
5	86-CP-5	—	86-RCP-5	71-5
6	86-CP-6	—	86-RCP-6	71-6
7	86-CP-7S	—	86-RCP-7S	71-7
8 Octal	86-CP-8	86-CP-8T	86-RCP-8	70-8
9	86-CP-9	86-CP-9T	86-RCP-9	70-9
11	86-CP-11	86-CP-11T	86-RCP-11	—
12	86-CP-12	—	86-RCP-12	70-12
16	86-CP-16	—	—	—
20	—	—	—	70-20

**Mate with Tube Sockets on this page.*

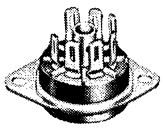
PLUGS AND SOCKETS

BUNKER RAMO AMPHENOL

Miniature Sockets

Phosphor bronze contacts with cadmium plating except as noted. Rated 500 V (RMS) at 1 Amp.

Mounting	Mounting Hole	Rivet Hole Centers with Tube
7 Pin Sockets	5/8"	7/8"
9 Pin Sockets	3/4"	1 1/8"



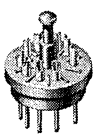
Contacts	Dielectric	Center Shield	Standard Bottom Mtd.	Shield Base Top Mtd.
7	Black Phenolic	Large	147-500	147-905
7	Black Phenolic	None	147-504	—
7	Mica Filled	Small	147-505	147-913
7	Mica Filled	Small	—	147-916*
7	Mica Filled	None	147-170-20	—
7	Mica Filled	None	147-840*	—
9	Black Phenolic	Large	59-409	59-406
9	Mica	Large	59-410	59-407
9	Mica	Large	59-412*	59-403*
9	Mica	None	59-411	59-405
9	Black Phenolic	Large	—	59-461
9	Mica	Large	59-410-1000	—
9	Black Phenolic	None	59-446	—

*Beryllium copper silver-plated contacts.

Miniature Plugs

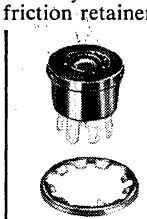
Mates with 7 and 9 pin sockets above, Diallyl Phthalate with gold over silver plated brass contacts. 1500 V RMS at 5 Amps. Molded-in strain relief post.

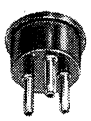
	7 Pin	9 Pin
Plug	86-896	86-893
Plug with rubber cap	86-895	86-897
Plug with rubber cap, side outlet	86-894	—

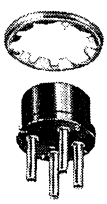


Miniature Speaker, Plugs and Receptacles

Molded of black phenolic, with nickel-plated brass contacts in plugs, copper alloy in receptacles. Mounts in 5/8" hole, round or D, with friction retainer ring.





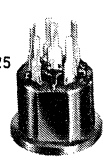


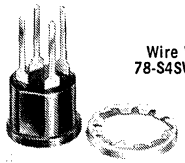
Contacts	Receptacle	Mates with 78-SXS at Left	Mates with 78-SXS at Left
3	78-S3S	71-3S	86-CP-3S
4	78-S4S	71-4S	86-CP-4S
5	78-S5S	71-5S	86-CP-5S
6	78-S6S	71-6S	86-CP-6S
7	78-7P	—	—

Miniature Sockets with P.C. and Wire Wrap Terminations

Same as 78-SXS receptacles above except have contact tails designed for P.C. board or wire wrap termination.

P.C. Mount
78-S5SW-0125





Wire Wrap
78-S4SW-0500

Contacts	Copper Alloy Contacts with 1/8" x 1/16" P.C. Tails. Has .020" Shoulder	Copper Alloy Contacts with 1/2" x 1/16" Tails for Wire Wrapping: Standard .016" Thick Tail for 22 Ga. Wire 3 Amps.	Copper Alloy Contacts with 1/2" x 1/16" Tails for Wire Wrapping: Heavy Duty .025" Thick Contact for 16 Ga. Wire, 7.5 Amps.
3	78-S3SW-0125	78-S3SW-0500	78-S3SW-0525
4	78-S4SW-0125	78-S4SW-0500	78-S4SW-0525
5	78-S5SW-0125	78-S5SW-0500	78-S5SW-0525
6	78-S6SW-0125	78-S6SW-0500	78-S6SW-0525

Relay and Tube Base

Black phenolic base with nickel-plated brass contacts. Rated 1250 V (RMS) at 5 Amps.

Part Number	Contacts	Outside Diam.	Pin Circle	Center Post
50-035	3	.695"	.343"	No
50-801	8	1.301"	.687"	Yes
50-820	11	1.301"	.750"	Yes

Lamp Socket

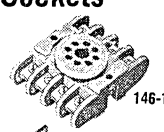
For medium base prefocused lamps. 1000 watts. 110/250 volts, UL approved.

98-8	Phenolic, to 450°F.
98-1	Steatite, to 1800°F.

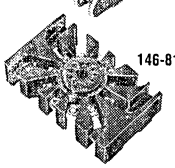
Relay Sockets/Industrial Tube Sockets

Heavy duty octal socket with barrier-protected screw type terminals. 1250 V RMS at 5 Amps. Two .156 mtg. holes on 1.688 centers. Molded one piece melamine construction.

Top Mounting		Bottom Mounting
146-103	No Tie Points	146-203
146-104	With 4 Tie Points	146-204



146-103



146-817

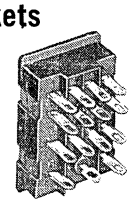
146-817 (11 contacts) — Melamine dielectric, phosphor bronze contacts with solderless reversible screw terminals. 600 V (RMS) at 10 Amps. Two .156 mtg. holes on 4.187 centers. May be gang mounted.
59-106 (14 contacts) — Mica-filled dielectric, phosphor bronze contacts.
59-470 (20 contacts) — Diallyl phthalate with beryllium copper contacts.

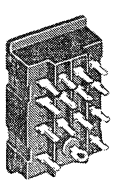
59-470

59-106

Rectangular Relay Sockets

Economical 14 contact socket for popular 4 pole, double throw general purpose relays. Available in solder eyelet termination with panel mounting clip or dip solder terminations for PC board mounting. Cadmium plated brass contacts in molded phenolic dielectric rated 7½ amps at 600 volts.



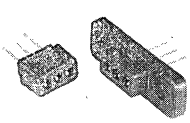


59-133 Solder eyelet contacts
59-134 Printed circuit contacts

SCR Sockets

Three contact receptacle designed to accept General Electric Company's C106 SCR (Silicone controlled rectifier). Nickel silver contacts. Black nylon insulator. Voltage rating: 500 volts (RMS). Current rating: 5 Amps. Contact spacing: .200" centers. Mating engagement depth: .160" min. Contact length: Approximately .323" x .020" square. Contact tails designed for wire wrap or printed circuit board mounting.

77-115	Press fit style without flange. To fit rectangular panel or chassis cut dimensions .335 ±.005" x .1625 ±.0015".
77-116	Molded mounting flange has two .125" diameter mounting holes on .625" centers. Assembly fits out .325" x .200".



Heavy Duty Side Mount Socket

For 4 contact industrial tubes.

AMPHENOL Number	With Retaining Clip	With Terminal Block	With Bottom Cover	With Underwriter's Shield	For Jumbo 4-Pin Tubes	For UX4-Pin Tubes
146-105	X		X		X	
146-106	X				X	
146-107	X	X	X		X	
146-109				X		X
146-110				X		X

NOTE — Bottom Cover 146-910 may also be used with 146-109 and 146-110 sockets.

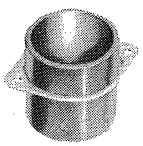
CONNECTORS AND HARDWARE

BUNKER RAMO **AMPHENOL**

Duodecal & Diheptal Sockets

For TV and CRT tubes. Removable socket cap and body of molded phenolic. 2000 V (RMS) at 10 Amps.

Part No.	Description
59-402	Duodecal socket for a max. of 12 equally spaced pins on a circle diam. of 1.063″.
59-415	Diheptal sockets for a max. of 14 equally spaced pins on a circle diam. of 1.750″. **Small—for 2.050″ D. Tube Base.**
59-417	Diheptal sockets for a max. of 14 equally spaced pins on a circle diam. of 1.750″. **Medium—for 2.250″ D. Tube Base.**



High Voltage Sockets

For rectifiers, power supplies and other high voltage uses. Steel mounting plate.

Part No.	Contacts	Dielectric	For Tube Diam.	Mounting Information	
146-101	8	Melamine	1.377″ Max.	2 .136″ dia. holes on 2.031″ centers	1.150″ cutout
77A-4T	4	Phenolic	1.156″	2 5/32″ dia. holes on 1 7/8″ centers	1½″ cutout

Grid Cap

63-1	For tube grid caps, ¼″ to ½″ diameter.

Tube Shields

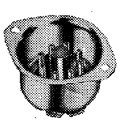
Cadmium plated steel with internal spring holds tube securely.

	Miniature Tube	Maximum Tube Length
5-401	7 Pin	1 3/16
5-402	7 Pin	1¾
5-405	9 Pin	1½
5-408	9 Pin	1 15/16
5-409	9 Pin	2⅜

Recessing Shells

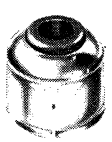
For use with 78S, 86CP, 60, 61 and 160 Series plugs and sockets.

23-1S	Aluminum. Raise or recess 1 3/16″. 1¾″ mounting hole, uses 3 No. 6 screws.
61-61	Cadmium plated steel. Recesses unit 1 3/16″. Mounts in 1 7/16″ hole. Two 5/32″ mounting holes on 1¾″ centers.



Caps

Thermoplastic



Rubber Grommet

Side Outlet Rubber Grommet

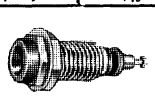
Cable Clamp

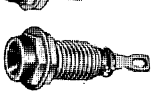
Makes inexpensive cable connectors of standard sockets, plugs and receptacles such as 78, 60, 61, 86 and 160 Series. For applications requiring frequent mating and unmating use 3-858 or 3-859 with molded finger grip.

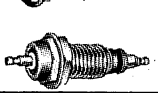
FINISH				
Black Thermoplastic	Black Epoxy	Clear Cadmium	Cable Outlet	Maximum Cable O.D.
—	3-10	3-10-1000	None	Dust Cap
—	3-12	—	Metal	5/16″
—	3-13	3-857	Rubber	7/16″
—	3-17	—	Side, Rubber	7/16″
—	3-24	3-856	Cable Clamp	3/8″
3-858	—	—	Finger Grip Style	5/16″
3-859	—	—	Finger Grip Style	5/16″

Tip Jacks

Nylon body with recessed silver plated contact. For .080″ dia. phone tip. Tinned terminal. ¼″ mounting hole. Add suffix to catalog number to indicate color.





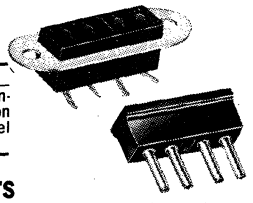


350-29175-* Turret Terminal
350-29200-* Spade Terminal
350-50200-* Feed-thru
**Suffix Color Numbers.*

-1 Red
-2 Black
-3 Brown
-4 Green
-5 Orange
-6 White
-7 Blue

Rectangular Connector

70-26	4 contact cable plug
77-26	4 contact receptacle, molded-in-plate, two 5/32″ screw holes on 1 3/8″ centers. 5/16″ x 1 1/16″ panel cutout



Miniature Cable Connectors

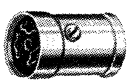
Black phenolic dielectric in cadmium plated brass shell. Polarized contact spacing. Plugs and receptacles take cables up to ¼″ diameter. Panel receptacle mounts in ⅞″ hole with two 6-32 screw holes on 1¼″ centers.

Rated 3 Amp., 500 Volts.

PLUGS

Contacts	Long	Short
3	91-MPM-3L	91-MPM-3S
4	91-MPM-4L	91-MPM-4S
5	91-MPM-5L	91-MPM-5S
6	91-MPM-6L	91-MPM-6S

CABLE RECEPTACLES

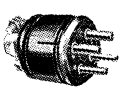


SHIELDED PANEL RECEPTACLES

Contacts	Long	Short	Mates With Long Plugs
3	91-MPF-3L	91-MPF-3S	78-PCG3
4	91-MPF-4L	91-MPF-4S	78-PCG4
5	91-MPF-5L	91-MPF-5S	78-PCG5
6	91-MPF-6L	91-MPF-6S	78-PCG6

Light Duty Connectors**

Rubber Grommet



Cable Clamp

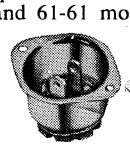
Contacts	Pin Contacts	Socket Contacts	Pin Contacts	Socket Contacts
4	86-PM4	78-PF4	86-PM4-11	78-PF4-11
5	86-PM5	78-PF5	86-PM5-11	78-PF5-11
6	86-PM6	78-PF6	86-PM6-11	78-PF6-11
7	86-PM7S	78-PF7S	86-PM7S-11	78-PF7S-11
—	—	—	—	—
8	86-PM8	78-PF8	86-PM8-11	78-PF8-11
9	86-PM9	78-PF9	86-PM9-11	78-PF9-11
11	86-PM11	78-PF11	86-PM11-11	78-PF11-11
12	86-PM12	—	86-PM12-11	—
—	—	—	—	—
20	86-PM20	—	—	—

** *For cable to cable application, mate with each other. For cable to panel applications, mate with type S, RS, and MIP tube sockets. Do not use where frequent mating and unmating is required. Use 3-858 molded cap with finger grip.*

110/220 Volt Plugs and Receptacles

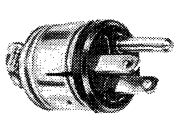
UL listed except for 160-10, and 160-11. Used with Series 3 caps, 23-1S and 61-61 mounting plates.

61-M



61-M10

160-2-N



160-9-N

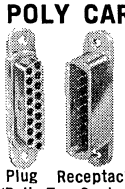
Mounting	Standard Plug	2 Pole Black Phenolic 15 Amp. 125 Volts Plug Polarized	2 Pole Black Phenolic 15 Amp. 125 Volts Recep-tacle	2 Pole With Ground Blk Thermoplastic 15 Amp. 125 Volts Plug	2 Pole With Ground Blk Thermoplastic 15 Amp. 125 Volts Recep-tacles	3 Pole Blk Phenolic 15 Amp. 125 Volts Plug	3 Pole Blk Phenolic 15 Amp. 125 Volts Recep-tacle
Retaining Ring	61-M	61-MP	61-F	160-11-N	160-10-N	60-M	60-F
Mounting Plate and Retainer Ring	61-M1	61-MP1	61-F1	160-3-N	160-2-N	60-M1	60-F1
Molded-in-Plate	—	—	61-MIP-61F	—	—	—	—
Recessed Housing	61-M10	61-MP10	61-F10	160-5-N	160-4-N	—	—
WITH STEEL CAP FOR CABLE							
Rubber Grommet	61-M4	61-MP4	61-F4	160-7-N	160-6-N	60-M4	60-F4
Cable Clamp	61-M11	61-MP11	61-F11	160-9-N	160-8-N	60-M11	60-F11

MINIATURE CONNECTORS

BUNKER RAMO AMPHENOL

223 Series Tiny Tim® Connectors

5 TO 33 CONTACTS
POLY CARBONATE OR NYLON CONSTRUCTION



Plug Receptacle
(Relia-Tac Contacts Illustrated)

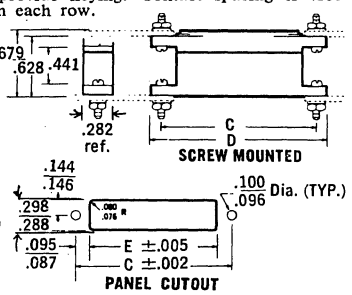
Exceptional interconnections for circuit modules, either potted-in or surface mounted, and can also be used as micro-miniature rack-and-panel, cable-to-cable, and cable-to-panel connectors.

The positive mating is the result of the snap latch engagement locking device molded into the connector body. Contact identification numbers are also molded in.

Trapezoidal mating faces are used for polarization. Guide pins provide keying. Contact spacing is .100" on centers on each row.

SPECIFICATIONS

Temperature Range:
−55°C to +125°C
Current Rating:
3 amps (Wire-Form contacts).
5 amps (all other contacts).
Voltage Rating:
1500 VAC (RMS) at sea level.
375 VAC (RMS) at 70,000 ft.
Dielectric:
Polycarbonate resin. (Nylon also available).
Contact factor for performance specifications



No. of Contacts	E Length of Cutout	C Mounting Centers	D ref. Overall Length
5	.410	.593	.843
9	.610	.793	1.043
17	1.015	1.193	1.443
25	1.410	1.593	1.843
33	1.810	1.993	2.243

Ordering Information

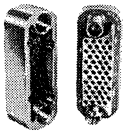
223- 1 1 17

Series Designation 223
Method of Mounting 1—Screw Mount
Number of Contacts 05, 09, 17, 25, 33
Insert Style
1—Plug, Lexan (Green)
2—Receptacle, Lexan (Green)
5—Plug, Nylon (Black)
6—Receptacle, Nylon (Black)

NOTE: Order Contacts Separately
Use Wire-Form pin contacts for plugs, socket contacts for receptacles.
Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

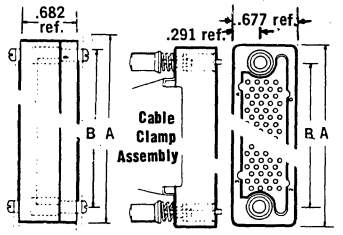
220 Series Micro-Rac®

RACK AND PANEL APPLICATIONS: 52 AND 104 CONTACTS
FLOAT MOUNTED: LOW COST HIGH CONTACT DENSITY

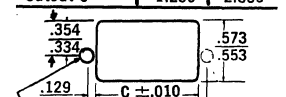


Mono-block construction. Contact identification numbers are molded in. Polarization is achieved by a trapazoidal mating area and keying with the use of guide pins or keying by molded-in slot-and-key arrangements.

Cable clamp assemblies are available for both sizes. Special size connectors can be supplied if needed. Environmental resistance can be added.



		No. of Contacts 52	104
Dim. Access.	Potting Mold	220-635	220-634
	Cable Clamp	220-5	220-6
	Max. Length A	1.888	3.017
	Mtg. Ctrs. B	1.492	2.611
	Cutout C	1.250	2.359



.094 Dia. (2 Holes) for Float Mtg. Only. .172 Dia. (2 Holes) for Mtgs. Other Than Float.

Ordering Information

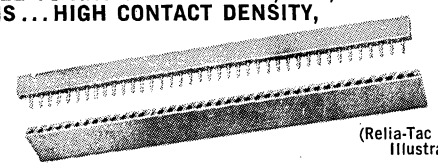
Series Designation 220- 1 N 104

Insert Style
1—Plug (Lexan)
2—Receptacle (Lexan)
(Includes Hardware)
Number of Contacts 052, 104
Connector Class N—Non-environmental

NOTE: Order Contacts Separately
Use Wire-Form pin contacts for plugs, socket contacts for receptacles.
Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

221 Series Strip Connectors

ADAPTABLE TO ANY SHAPE: STACK, CUT, CUT AND STACK, USE AS IS... HIGH CONTACT DENSITY,



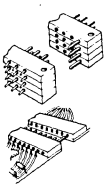
(Relia-Tac Contacts Illustrated)

AMPHENOL Strip Connectors are highly reliable, low cost micro-miniatures with great application versatility. They are furnished in 4" and 6" lengths, but you can cut and stack them to whatever configuration you need to satisfy your various application requirements.

If you want, AMPHENOL can do it all for you promptly and economically — cut the connectors to the length you want, make mounting holes, cut leads to length, and crimp, or solder them to the contacts.

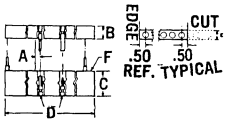
Strip connectors use Poke-Home contacts and perform superbly. Where keying is desired, guide pins are inserted in two or more plug strip contact holes.

Because Strip connectors are injection molded, special configurations can be produced quickly and inexpensively.



Strips can be used in stacked arrangement. Should be stacked parallel only.

PC board application using strip connectors.



RELIA-TAC CONTACT OR WIRE-FORM CONTACT
CUSTOM LENGTH
Number of holes multiplied by contact center dimension equals approximate length of strip.

Description	A Contact Centers	B	C	D	E	F Contact Positions
6" Plug Strip	.100	—	.456	6.00	.105	60
6" Receptacle Strip	.100	.230	—	6.00	.105	60
4" Plug Strip	.075	—	.456	4.00	.105	53
4" Receptacle Strip	.075	.230	—	4.00	.105	53
4" Plug Strip	.050	—	.281	4.00	.075	80
4" Receptacle Strip	.050	.218	—	4.00	.075	80

Ordering Information

Standard and custom lengths.

Series Designation 221 - 1 5 02

Contact Centers
1—.100 in.
2—.075 in.
3—.050 in. (only Nylon)

Insert Style
1—Plug, polycarbonate
2—Receptacle, polycarbonate
5—Plug, Nylon
6—Receptacle, Nylon

Number of Contact Holes needed: from 02 to 60 on .100 centers (standard 6" strip contains 60 holes); from 02 to 53 on .075 centers (standard 4" strip contains 53 holes); from 02 to 80 on .050 centers (standard 4" strip contains 80 holes).
Note: Must use 2 digits.

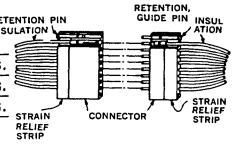
Note: Order contacts separately. Use Wire-Form pin contacts for plugs; socket contacts for receptacles. Use Relia-Tac pin contacts for receptacles; socket contacts for plugs.

Strain Relief Strips Protect Wire

AMPHENOL has a solution to the problem of excessive flexing that breaks wire strands in cable-terminated applications. Strain relief strips are available to encase and protect the wire in the crimp area at the rear of the strips. Molded in black Nylon 6/6 material, the strips can be ordered to match any Amphenol strip connector. Held in place by retention pins, which can also be used as a guide pin.

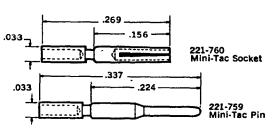
Ordering Information

221-9160—for use with strip connectors on .100 ctrs.
221-9253—for use with strip connectors on .075 ctrs.
221-9380—for use with strip connectors on .050 ctrs.



Mini-Tac Contacts

(Sub-miniature Relia-Tac contacts for .050" center mini-strip connectors only).
Current Rating: 3 Amps.
Wire Size: 26 to 32 ga. stranded wire.



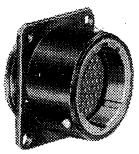
Poke-Home® Guide Pins

Poke-Home guide pins when seated in plug inserts serve functions of polarizing, keying or connector alignment. They can be used in conjunction with either Relia-Tac or Wire Form contacts. Contact factory for information.

CIRCULAR INDUSTRIAL CONNECTORS

BUNKER RAMO AMPHENOL

224 Series Ultra-Mite Connectors



Square flange plug shell, receptacle insert

Cable plug shell, plug insert

Single hole mount plug shell, plug insert

Cable receptacle shell, receptacle insert

Cable receptacle shell, plug insert

Premium Performance For Every Design Budget

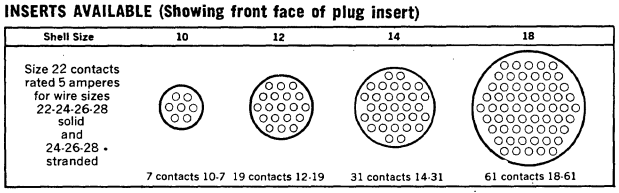
AMPHENOL Ultra-Mite connectors are a complete line of non-environmental (Class N) and environmental (Class P) connectors at prices that fit into every design budget. The connectors are available as straight plugs and square flange, single hole mounting and cable receptacles. Either plug or socket contact inserts may be selected for any of the four available shell styles. High density contact arrangements offer 7, 19, 31 and 61 contacts.

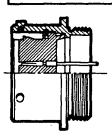
The standard Ultra-Mite insert material is an exceptional low cost plastic capable of withstanding temperature constants of up to 325°F Also available in nylon upon request. No-scoop construction, another quality feature, prevents damage to pin contacts in a connector when the mating connector is wiped across its face, as in blind mating connections.

- **Lowest cost** complete High-Density Miniature connector family available.
- High performance-potted constructions meet and exceed MIL-C-26482.
- Completely subminiaturized connectors with high contact density — 61 contacts in a size 18 shell.
- Size 22 Poke-Home contacts
- Lightweight — about 25% that of standard connectors with the same number of contacts.
- All Class "P" receptacles have dynamic O-Ring shell seal.
- Bayonet lock — 3 pin spring loaded coupling ring for quick disconnect.
- Crimp contact terminations.
- 5 key polarization.
- Cable clamps for strain relief.
- Connector identification molded in front and back.
- Natural recess in rear of connector for potting.

ARRANGEMENTS

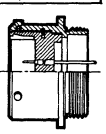
INSERTS AVAILABLE (Showing front face of plug insert)





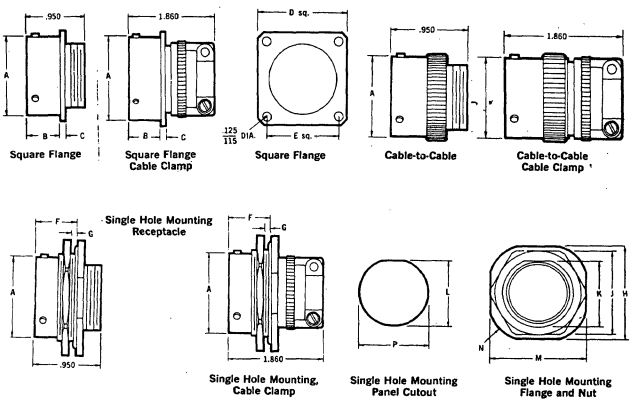
Square Flange Shell with Plug Insert

Square Flange Shell with Socket Insert



Plug or Socket Inserts in any Shell Style

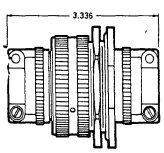
Panel Mount Shells



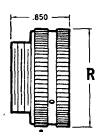
Shell Dimensions

CONNECTORS

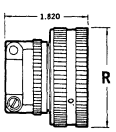
Ultra-Mite connector classes "N", "P" are available in four shell styles — Straight Plug, Square Flange, Single Hole Mounting, and Cable-to-Cable. The standard Ultra-Mite coupling is bayonet lock for quick disconnect. All plugs have threaded back ends to accept cable clamps or potting forms.



Class "N" Mated



Standard Bayonet Coupling Shell



with Cable Clamp

Shell Size	DIMENSIONS "R" Dia. Max.
10	.906
12	1.078
14	1.141
18	1.375

DIMENSIONS

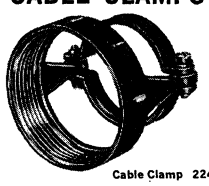
Shell Size	A Dia.	B Max.	C Max.	D ±.015	E ±.015	F Max	G Panel Thickness	H Max.	J Max.	K ±.003	L ±.005	M Panel Nut Max.	N Max.	P ±.005
10	.659	.620	.067	.938	.719	.650	.109	1.109	.953	.718	.730	1.075	1.192	.760
12	.829	.620	.067	1.031	.812	.650	.109	1.296	1.140	.905	.917	1.292	1.380	.947
14	.898	.620	.067	1.125	.906	.650	.109	1.396	1.205	.968	.980	1.396	1.505	1.010
18	1.131	.620	.067	1.312	1.062	.650	.109	1.646	1.455	1.217	1.225	1.646	1.740	1.260

Contacts

Ultra-Tac contacts are recommended for best service. Relia-Tac contacts may also be used. See listing on next page for contact specifications.

HARDWARE ACCESSORIES — CABLE CLAMPS

Cable clamps support conductors extending from plugs and receptacles and prevent twisting or pulling of the contact terminations. To order cable clamps, specify the part number of the cable clamp which corresponds to the connector shell size. For example, the correct cable clamp for a 224-16N18-61S02 plug is 224-552-18.*



Cable Clamp 224-552-00

Shell Size

POTTING

On "P" connectors, to seal the back of the connectors, potting compound is injected into the back of the shell and allowed to cure. It forms a chemical bond to the inner and outer walls of the connector, to the back of the insert, around the contact terminations and well out along the leads.

Not only is a back shell eliminated, but also the cable clamp. The contact terminations are completely and individually protected by the resilient mass which surrounds them and resists transmittal of vibration to the terminations. The potted assembly is moisture proof and resistant to contaminants.

Ordering Information

CONNECTOR PART NUMBER

To order the 224 Series Ultra-Mite connectors you want, put together the part numbers as illustrated in the following example. All connector part numbers are without cable clamps and potting forms. Order hardware accessories separately.

Plug connectors accept socket contacts only. Receptacle connectors accept pin contacts only. Relia-Tac and Ultra-Tac contacts are not intermateable.

224-16N18-61S02(100)

Series Designation 224

Coupling Type
1—Bayonet

Shell & Insert Type
0—Square Flange Receptacle
1—Square Flange Plug
2—Single Hole Plug
3—Single Hole Receptacle
4—Straight Plug Receptacle
6—Straight Plug Plug
8—Cable to Cable Plug
9—Cable to Cable Receptacle

Connector Classes
N—Non-Environmental
P—Potted (Receptacles only). ***

(Deviations)
100-less Contacts*

Contact Type
P—Pin (for receptacles only). P02 or P03.*
S—Socket (for plugs only). S02 or S03 (contacts included unless deviation 100 specified).

Number of Contacts
7, 19, 31, 61

Shell Sizes
10, 12, 14, 18

*Most economical way to order. Order contacts in bulk.

CIRCULAR INDUSTRIAL CONNECTORS

BUNKER RAMO AMPHENOL

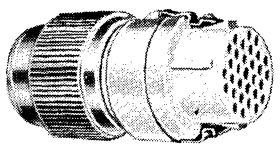
222 Series Mighty-Mite® Connectors

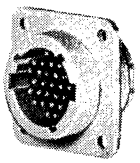
7 to 61 Contacts — .085 Contact Centers
CABLE APPLICATIONS — ENVIRONMENTAL VERSION
MEETS/EXCEEDS MIL-C-26482

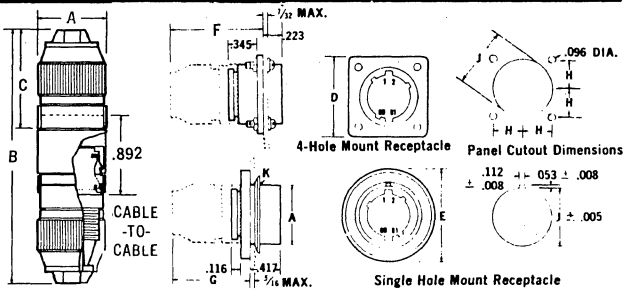
222-11N31

222-22N31

222-519







For contact arrangements, see Ultra-Mite connectors on previous page.

Superior Performance at Low Cost

AMPHENOL Mighty-Mite connectors are low cost, highly reliable micro-miniature connectors designed to serve an exceptionally wide range of cable-to-cable and cable-to-chassis applications.

Mighty-Mite connectors are available as straight plugs, single hole mounting, square flange, and cable receptacles in both standard and environmental constructions. Standard connectors are molded of one-piece, rugged polycarbonate or nylon resin. Polysulfone constructions are available for applications involving higher temperatures (up to 325°F) and where repeated contact insertions are required.

		No. of Contacts			
		7	19	31	61
DIMENSIONS	A ref. diameter	.496	.621	.746	.996
	B ref. length	2.402	2.618	2.948	3.530
	C ref. length	.854	.962	1.134	1.418
	D ref. square	.750	.875	1.000	1.250
	E ref. diameter	.940	1.065	1.189	1.444
	F ref. length	1.170	1.278	1.450	1.734
	G ref. length	.976	1.084	1.256	1.540
	H length	.250	.312	.375	.500
	J diameter	.511	.636	.761	1.011
ACC	Strain Relief Assembly No.	222-517	222-518	222-519	222-520
	Retaining Ring No.	2-310	2-311	2-312	2-313

Ordering Information

222- 1 1 N 61

Series Designation 222

Method of Mounting
1—Flangeless
2—4 hole mount receptacle
3—Single hole mount Receptacle (includes retaining ring)

Number of Contacts 07, 19, 31, 61

Connector Class: N—Non-environmental
P—Potted* (receptacle only)

Insert Style
1—Plug (Lexan)
2—Receptacle (Lexan)
3—Plug (Polysulfone)
4—Receptacle (Polysulfone)
5—Plug (Nylon)
6—Receptacle (Nylon)

* The "N" Plug is used with "P" receptacles for potted connectors.
NOTE: Order Contacts Separately.
Use Wire-Form pin contacts for plugs, socket contacts for receptacles.
Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

220 Series Contacts

FOR 220, 221, 222, 223, 224 SERIES CONNECTOR

Ultra-Tac Contacts

Top quality micro-miniature contacts. The socket contacts are hooded to resist test prod damage.

Relia-Tac Contacts

Durable, customer-proven contacts.

Part Number	Description
220-P02 (Pin) 220-S02 (Socket)	Standard, See specifications below
220-844-02 (Pin) 220-845-02 (Socket)	Same as above, except heavy gold plating and inspection hole in crimp area

Wire Form Contacts

The unique 4-member spring design of the pin exerts self-equalizing force on socket wall, reducing contact resistance. Standard crimp type contacts incorporate gold clad copper alloy wire members in copper sleeves; gold plate finish.

Pin Tail Contacts

Pin Tail Relia-Tac contacts may be used for mounting connectors directly to printed circuit boards. Can be provided with right angle bend. They cannot be used in 224 Series connectors.

Solder Cup Contacts

Can be soldered to leads before insertion or, with proper heat sink, after contacts are assembled.

Specifications	ULTRA-TAC	RELIA-TAC	WIRE FORM	PIN TAIL	SOLDER CUP
	.388, .151, .036 MIN, .051 MAX, .027, 220-P03; .433, .036 MIN, .051 MAX, 220-S03	.388, .151, .028 MIN, .051 MAX, .032, 220-P02; .404, .028 MIN, .051 MAX, 220-S02	.413, .028 MIN, .053 MAX, 220-P01; .413, .028 MIN, .053 MAX, 220-S01	.051 MAX, .095, .233, .151, .021 MIN, .032, 220-834-01; .720, .250, .024 MAX, .051, 220-815-02	.059 MAX, .496, .151, .036 MIN, .032, 220-830-02; .402, .036 MIN, .059, 220-831-02
Current (Amps) Rating	5	5	3	5	5
Contact Resistance* (ohms)	.0060	.0060	.0050 to .0060	.0050 to .0060	.0060
Wire Range (Ga.) (Solid & Stranded)	22, 24, 26	24, 26, 28	24, 26, 28	N/A	24, 26, 28
Contact Finish	Gold-over-Nickel on Copper Alloy Bodies	Gold-over-Nickel on Copper Alloy Bodies	Gold-clad Copper Alloy Wire in Gold Plated Copper Sleeves	Gold-over-Nickel on Copper Alloy Bodies	Gold-over-Nickel on Copper Alloy Bodies

* Constant to a minimum of 100 cycles of insertion and withdrawal.

Ordering Information

Minimum order quantity is 100 pieces.
Contacts can be supplied on reels for use in semi-automatic crimp machines. Contact factory.

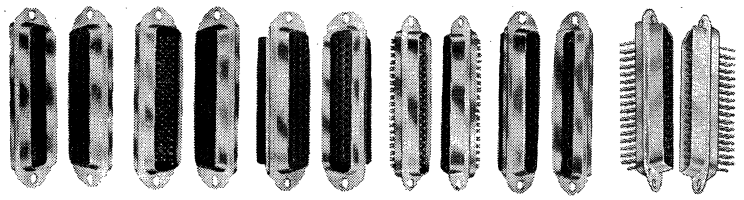
NOTE: Except for the Wire-Form design, all socket contacts are completely shrouded within the plug inserts for optimum protection against damage. Pin contacts are normally exposed when assembled into receptacle inserts. Wire-Form contact pins are to be used in plug inserts and socket contacts in receptacles.

MIN RAC CONNECTORS

BUNKER RAMO AMPHENOL

17 Series Min Rac® Connectors

- **Sub Miniature Rack and Panel**
- **Choice of Fixed or Removable Contacts.**
- **Six Styles — Unlimited Variety**
- **Intermates with all "D" Shaped Sub Miniatures.**

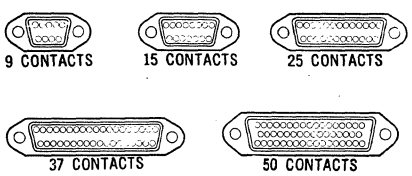


Poke Home & Hard Dielectric | High Density | Encapsulated | Fixed Contact | Power & Coax | Solderless Wrap

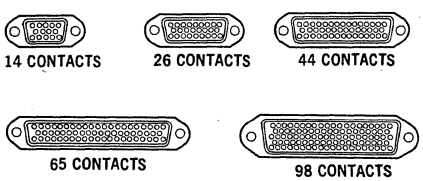
A complete line of versatile connectors offering 9 to 98 contacts in a choice of arrangements and dielectrics. Cable housings are available for cable-to-panel or cable-to-cable applications, and several locking devices are offered. These lightweight, miniature connectors are ideal for computers, telecommunications, instrumentation and avionics systems not requiring environmental capability.

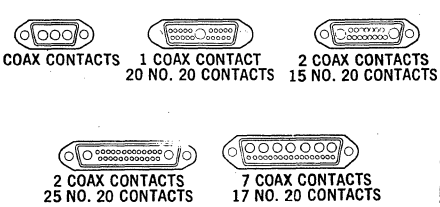
Contact Arrangements

FOR ORIGINAL POKE HOME, HARD DIELECTRIC, FIXED CONTACT, SOLDERLESS WRAP AND ENCAPSULATED CONTACT



FOR HIGH DENSITY LINE ONLY





Additional insert configurations are available. Refer to factory for information.

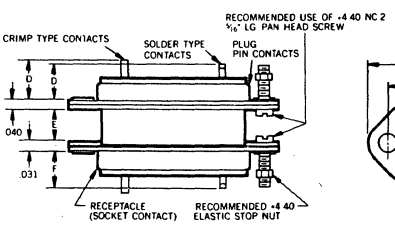
SPECIFICATIONS

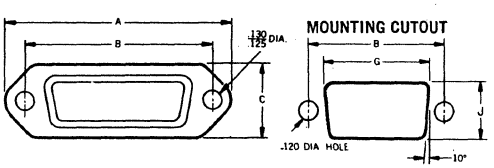
ORIGINAL POKE HOME & ENCAPSULATED CONTACT
Temperature Range: −55°C to +125°C.
Current Rating: 7.5 Amps.
Voltage Rating: 500 VAC (RMS) at sea level.
150 VAC (RMS) at 90,000 ft.
Dielectric: Zytel 101 nylon per Mil-P-20693.
Shells: Cadmium-plated cold-rolled steel with clear chromate finish per QQP-416A, Type I. Gold iridite finish available on request per QQP416A, Type II.
Contacts: Crimp Type — .00002″ min. gold over copper plated silnic bronze. Solder type — .00002″ min. gold over copper plated brass.
Wire Size: Solder: Up to #20; crimp #20, #22 and #24 AWG.

HARD DIELECTRIC
Temperature Range: −55°C to +175°C.
Current Rating: 7.5 Amps max. (#20 size contacts).
Voltage Rating: 500 VAC (RMS) at sea level.
150 VAC (RMS) at 90,000 ft.
Dielectric: Diallyl phthalate glass-filled per Mil-M-19833, Type GDI-30.
Shells: Same as above.
Contacts: Crimp-type — leaded copper with .00002″ min. gold over copper flash plating per Mil-G-45204, Type II. Solder type — brass or silnic bronze with .00002″ min. gold over copper flash plating per Mil-G-45204, Type II.
Wire Size: Accepts #20 AWG wire max.

FIXED CONTACTS and POWER & COAX.
Temperature Range: −55°C to +125°C.
Current Rating: 7.5 Amps.
Voltage Rating: 500 VAC (RMS) at sea level.
125 VAC (RMS) at 70,000 ft.
Dielectric: Glass-filled nylon.
Shells: Same as above.
Contacts: Power; Screw machine type — .00002″ min. gold over copper plated brass. Punch press type — Stamped from phosphor bronze and plated .00002″ gold over copper flash. Wire wrap type — .00002″ min. gold over copper plated brass. .500″ Lg. x .025″ Sq. Coax.; #1 Shielded contacts are gold plated.
Wire Size: Up to #20 wire.

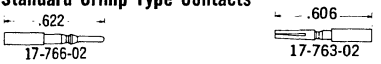
HIGH DENSITY
Temperature Range: −55°C to +125°C.
Current Rating: 3.0 Amps.
Voltage Rating: 500 VAC (RMS) at sea level.
75 VAC (RMS) at 70,000 ft.
Dielectric: Glass-filled nylon.
Shells: See above.
Contacts: Pins—leaded copper with .00002″ min. gold over copper flash plating. Sockets—phosphor bronze with .00002″ min. gold over copper flash plating.
Wire Size: #24, #26, #28 AWG.



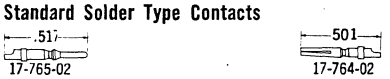


Contacts

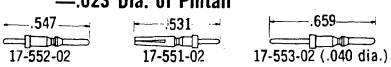
For Original Poke Home Line Only
Standard Crimp Type Contacts

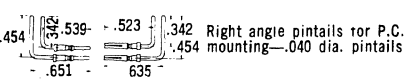


Standard Solder Type Contacts

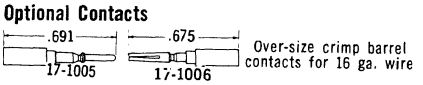


Pintail Contacts for P.C. Mounting —.023 Dia. of Pintail

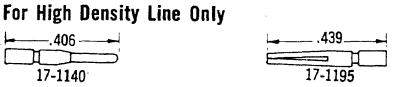




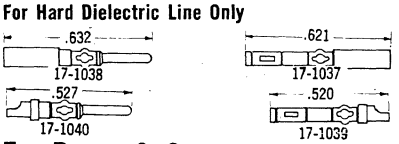
Optional Contacts



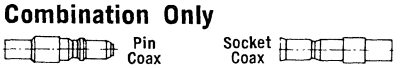
For High Density Line Only



For Hard Dielectric Line Only



For Power & Coax Combination Only



Pin	Cables	Socket
17-1112-01	For RG195/U and RG195A/U cable	17-1113-01
17-1132-01	For RG178B/U, RG196/U and RG196A/U cable	17-1130-01
17-1264-01	For RG58/U, RG141/U, RG141A/U, and RG303/U	17-1265-01

HIGH VOLTAGE CONNECTOR

10 #20 Contacts—Size 37 Shell

ORDERING INFORMATION

17-800 Plug 17-801 Receptacle

DIMENSIONS

Connector Size	All Lines A Max.	All Lines B	All Lines C Max.	D (1)	D (2)	D (3)	D Encapsulated Contact Line Only	D High Density Line Only	D Power & Coax. Comb. Only	E All Lines	F (1)	F (2)	F (3)	F Encapsulated Contact Line Only	F High Density Line Only	F Power & Coax. Comb. Only	Mounting Dimensions—All Lines G (Min.) Back Mtg.	G (Min.) Front Mtg.	H (Min.) Back Mtg.	H (Min.) Front Mtg.
9	1.239	.984	.515	25/64	9/32	43/64	29/64	.204	11/16	15/64	13/32	19/64	11/16	29/64	.192	3/4	.798	.830	.448	.505
15	1.567	1.312	.515	25/64	9/32	43/64	29/64	.204	11/16	15/64	13/32	19/64	11/16	29/64	.192	3/4	1.116	1.161	.448	.505
25	2.114	1.852	.515	25/64	9/32	43/64	29/64	.204	11/16	15/64	13/32	19/64	11/16	29/64	.192	3/4	1.654	1.701	.448	.505
37	2.754	2.500	.515	25/64	9/32	43/64	29/64	.204	23/32	15/64	13/32	19/64	11/16	29/64	.192	3/4	2.304	2.348	.448	.505
50	2.661	2.406	.626	25/64	9/32	43/64	29/64	.204	23/32	15/64	13/32	19/64	11/16	29/64	.192	3/4	2.210	2.285	.559	.645

(1) Original Poke-Home and Hard Dielectric with Crimp Contacts.
(2) Original Poke-Home, Hard Dielectric and Fixed Contacts with Solder Contacts.
(3) Fixed Contacts with Solderless wrap tails only.

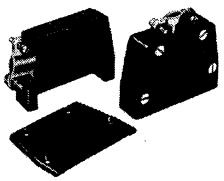
MIN RAC CONNECTORS

BUNKER RAMO AMPHENOL

17 Series Min Rac Accessories

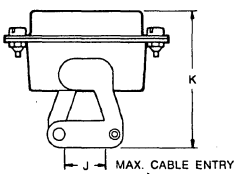
Plastic Backshell

A versatile accessory for all Min Rac connectors. Protects connector terminations and provides cable strain relief. Unique removable side panel allows attachment even after cable has been terminated. Can easily be removed for servicing in field. Deep recess accepts all connector styles, even encapsulated and power and coax lines. Interchangeable insert and cable clamp allows choice of top or side cable entry. Made of glass-filled nylon with cadmium plated steel clamp.



Metal Cable Housing

Used to adapt connector for cable to panel or cable to cable applications. Easily attached to connector by two screws. Available in clear chromate or gold iridite finish to match connector shells.



DIMENSIONS

	Size 9	15	25	37	50
J	13/32	13/32	19/32	23/32	23/32
K	1 23/64	1 23/64	1 25/64	1 25/64	1 25/64

PART NUMBERS

Shell Size	Backshell & Cable Housings Plastic	Backshell & Cable Housings Metal Clear Chromate	Backshell & Cable Housings Metal Gold Iridite	Spring Latch Locking Device Clear Chromate	Spring Latch Locking Device Gold Iridite	Screw Latch Locking Device Clear Chromate	Screw Latch Locking Device Gold Iridite	Jackscrew & Socket Assembly Clear Finish Only	Potting Molds
9	17-1370	17-310-01	17-310-02	17-529	17-847	17-768	17-848	17-895	17-886-09
15	17-1371	17-311-01	17-311-02	17-529	17-847	17-768	17-848	17-895	17-886-15
25	17-1372	17-312-01	17-312-02	17-529	17-847	17-768	17-848	17-895	17-886-25
37	17-1373	17-313-01	17-313-02	17-529	17-847	17-768	17-848	17-895	17-886-37
50	17-1374	17-314-01	17-314-02	17-770	17-850	17-768	17-848	17-895	17-886-50

How to Order 17 Series Min Rac Connectors

17 — 1 1 09 0 — 1

DEVIATIONS
- 0 Solder Contacts
- 1 Crimp Contacts, Male or Female
- 5 Solder Contact and Float Mounted (Female only)
- 6 Crimp Contact and Float Mounted (Female only)
- 11 .023 Dia. .138 Pin Tail Contacts for Nylon inserts only
- 15 Low cost punch press type fixed contacts
- 16 Screw machine type fixed contacts
- 19 Wire wrap type tails .500" Lg. x .025" Sq.

COAX CONTACTS
(Must be ordered separately).
- 0 - None
- 1 - Coax.
- 2 - 2 Coax.
- Etc.

NUMBER OF POWER CONTACTS
- 09 - 9 contacts
- 15 - 15 contacts
- 98 - 98 contacts etc.

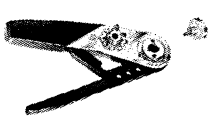
FINISH
- 0 Cadmium w/clear chromate
- 1 Cadmium w/gold iridite

CONNECTOR TYPE
- 1 Receptacle (Zytel) Socket Contacts
- 2 Plug (Zytel) Pin Contacts
- 6 Receptacle (Hard Dielectric) Socket Contacts
- 7 Plug (Hard Dielectric) Pin Contacts
- 8 Receptacle (Glass-Filled Nylon) Socket Contacts
- 9 Plug (Glass-Filled Nylon) Pin Contacts

SERIES NUMBER 17

Crimping and Insertion Tools for 17 Series Min Rac and 220 Series Micro-Miniature Contacts

NO. 357-100 — HAND CRIMPING TOOL

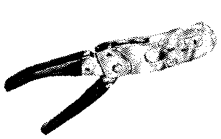


Adjustable 4-indent miniature to MIL-T-22520. Requires contact locator bushing for specific contact used. (See below.)

17 Series		Micro-Miniature	
Contact Locator	Contact	Contact Locator	Contact
357-300-2	17-763, 766, 1037, 1038, 1072, 1073	357-300-1	220-S01, 220-S02, 220-P01
357-300-5	17-1105, 1108	357-300-3	220-S03
357-300-6	17-1140	357-300-8	220-P02, 220-P03
357-300-7	17-1195		

No. 357-552 — Hand Crimp Tool for Coax Connectors

Cycle-controlled hexagon crimp action for reliable termination of outer ferrule of coax contacts. Used for 17-1130 and 17-1132 coax contacts, with RG 178/U cable. (357-100 or 357-104 crimp tool required to terminate center conductor of coax cables.)



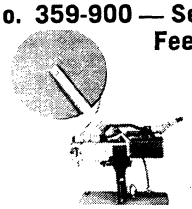
No. 357-553 — Hand Crimp Tool

Same as above except for 17-1112 and 17-1113 coax contacts used with RG 195/U cable.

No. 359-400 — Manual Feed, Pneumatic Crimp Tool

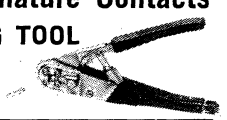
4-indent Cycle-Controlled crimping tool. Consult factory for correct settings, nest bushings and accessories.

No. 359-900 — Semi-Automatic Feed Crimp Tool



4-indent cycle-controlled crimping. Contacts supplied on carrier strips wound on reel for fast, easy crimping. Consult factory for available contacts and accessories.

NO. 357-104 — HAND CRIMPING TOOL



Miniature step adjustable. Requires contact locator, see below.

17 Series		Micro-Miniature	
Contact Locator	Contact	Contact Locator	Contact
357-300-2	17-763, 766, 1037, 1038, 1072, 1073	357-300-1	220-S01, 220-S02, 220-P01
357-300-5	17-1105, 1108, Coax Contact Center Cond.	357-300-3	220-S03
357-300-6	17-1140	357-300-8	220-P02, 220-P03
357-300-7	17-1195		

No. 356-200 — Insertion and Removal Tool Handle

Select correct insertion bit or removal bit to accommodate desired contact.

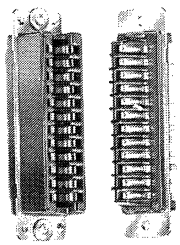
17 Series			Micro-Miniature		
Contact	Insertion Bit	Removal Bit	Contact	Insertion Bit	Removal Bit
17-763	356-400-1	356-400-5	220-S01 Wire-Form	356-400-11	356-400-12
17-766	356-400-1	356-400-6	220-P01 Wire-Form	356-400-11	356-400-13
17-1005	356-400-2	356-400-6	220-S02 (Relia-Tac) and 220-S03 (Ultra-Tac) 220-831-02, 220-815-00.	356-400-11	356-400-14
17-1006	356-400-2	356-400-5			
17-1037	356-400-1	356-400-5			
17-1038	356-400-1	356-400-6			
17-1039	356-400-1	356-400-5			
17-1072	356-400-1	356-400-5	220-P02 (Relia-Tac) and 220-P03 (Ultra-Tac) 220-830-02, 220-834-07.	356-400-11	356-400-15
17-1073	356-400-1	356-400-6			
17-1112	356-400-3	356-400-7			
17-1113	356-400-3	356-400-8	221-756-01	None	356-400-17 (Plug strips)
17-1130	356-400-2	356-400-8	221-756-01	None	356-400-18 (Receptacle strips)
17-1132	356-400-2	356-400-7	221-756-02	None	356-400-16 (Receptacle strips only)
17-1140	356-400-11	356-400-14			
17-1195	356-400-11	356-400-15			

BLUE RIBBON® CONNECTORS

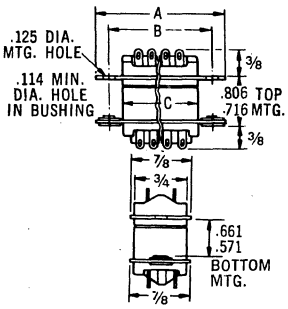
BUNKER RAMO AMPHENOL

26 Series Blue Ribbon Connectors

Barrier Polarization

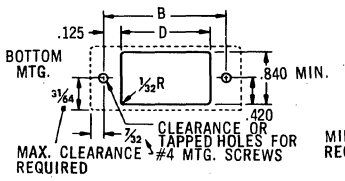


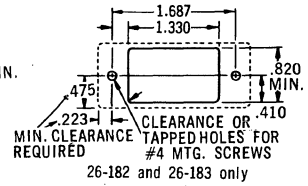
26-4200-24S 26-4100-24P



Tapered design of plug body provides pre-alignment of mating contacts. Dielectric barriers between contacts vary in thickness by minute dimensions to provide polarization. Float bushings allow a float of up to .02 in each direction, facilitating the blind mating common in rack and panel applications. Requires simple rectangular panel cutout.

The eight contact size is also available with a molded key and keyway for polarization. Catalog numbers, 26-182 plug and 26-183 receptacle.





26-182 and 26-183 only

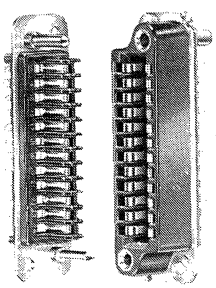
Contacts	Plugs	Mating Receptacles	DIMENSIONS A	B	C	D
8	26-4100-8P	26-4200-8S	1.719	1.375	1.036	1.120
16	26-4100-16P	26-4200-16S	2.469	2.125	1.784	1.868
24	26-4100-24P	26-4200-24S	3.219	2.875	2.536	2.620
32	26-4100-32P	26-4200-32S	3.969	3.625	3.286	3.370
8	26-182	26-183	—	—	—	—

SPECIFICATIONS (Exceed requirements of SCL-6020A)

Current Capacity — 5 Amps per contact
Voltage Rating — 750 volts D.C. at sea level.
300 volts D.C. at 60,000 feet
Operating Temperature — −55°C to +125°C
−67°F to +257°F
Contact Plating — .00002″ gold over copper base
Maximum Wire Size — 16 gauge

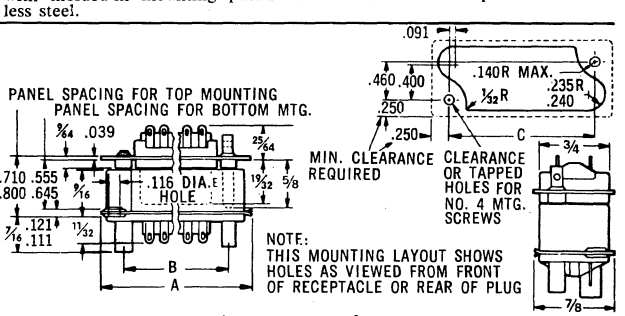
Plugs and receptacles are molded of high impact diallyl phthalate dielectric with molded-in mounting plates of corrosion resistant passivated stainless steel.

Pin Polarization



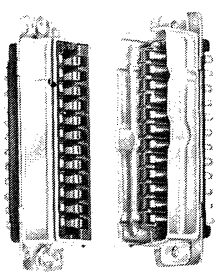
26-190-24 26-159-24

Sturdy guide pins pre-align connectors before contact engagement. Pins are of dissimilar size to avoid reverse mating. Float bushings on receptacle allow a float in all directions of .02″ to minimize the need for close mounting dimensions and to assist in blind matings. Rated 5 amperes, 750V DC at sea level; 300V DC at 60,000 feet.



Contacts	Plug	Receptacle	DIMENSIONS A	B	C
16	26-159-16	26-190-16	2.442	1.842	2.024
24	26-159-24	26-190-24	3.118	2.522	2.704
32	26-159-32	26-190-32	3.798	3.202	3.384

Keyed Shells

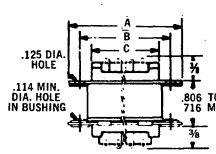


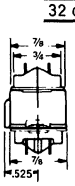
26-4201-24P 26-4101-24S

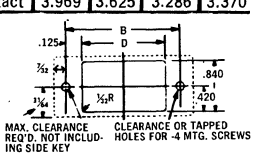
Similar to barrier polarization type, but with keyed aluminum shells to provide a large assortment of alternate positions. Mounting plates are stainless steel and receptacle includes float bushings which allow a float of .02 in all directions. Rated 5 amperes, 800 V DC at sea level; 300 V DC at 70,000 feet.

DIMENSIONS

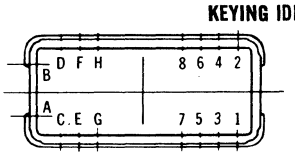
	A	B	C	D
8 contact	1.719	1.375	1.036	1.120
16 contact	2.469	2.125	1.784	1.868
24 contact	3.219	2.875	2.536	2.620
32 contact	3.969	3.625	3.286	3.370



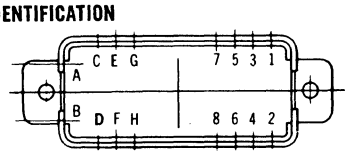




KEYING IDENTIFICATION



Plug Front Shell



Receptacle Front Shell

Ordering Information

Contacts	Plug	Receptacle	Position	Shell Keys Letters	Numbers
8	26-4101-8P	26-4201-8S	1	A	1
	26-4102-8P	26-4202-8S	2	A	2
	26-4103-8P	26-4203-8S	3	B	1
	26-4104-8P	26-4204-8S	4	B	2
16	26-4101-16P	26-4201-16S	1	A-C	3-6
	26-4102-16P	26-4202-16S	2	A-D	2-5
	26-4103-16P	26-4203-16S	3	A-E	5-6
	26-4104-16P	26-4204-16S	4	A-F	4-5
	26-4105-16P	26-4205-16S	5	B-C	1-6
	26-4106-16P	26-4206-16S	6	B-D	1-2
	26-4107-16P	26-4207-16S	7	B-E	1-4
	26-4108-16P	26-4208-16S	8	B-F	2-3
24	26-4101-24P	26-4201-24S	1	A-C	3-6
	26-4102-24P	26-4202-24S	2	A-D	4-7
	26-4103-24P	26-4203-24S	3	A-E	5-6
	26-4104-24P	26-4204-24S	4	A-F	4-5
	26-4105-24P	26-4205-24S	5	A-G	6-7
	26-4106-24P	26-4206-24S	6	A-H	1-6
	26-4107-24P	26-4207-24S	7	B-C	2-7
	26-4108-24P	26-4208-24S	8	B-D	1-2
	26-4109-24P	26-4209-24S	9	B-E	1-4
	26-4110-24P	26-4210-24S	10	B-F	2-3
	26-4111-24P	26-4211-24S	11	B-G	3-4
	26-4112-24P	26-4212-24S	12	B-H	2-5
32	26-4101-32P	26-4201-32S	1	A-C	3-6
	26-4102-32P	26-4202-32S	2	A-D	4-7
	26-4103-32P	26-4203-32S	3	A-E	5-6
	26-4104-32P	26-4204-32S	4	A-F	4-5
	26-4105-32P	26-4205-32S	5	A-G	6-7
	26-4106-32P	26-4206-32S	6	A-H	1-6
	26-4107-32P	26-4207-32S	7	B-C	2-7
	26-4108-32P	26-4208-32S	8	B-D	1-2
	26-4109-32P	26-4209-32S	9	B-E	1-4
	26-4110-32P	26-4210-32S	10	B-F	2-3
	26-4111-32P	26-4211-32S	11	B-G	3-4
	26-4112-32P	26-4212-32S	12	B-H	2-5

BLUE RIBBON® CONNECTORS

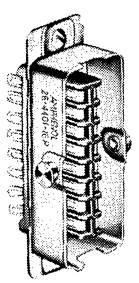
BUNKER RAMO AMPHENOL

26 Series Cable to Panel and Cable to Cable Types

- **Low Withdrawal Force**
- **Secure Spring Latch**
- **Low Insertion Force**
- **Alternate Positions**
- **Provisions for Safety Wiring**

Cable-to-Panel Blue Ribbon Connectors include a straight plug, right angle plug, and panel receptacle. The plug is equipped with a spring tension swivel latch to insure mating, even in vibration applications. Provision for safety wiring provides additional reliability.

The nickel plated brass shells are notched to provide keying for alternate positions. The large number of alternate positions available is effectively doubled since the plug and receptacles are available with either a male or a female insert. Add P to the catalog number for a male insert; S for a female insert.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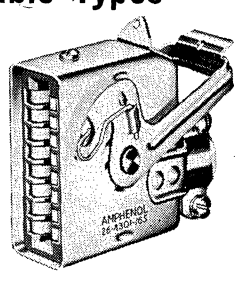
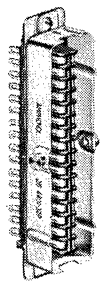

26-4301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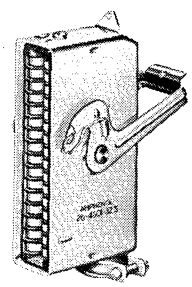
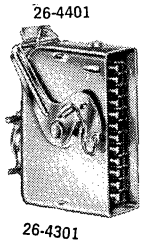
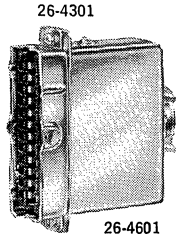
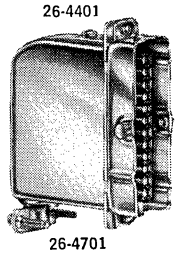
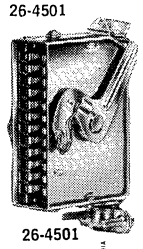

26-4501


26-4301

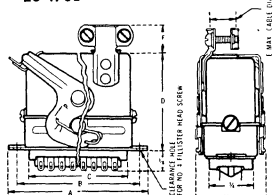

26-4601


26-4701


26-4501

DIMENSIONS

	A	B	C	D	E	F	G	H	J	K	L	M	N
8 contact plug and receptacle mated	1.719	1.375	1.036	1.593	.312	.438	1.593	.455	1.120	2.059	1.697	4.046	3.322
16 contact plug and receptacle mated	2.469	2.125	1.784	1.719	.625	.517	1.797	.517	1.868	2.246	1.822	4.420	3.572
24 contact plug and receptacle mated	3.219	2.875	2.536	1.844	.625	.517	1.922	.517	2.620	2.371	1.947	4.670	3.822
32 contact plug and receptacle mated	3.969	3.625	3.286	1.906	.625	.517	1.984	.517	3.370	2.434	2.025	4.796	3.978

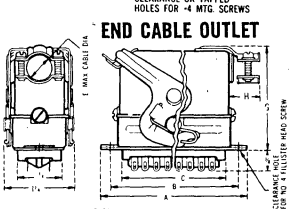


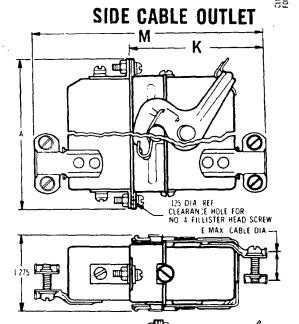
Ordering Information

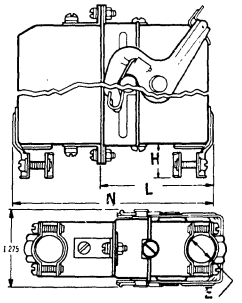
CABLE-TO-PANEL AND CABLE-TO-CABLE

Contact	Plugs: End Cable Outlet	Plugs: Side Cable Outlet	Mating Panel Receptacles	Mating Receptacles with Back Shell: Outlet End Cable	Mating Receptacles with Back Shell: Outlet Side Cable	Position No.	Shell Keys: Letters	Shell Keys: Numbers
8	26-4301-8 S or P	26-4501-8 S or P	26-4401-8 P or S	26-4601-8	26-4701-8	1	A	1
	26-4302-8 S or P	26-4502-8 S or P	26-4402-8 P or S	26-4602-8	26-4702-8	2	A	2
	26-4303-8 S or P	26-4503-8 S or P	26-4403-8 P or S	26-4603-8	26-4703-8	3	B	1
	26-4304-8 S or P	26-4504-8 S or P	26-4404-8 P or S	26-4604-8	26-4704-8	4	B	2
16	26-4301-16 S or P	26-4501-16 S or P	26-4401-16 P or S	26-4601-16	26-4701-16	1	A-C	3-6
	26-4302-16 S or P	26-4502-16 S or P	26-4402-16 P or S	26-4602-16	26-4702-16	2	A-D	2-5
	26-4303-16 S or P	26-4503-16 S or P	26-4403-16 P or S	26-4603-16	26-4703-16	3	A-E	5-6
	26-4304-16 S or P	26-4504-16 S or P	26-4404-16 P or S	26-4604-16	26-4704-16	4	A-F	4-5
	26-4305-16 S or P	26-4505-16 S or P	26-4405-16 P or S	26-4605-16	26-4705-16	5	B-C	1-6
	26-4306-16 S or P	26-4506-16 S or P	26-4406-16 P or S	26-4606-16	26-4706-16	6	B-D	1-2
	26-4307-16 S or P	26-4507-16 S or P	26-4407-16 P or S	26-4607-16	26-4707-16	7	B-E	1-4
	26-4308-16 S or P	26-4508-16 S or P	26-4408-16 P or S	26-4608-16	26-4708-16	8	B-F	2-3
24	26-4301-24 S or P	26-4501-24 S or P	26-4401-24 P or S	26-4601-24	26-4701-24	1	A-C	3-6
	26-4302-24 S or P	26-4502-24 S or P	26-4402-24 P or S	26-4602-24	26-4702-24	2	A-D	4-7
	26-4303-24 S or P	26-4503-24 S or P	26-4403-24 P or S	26-4603-24	26-4703-24	3	A-E	5-6
	26-4304-24 S or P	26-4504-24 S or P	26-4404-24 P or S	26-4604-24	26-4704-24	4	A-F	4-5
	26-4305-24 S or P	26-4505-24 S or P	26-4405-24 P or S	26-4605-24	26-4705-24	5	A-G	6-7
	26-4306-24 S or P	26-4506-24 S or P	26-4406-24 P or S	26-4606-24	26-4706-24	6	A-H	1-6
	26-4307-24 S or P	26-4507-24 S or P	26-4407-24 P or S	26-4607-24	26-4707-24	7	B-C	2-7
	26-4308-24 S or P	26-4508-24 S or P	26-4408-24 P or S	26-4608-24	26-4708-24	8	B-D	1-2
	26-4309-24 S or P	26-4509-24 S or P	26-4409-24 P or S	26-4609-24	26-4709-24	9	B-E	1-4
	26-4310-24 S or P	26-4510-24 S or P	26-4410-24 P or S	26-4610-24	26-4710-24	10	B-F	2-3
	26-4311-24 S or P	26-4511-24 S or P	26-4411-24 P or S	26-4611-24	26-4711-24	11	B-G	3-4
	26-4312-24 S or P	26-4512-24 S or P	26-4412-24 P or S	26-4612-24	26-4712-24	12	B-H	2-5
32	26-4301-32 S or P	26-4501-32 S or P	26-4401-32 P or S	26-4601-32	26-4701-32	1	A-C	3-6
	26-4302-32 S or P	26-4502-32 S or P	26-4402-32 P or S	26-4602-32	26-4702-32	2	A-D	4-7
	26-4303-32 S or P	26-4503-32 S or P	26-4403-32 P or S	26-4603-32	26-4703-32	3	A-E	5-6
	26-4304-32 S or P	26-4504-32 S or P	26-4404-32 P or S	26-4604-32	26-4704-32	4	A-F	4-5
	26-4305-32 S or P	26-4505-32 S or P	26-4405-32 P or S	26-4605-32	26-4705-32	5	A-G	6-7
	26-4306-32 S or P	26-4506-32 S or P	26-4406-32 P or S	26-4606-32	26-4706-32	6	A-H	1-6
	26-4307-32 S or P	26-4507-32 S or P	26-4407-32 P or S	26-4607-32	26-4707-32	7	B-C	2-7
	26-4308-32 S or P	26-4508-32 S or P	26-4408-32 P or S	26-4608-32	26-4708-32	8	B-D	1-2
	26-4309-32 S or P	26-4509-32 S or P	26-4409-32 P or S	26-4609-32	26-4709-32	9	B-E	1-4
	26-4310-32 S or P	26-4510-32 S or P	26-4410-32 P or S	26-4610-32	26-4710-32	10	B-F	2-3
	26-4311-32 S or P	26-4511-32 S or P	26-4411-32 P or S	26-4611-32	26-4711-32	11	B-G	3-4
	26-4312-32 S or P	26-4512-32 S or P	26-4412-32 P or S	26-4612-32	26-4712-32	12	B-H	2-5

INSERTS: The plug and receptacle are available with either male or female inserts. Add the Suffix P for male inserts; S for female inserts.





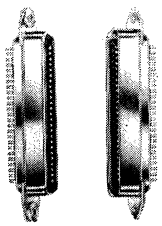

CABLE-TO-CABLE TYPE

MICRO RIBBON® CONNECTORS

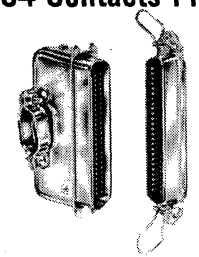
BUNKER RAMO AMPHENOL

57 Series Micro-Ribbon® Connectors

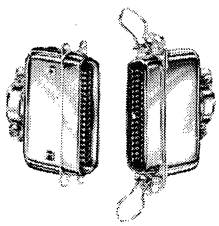
High Contact Density — 14 to 64 Contacts Protective Polarized Shell



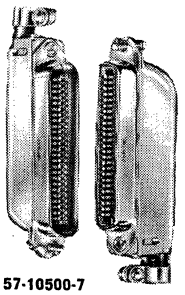
57-10500 57-20500
RACK & PANEL



57-50500 57-40500
SIDE CABLE ENTRY



57-30360 57-60360
TOP CABLE ENTRY



57-10500-7 57-20500-7
LOW PROFILE HOOD

All of the advantages of ribbon contacts apply to Micro Ribbon Connectors. This includes the self-cleaning, self-wiping action of the contacts and extremely low insertion and withdrawal forces. Dielectric is improved diallyl phthalate with high impact strength and low moisture absorbency characteristics. Trapezoidal shells provide polarization, and are made of zinc plated brass with a clear chromate conversion seal. Small size makes the Amphenol Micro Ribbon Connector ideal for high density miniature modules as well as rack and panel applications. Connectors may be top or bottom mounted. Rated 700V DC at sea level; 200 VDC at 70,000 feet.

Rack and Panel and Module Applications. Receptacle mounting plate includes float bushings to allow a float of .020 in each direction. This facilitates blind mating and minimizes the need for critical mounting dimensions.

Cable-To-Panel Application. Panel receptacles are equipped with sturdy spring latches which are guided and retained by cutouts in the plug's flanges. Receptacles must be top mounted. Cable entry at top side, as desired.

SPECIFICATIONS

(Meets requirements of SCL-6020A)

Current Capacity — 5 amps per contact.

Voltage Rating — 700 volts D.C. at sea level.
200 volts D.C. at 70,000 ft.

Operating Temperature — −55°C to +105°C
−67°F to +221°F

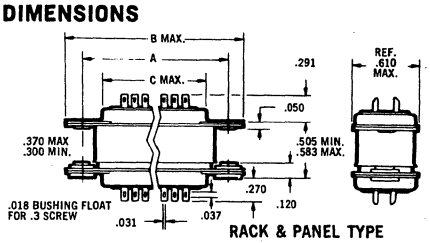
Wire Sizes — Solid — 22 gauge max.
Stranded — 24 gauge max.

Contacts — .000030" gold plated over copper flash on cadmium copper base.

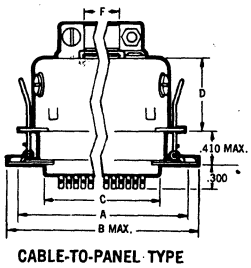
Dielectric — Diallyl phthalate per Mil-M-14F Type MDG

Shells — Zinc plated brass with clear chromate coating, trapezoidal shape for polarization. Gold iridescent chromate finish also available.

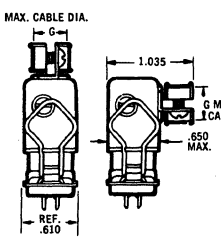
DIMENSIONS



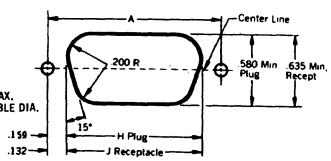
RACK & PANEL TYPE



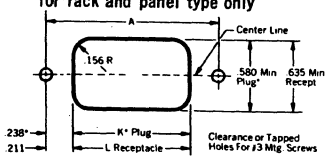
CABLE-TO-PANEL TYPE



TOP CABLE ENTRY SIDE CABLE ENTRY

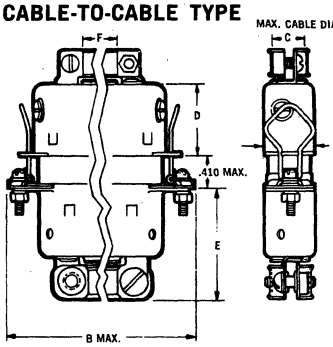


CUTOUT—BOTTOM MOUNTING
for rack and panel type only



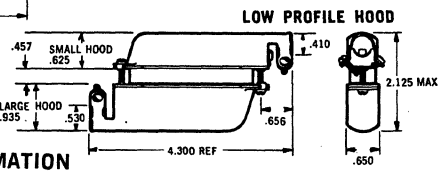
CUTOUT—TOP MOUNTING
for both types

CABLE-TO-CABLE TYPE



TOP CABLE ENTRY

LOW PROFILE HOOD



DIMENSIONS

		14 Contacts	24 Contacts	36 Contacts	50 Contacts	64 Contacts
BOTH TYPES	A	1.417	1.842	2.352	2.947	3.542
	MAX. B	1.750	2.175	2.685	3.270	3.875
	MAX C	.910	1.335	1.845	2.440	3.035
CABLE TO CHASSIS TYPE ONLY	D	.843	.825	.905	.995	—
	E	1.243	1.225	1.305	1.395	—
	F	.301	.468	.629	.756	—
	G	.412	.468	.468	.468	—
BOTTOM MOUNTING FOR RACK & PANEL TYPE ONLY	H	1.098	1.523	2.033	2.628	3.224
	J	1.153	1.578	2.088	2.683	3.278
TOP MOUNTING FOR BOTH TYPES	K	.940	1.365	1.875	2.470	3.065
	L	.955	1.420	1.930	2.525	3.120

ORDERING INFORMATION

Contacts	Rack and Panel Module Applications — Stand. Solder Cup Tails — Plugs	Rack and Panel Module Applications — Stand. Solder Cup Tails — Receptacles	Rack and Panel Module Applications — Tapered P.C. Tails — Plugs	Rack and Panel Module Applications — Tapered P.C. Tails — Receptacles	Cable to Panel Applications — Top Entry Cable Plugs	Cable to Panel Applications — Side Entry Cable Plugs	Cable to Panel Applications — Receptacles	Cable-To-Cable Application — Plugs	Cable-To-Cable Application — Receptacles	Low Profile
14	57-10140	57-20140	57-10140-4	57-20140-8	57-30140	57-50140	57-40140	See	57-60140	50 contacts only.
24	57-10240	57-20240	57-10240-3	57-20240-8	57-30240	57-50240	57-40240	Cable	57-60240	Receptacle — 57-20500-7
36	57-10360	57-20360	57-10360-13	57-20360-9	57-30360	57-50360	57-40360	to	57-60360	Plug — 57-10500-7
50	57-10500	57-20500	57-10500-27	57-20500-31	57-30500	57-50500	57-40500	Panel	57-60500	
64	57-10640	57-20640	—	—	—	—	—	Listing	—	

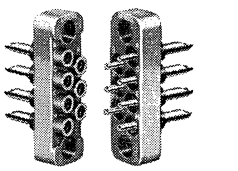
RACK AND PANEL CONNECTORS

BUNKER RAMO AMPHENOL

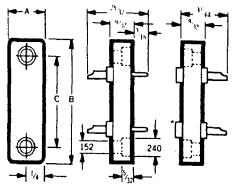
126 Series Miniature Rack and Panel Connectors

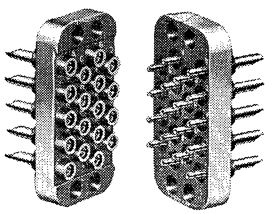
Heavy duty, reliable, time proven connectors. Dielectric is of melamine. Contacts are gold over silver plated. Voltage rating of types 1 and 2 is 700V RMS between contacts and 600V RMS between contacts and ground with a current rating of 17 amperes. Voltage rating of types 3 and 4 is 600V RMS with a current rating of 7½ amperes.

Connectors Type	Pin Part Number	Socket Part Number	No. of Contacts	Amps	Wire Gauge Solid	Wire Gauge Strand.	Width A	Length B	Mount'g Centers C
1	126-016	126-017	7	17	12	14	.500	1.625	1.250
	126-204	126-205	15	17	12	14	.500	2.600	2.225
2	126-206	126-207	18	17	12	14	1.000	2.000	1.688
3	126-173	126-174	14	7½	18	20	.437	1.250	.937
	126-199	126-189	18	7½	18	20	.562	1.312	1.000
	126-171	126-172	21	7½	18	20	.375	2.250	1.937
4	126-188	126-187	34	7½	18	20	.750	2.000	1.687

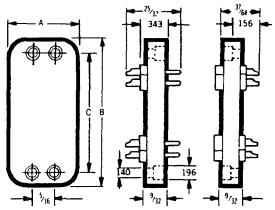


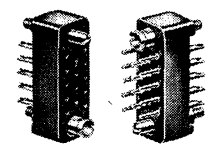
TYPE 1



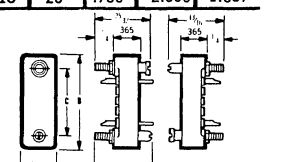


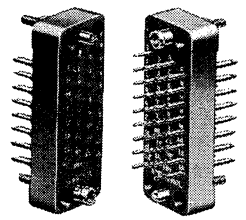
TYPE 2



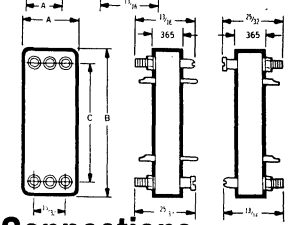


TYPE 3

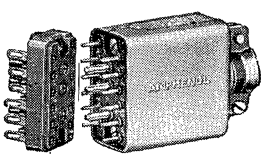




TYPE 4



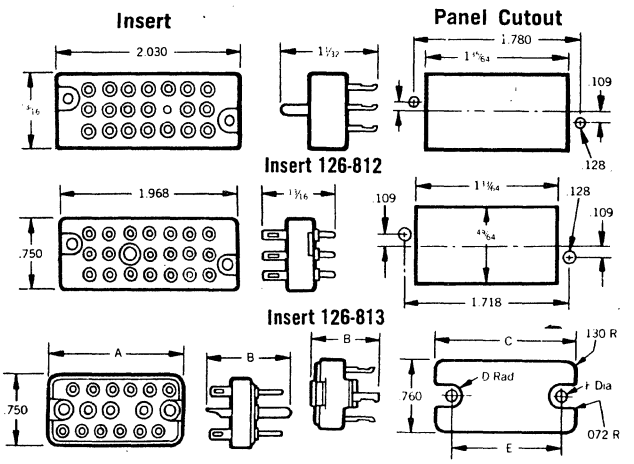
126 Series Rectangular Rack & Panel with Shells For Cable Connections



Rated a full 900V RMS, contacts are gold, over silver. Four contact configurations are available with 3 contact sizes. Contact size 12 is rated 23 amperes; size No. 16 is rated 13 amperes; size 20 is 7½ amperes. Dielectric is mica filled phenolic. Aluminum housing with mechanical strain relief is available for cable applications. Gold over silver plated contacts.

No. of Contacts Size 12	Size 16	Size 20	Pin Contacts Insert Only	Pin Contacts With Housing	Socket Contacts Insert Only	Socket Contacts With Housing	Mounting Screw Size No.	Shell Height
2	—	9	126-804	126-809	126-805	126-808	4	1.75
3	—	12	126-151	126-152	126-150	126-153	6	2.06
4	—	16	126-806	126-811	126-807	126-810	4	2.06
—	20	—	126-813	—	126-812	—	4	—

INSERTS	A	B	C	D	E	F
126-804	1.171	.937	1.181	.120	.864	.120
126-805	1.171	4%64	1.181	.120	.864	.120
126-151	1.500	.937	1.510	.115	1.188	.145
126-150	1.500	4%64	1.510	.115	1.188	.145
126-806	1.932	.937	1.947	.120	1.620	.120
126-807	1.937	4%64	1.947	.120	1.620	.120

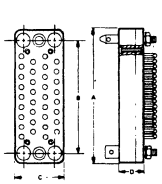


Military Version

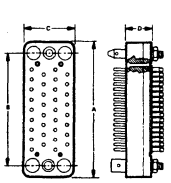
A family of miniature connectors which meets MIL-C-8384.

SPECIFICATIONS

Current Rating: 7.5 amps.
Voltage Rating: 500V A.C. (RMS).
Temperature Range: −55°C to +125°C.
Dielectric: Molded epoxy type thermo-set plastic.
Pin Contacts: Brass alloy with gold over nickel plating.
Socket Contacts: Beryllium copper with gold over silver plating.
Guide Hardware: Gold-plated brass with 4-40 thread.
Wire Size: 18AWG solid - 20AWG stranded.



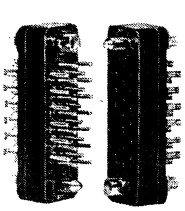
SOCKET CONTACTS



PIN CONTACTS

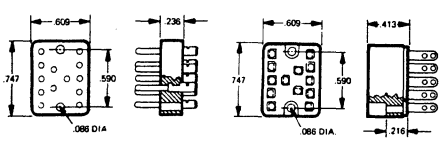
DIMENSIONS AND ORDERING INFORMATION

No. of Contacts	Part Numbers Pin Contacts	Part Numbers Socket Contacts	Dimensions A	B	C	D
7	126-T-2628	126-T-2629	1.218	.904	.381	.362
9	126-T-2630	126-T-2631	1.309	.998	.381	.362
14	126-T-2626	126-T-2627	1.248	.935	.439	.362
20	126-T-2619	126-T-2620	1.556	1.248	.439	.362
26	126-T-2632	126-T-2633	1.627	1.312	.558	.362
34	126-T-2621	126-T-2622	1.996	1.684	.749	.362



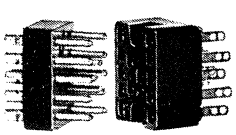
All Others

Cubic Connector



SPECIFICATIONS

Current Rating: 3 amps.
Voltage Rating: 125 volts A.C. (RMS).
Temperature Range: −25°C to +85°C.
Dielectric: Black Phenolic.
Pin Contacts: Brass alloy with nickel plating.
Socket Contacts: Phosphor bronze with silver plating.
Wire Size: 20 AWG solid — 22AWG stranded.



Contacts	Part Numbers Pin	Part Numbers Socket
13	126-T-2655	126-T-2656-3

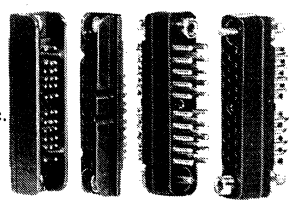
RACK AND PANEL CONNECTORS

AMPHENOL
THE BUNKER-RAMO CORPORATION

126 Series

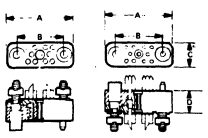
Micro Miniature Rectangular

This group of four connectors provides more contacts in less space than the 126 Series miniatures. A unique spring type socket contact is used which provides excellent wiping action and firm pressure on 6 points along the pin to insure a positive electrical connection everytime.

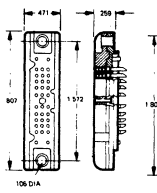


SPECIFICATIONS

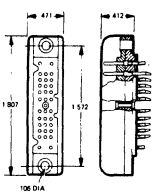
Current Rating: 3 amps.
Voltage Rating: 60 volts. A.C. (RMS)
Temperature Range: −55°C to +125°C.
Dielectric: Molded epoxy type thermo-set plastic.
Pin Contacts: Brass alloy with gold over nickel plating.
Socket Contacts: Beryllium copper with gold over silver plating.
Guide Pins: Nickel-plated brass.
Wire Size: 22 AWG solid. 24 AWG stranded.



ALL OTHERS



126-T-2669-1 ONLY



126-T-2668 ONLY

Number of Contacts	Part Numbers		Dimensions			
	Pin Contacts	Socket Contacts	A	B	C	D
10	126-T-2609	126-T-2610-1	.746	.530	.275	.235
16	126-T-2664	126-T-2665-1	.904	.687	.275	.235
28	126-T-2666	126-T-2667-1	1.218	1.002	.275	.235
34	126-T-2668	126-T-2669-1	1.807	1.572	.471	.412

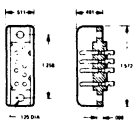
Cable Connector

SPECIFICATIONS

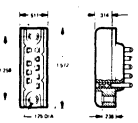
Current Rating: 3 amps.
Voltage Rating: 380V. A.C. (RMS)
Temperature Range: −40°C to +85°C.
Dielectric: Black nylon thermo-plastic.
Pin Contacts: Brass alloy with silver plating.
Socket Contacts: Phosphor bronze with silver plating.
Wire Sizes: 18 AWG solid. 20 AWG stranded.
Housing: Gray polycarbonate plastic.

Contacts	Part Numbers		
	Plug	Receptacle	Housing
9	126-T-2560	126-T-2561	126-T-2870

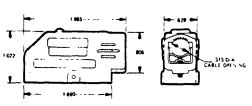
DIMENSIONS AND ORDERING INFORMATION



PLUG



RECEPTACLE

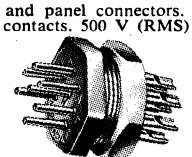


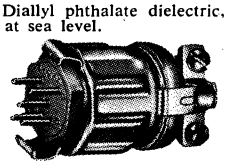
HOUSING

126 Series Hex Connectors 4 to 9 Contacts

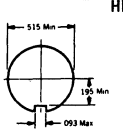
Popular hexagon rack and panel connectors. Diallyl phthalate dielectric, gold over silver plated contacts. 500 V (RMS) at sea level.

HEX. NUT TYPE

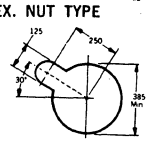


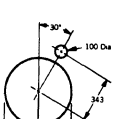


HOOD & CLAMP TYPE

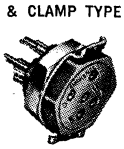


Hex Nut Type Mounting Holes





All Others

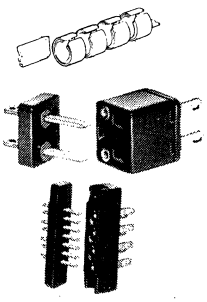


LOCKING CLIP TYPE

Contacts	Hex Nut Panel Mount	Panel Mount With Locking Clip	With Hood and Cable Clamp
4 Pin	126-1431	126-214	126-214 - 1000
4 Socket	126-3815	126-233	126-215 (Hood Only)
5 Pin	126-010	126-216	126-217
5 Socket	126-011	126-218	126-223
7 Pin	126-191	126-197	126-195
7 Socket	126-192	126-198	126-196
9 Pin	126-012	126-219	126-220
9 Socket	126-013	126-221	126-222

115 Series Blade & Spring Contact Line

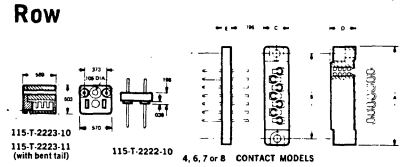
A complete line of rugged connectors utilizing a flat blade male contact and a female spring contact with multiple rows of gripping fingers. The blade enters the opening in the "C" shaped spring, forcing it apart.



SPECIFICATIONS

Current Rating: 10 amps (2 contact model, 8 amps).
Voltage Rating: 2, 6, 8 contacts 125V. A.C. (RMS). 4, 7, (8 with guide pins) 12, 16, 30 380V. A.C. (RMS). 26 contact 127V. A.C. (RMS).
Temperature Range: −20°C to +85°C.
Diclectric: Black phenolic.
Pin Contacts: Flat brass blade with silver plating.
Socket Contacts: Phosphor bronze with silver plating.
Wire Size: 16 AWG solid. 18 AWG stranded.

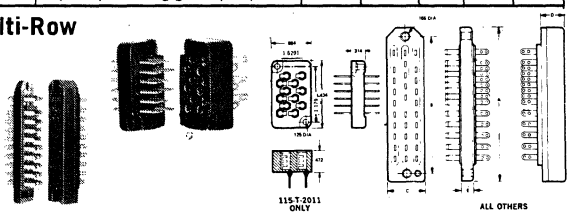
Single Row



115-T-2223-10
115-T-2223-11 (with bent tail)
115-T-2222-10
4, 6, 7 or 8 CONTACT MODELS

Contacts	Part Numbers		Dimensions				
	Blade Contacts	Socket Contacts	A	B	C	D	E
2	115-T-2222-10	115-T-2223-10	.570	.295	.503	.589	.196
4	115-T-2301	115-T-2302	1.611	1.364	.550	.550	.118
6	115-T-2410	115-T-2411	1.611	1.364	.550	.550	.118
7	115-T-2060	115-T-2061	1.886	1.611	.472	.483	.196
8	115-T-2014	115-T-2015	1.709	1.454	.590	.550	.118
8	115-T-2002 (with polarizing guide pins)	115-T-2001	2.130	1.886	.479	.472	.393

Multi-Row

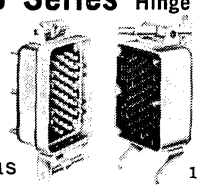


115-T-2011 ONLY

ALL OTHERS

Contacts	Part Numbers		Dimensions				
	Blade Contacts	Socket Contacts	A	B	C	D	E
8	115-T-2024-8	115-T-2025-8	1.847	1.493	.590	.491	.236
12 (2 rows)	115-T-2008-12	115-T-2009-12	2.319	1.965	.590	.491	.236
12 (3 rows)	115-T-2010	115-T-2011	1.434	1.179	.884	.472	.314
16	115-T-2670-16	115-T-2671-16	2.790	2.437	.590	.491	.236
20	115-T-2660-20	115-T-2661-20	3.262	2.908	.590	.491	.236
26	115-T-2056-26	115-T-2057-26	3.262	2.908	.590	.491	.236
30	115-T-2070-30	115-T-2071-30	3.262	2.908	.786	.491	.236

115 Series Hinge Action Mating



115-31S

115-30P

Amphenol 115 Series connectors accommodate 50 or 100 No. 16 wires and are nominally rated at 750 volts RMS 60CPS at sea level.

The vise action of the screw lock provides the leverage for easy attaching and disengaging of the plug. The two-piece inserts have molded-in numbers to facilitate wiring and checking of circuits.

100 CONTACTS	Crimp-On Contacts	Taper Pin Contacts	Solder Cup Contacts
Male Plug	115-30P	115-30P(432)	115-30P-1000
Female Receptacle	115-31S	115-31S(432)	115-31C-1000
Female Plug	115-30S	115-30S(432)	115-32S
Male Receptacle	115-31P	115-31P(432)	115-32P

50 CONTACTS	Taper Pin Contacts	Solder Cup Contacts
Male Plug	115-114P(432)	115-114P
Female Receptacle	115-115S(432)	115-115S
Female Plug	115-114S(432)	115-114S
Male Receptacle	115-115P(432)	115-115P

PRINTED CIRCUIT CONNECTORS

BUNKER RAMO AMPHENOL

133 Series Board Adapters

These plugs mount directly to the printed circuit board and eliminate wear on board circuits, a valued feature where frequent mating and unmating is required. Ideal for mating non-standard boards with receptacles.

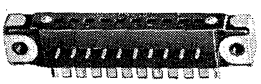
Standard contact plating is .00002" gold over copper, .00001", .00003", .00005", and .00010" gold plating available on special order. Contact resistance is 30 millivolts or less.

The contacts are on .156" centers for mating with the 143 Series receptacles.

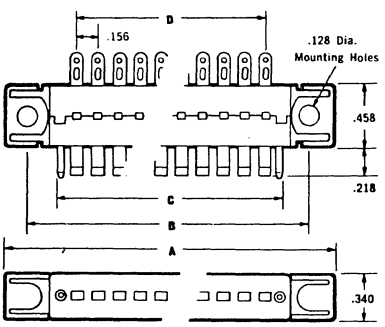
The 133 Series plug when used with the 143 receptacle, is polarized by removing a contact. Contact removal and the marking of the connector is performed by your AiD, or at the Amphenol factory.

DIMENSIONS (For Reference Only)

Part Number	Number of Contacts	A	B	C	D
133-006	6	1.818	1.531	1.082	.781
133-010	10	2.443	2.156	1.708	1.406
133-012	12	2.756	2.468	2.020	1.718
133-015	15	3.224	2.937	2.489	2.187
133-018	18	3.693	3.406	2.957	2.656
133-022	22	4.318	4.031	3.582	3.281



133-010-43
mates with 143 Series Receptacle



CONTACT OMISSION TABLE

Loc.	Suffix	Loc.	Suffix
A	1001	N	1012
B	1002	P	1013
C	1003	R	1014
D	1004	S	1015
E	1005	T	1016
F	1006	U	1017
H	1007	V	1018
J	1008	W	1019
K	1009	X	1020
L	1010	Y	1021
M	1011	Z	1022

AVERAGE VOLTAGE BREAKDOWN Between Contacts: 1800 VOLTS A.C. (RMS) at Sea Level.
OPERATING VOLTAGE RATING: 600V RMS at Sea Level.
CURRENT RATING: 5 AMPS.

Ordering Information

133 - 015 - 03
133 - 006 - 23 - 1002

- 133 Series
- No. of Contacts 006, 010, 012, 015, 018, 022
- Contact Tail Style
- Positioning: Contact Omission

143 Series Receptacles

MATES WITH .054 - .071 PC BOARDS OR 133 SERIES PLUGS

Tuning fork contact design assures uniform and firm contact action, even with PC boards at extremes of thicknesses.

Standard contact plating is .00002" gold over copper; .00001", .00003", .00005", and .00010" gold plate is available on special order.

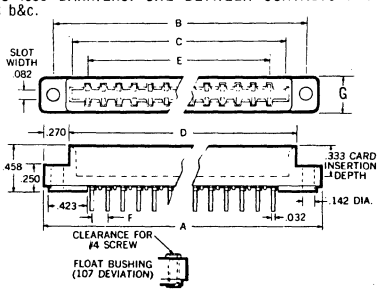
For boards of non-standard thickness, or where frequency of insertion and withdrawal will exceed 500 cycles, it is recommended that the 143 Series receptacle be used with the 133 Series plug. Contacts are on .156" centers. All sizes are available with a choice of contact tails. Polarizing key replaces a contact.

DIMENSIONS (For Reference Only)

Part Number	Number of Contacts Positions	A	B	C	D	E	F	G
143-006	6	1.779	1.531	1.097	1.239	.781	.156	.343
143-010	10	2.404	2.156	1.723	1.864	1.406	.156	.343
143-012	12	2.716	2.468	2.035	2.176	1.718	.156	.343
143-015	15	3.185	2.937	2.504	2.645	2.187	.156	.343
143-018	18	3.654	3.406	2.972	3.114	2.656	.156	.343
143-022	22	4.279	4.031	3.597	3.739	3.281	.156	.343
143-028	*28	5.217	4.968	4.535	4.677	4.219	.156	.343
143-036	**36	6.464	6.210	5.776	5.918	5.460	.156	.437

* ALSO AVAILABLE IN THIS SIZE ON .125" CENTERS.
** 36 CARD SLOT CONTAINS TWO .056 BARRIERS: ONE BETWEEN CONTACTS N&P AND ONE BETWEEN CONTACTS b&c.

143-010-03
mates directly to a printed circuit board or with a Series 133 Plug



Polarizing Key Location

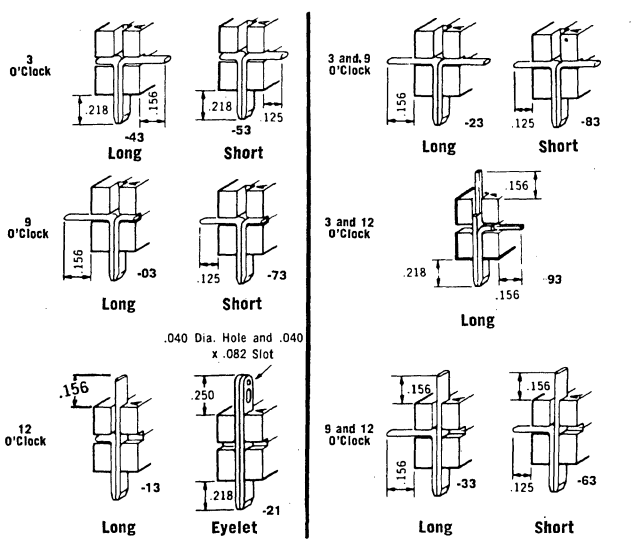
Loc.	Suffix	Loc.	Suffix
A	1001	N	1012
B	1002	P	1013
C	1003	R	1014
D	1004	S	1015
E	1005	T	1016
F	1006	U	1017
H	1007	V	1018
J	1008	W	1019
K	1009	X	1020
L	1010	Y	1021
M	1011	Z	1022

Ordering Information

143 - 006 - 01
143 - 018 - 07 - 1010

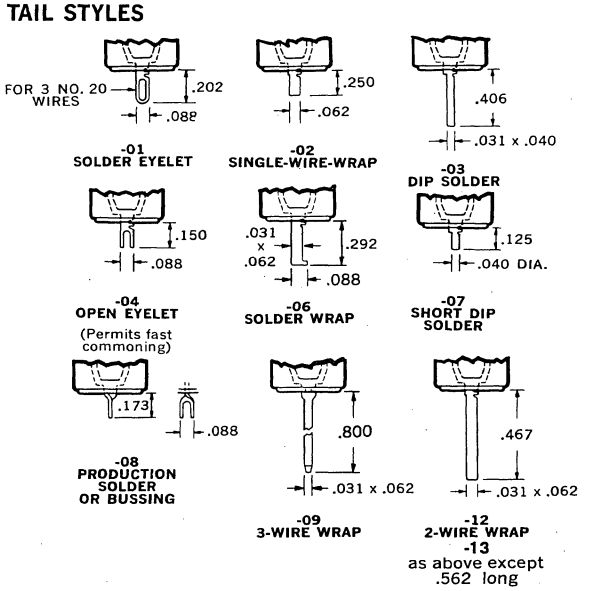
- 143 Series Receptacle
- No. of Contacts 006, 010, 012, 015 018, 022, 036
- Contact Tail Style
- Positioning Key Location
- Polarizing Key is Available In Any Location

CONTACT TAIL POSITIONS .040 DIAMETER — DIP SOLDER



Contacts are viewed from front of connector. Contact position A is shown.

TAIL STYLES



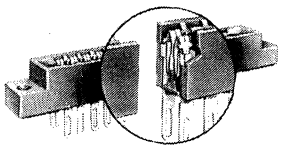
PRINTED CIRCUIT CONNECTORS

BUNKER RAMO AMPHENOL

225 Series Printed Circuit Receptacles

BIFURCATED BELLOWS CONTACT PRINTED CIRCUIT CONNECTORS QUALIFIED TO MIL-C-21097C
LOW MILLIVOLT DROP • NEGLIGIBLE PC CIRCUITRY WEAR

Amphenol gold-plated RIBBON contacts — with their smooth glide mating action — incur practically no wear on fragile printed circuitry. Ribbon contacts are bifurcated (slit), to guarantee at least two points of electrical contact, even with an irregular shaped printed circuit board. The double spring tension of the ribbon contact, and large mating surface, provides consistent low contact resistance, with corresponding low millivolt drop.



.156" CENTERS

Bifurcated ribbon contacts are on .156" centers and will accept PC boards of .054" to .071" thickness.

DIALLYL PHTHALATE

One piece, flame resistant, glass filled diallyl phthalate. Chamfered throat opening assists in guiding PC boards to a perfect engagement.

MIL-C-21097C

Amphenol 225 Series PC Connectors represent the most comprehensive connector line designed and qualified to MIL-C-21097B.

POLARIZATION

Molded keying slots between contacts accept polarizing key without loss of contact positioning. One nylon key is supplied with each commercial connector.

CONTACT ROWS

225 Series PC Connectors are available with two rows of separate independent contacts, or one row of contacts with back-up springs provided for proper mating tension. The 43 position size connector is therefore available with either 43 or 86 contacts. Double sided contacts with single tails are also available in 6 through 36 sizes. See configuration 5 on next page.

TERMINATION

A wide variety of contact tails permit 225 Series Printed Circuit Connectors to be terminated by soldering, or by crimping, of either Poke-Home or taper pin contacts. Wire wrappable terminations are also available.

SPECIFICATIONS

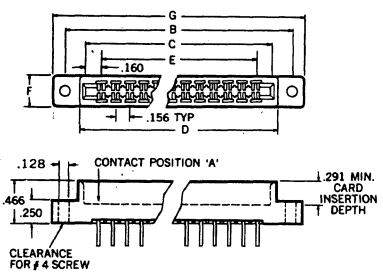
Operating voltage: 600 VAC (RMS) at sea level — 150 VAC (RMS) at 70,000 feet
Current rating: 5 amperes continuous
Test Voltage Between Adjacent Contacts: 1800 VAC (RMS) at sea level — 450 VAC (RMS) at 70,000 feet
Insulation Resistance: 5,000 megohms minimum

Contact Resistance	
Crimp and taper pin terminated	— 35 millivolts max. at rated current
Solder terminated	— 30 millivolts max. at rated current
Contact Retention	
Solder terminated	— 5 pounds axial load min.
Crimp terminated	— 10 pounds axial load min.
Taper pin	— 15 pounds axial load min.

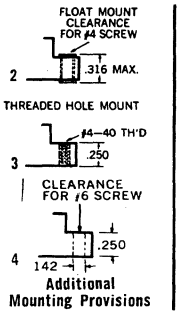
Dielectric material: Glass fiber reinforced diallyl phthalate — Type SGDF per MIL-M-14
Contact material: Beryllium copper, or phosphor bronze (see below)
Contact plating — .00003" min. gold over copper, or .00005" min. gold over copper.

Solder Termination — Standard

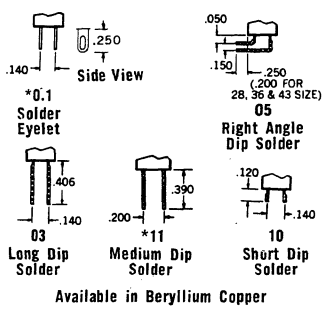
AMPHENOL 225 Series Printed Circuit Connectors with solder terminations provide full flexibility of termination with eight different tail styles — three straight plug-in terminations (.140" and .200" grid), one right angle plug-in termination, and four eyelet terminations.



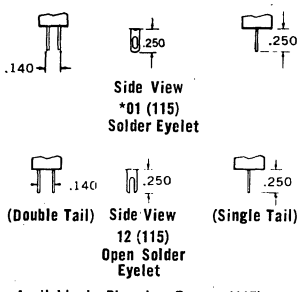
Mounting Provision 1



Additional Mounting Provisions

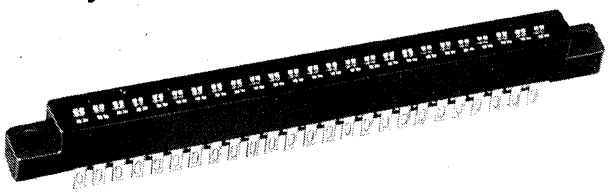


Available in Beryllium Copper



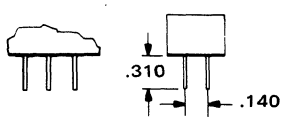
Available in Phosphor Bronze (115)

Economy Solder Terminations - (117 Deviation)

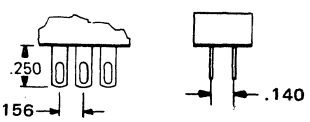


These low cost connectors are similar to the standard 225 Series but with an economical phenolic dielectric and .00002" min. gold plating on the contacts. They are available in 6 through 43 positions with either solder eyelet or dip solder tails. Contacts are .156" on center, with .140" row spacing, and may be arranged in two rows for two-sided circuit boards or in a single row with back-up springs for single-sided boards.

TAIL STYLES



04 - Dip Solder



Eyelet Type
01 - Solder Termination

SPECIFICATIONS

Operating Voltage: 600VAC (RMS) at sea level — 150VAC (RMS) at 70,000 ft.
Current Rating: 5 amps
Dielectric Material: Electrical Grade Phenolic, Black
Insulation Resistance: 5,000 megohms minimum
Contact Material: Copper alloy with .000020" gold over copper
Contact Resistance: 30 millivolts maximum at rated current
Board Thickness: .054 to .071"

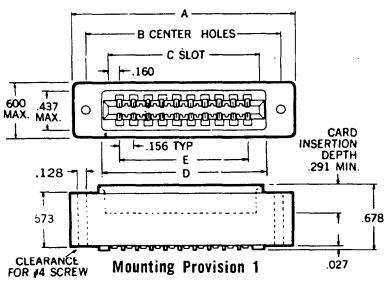
PRINTED CIRCUIT CONNECTORS

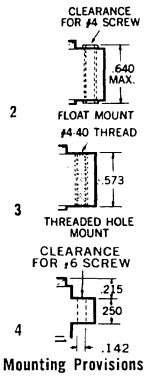
BUNKER RAMO AMPHENOL

Taper Pin Termination

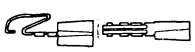
AMPHENOL 225 Series Printed Circuit Connectors with taper pin terminations provide flexibility of assembly procedure and ease of circuit modification and repair.

Two arrangement options are available: two rows of contacts for independent opposing circuits or a single row of contacts for single circuits. Single row connectors use separate back-up springs to assure firm mating.





TAPER PIN TYPE CONTACT

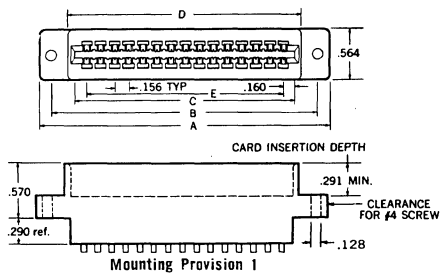


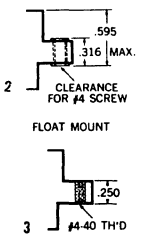
Tail style 00 accepts #53 pins. Available in beryllium copper only.

Crimp- Poke-Home Termination

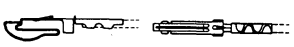
AMPHENOL 225 Series Printed Circuit Connectors with Poke-Home contacts offer both the economy of crimp termination and the flexibility of removable contacts — an unbeatable combination.

Two arrangement options are available: two rows of contacts for independent opposing circuits or a single row of contacts for single circuits. Single row connectors use separate back-up springs to assure firm mating.





CRIMP POKE-HOME TYPE CONTACT

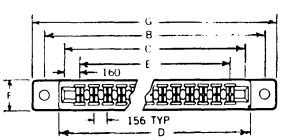


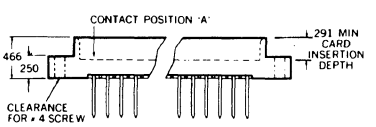
Tail style 00 available in beryllium copper only.

Approximate Dimensions For Solder, Crimp and Taper Pin Terminations

Number of Contact Positions	A	B	C	D	E	F	G
6	1.832	1.532	1.100	1.230	.780	.343	1.844
10	2.456	2.156	1.723	1.854	1.404	.343	2.468
15	3.236	2.936	2.502	2.636	2.184	.343	3.248
18	3.704	3.404	2.970	3.105	2.652	.343	3.716
22	4.328	4.031	3.597	3.730	3.276	.343	4.340
25*	—	4.501	4.067	4.198	3.744	.343	4.810
28	5.264	4.964	4.530	4.652	4.212	.500	5.264
36	6.512	6.219	5.778	5.900	5.460	.500	6.512
43	7.600	7.302	6.871	7.000	6.552	.500	7.600

* 25 position available only in double row solder termination.





POLARIZING KEYS

225-559
Over contact key must be ordered separately

225-594
Between contact key. One included for each connector. Packed separately in bulk.

Ordering Information

To order the specific 225 Series connector you want, put together the part number as per the following example:

SERIES NUMBER 225-

225-20631-101 (115)

TERMINATION CLASS

Digit	Termination
2	Solder
3	Taper Pin
4	Poke-Home

CONTACT POSITIONS

Digit Group	No. of Contacts
06	6 or 12
10	10 or 20
15	15 or 30
18	18 or 36
22	22 or 44
25*	25 or 50
28	28 or 56
36	36 or 72
43	43 or 86

*Avail. in Solder only.

CRIMP CONTACT ORDERING INFORMATION

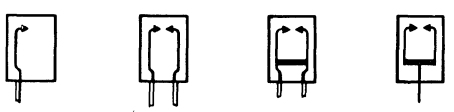
Crimp contacts are available in standard beryllium copper with .000030″ gold plating either in bulk or on reels.

Loose contacts—Order part number 225-605-06

Reel contacts (2400 contacts on reel) Order part number 225-605-52400

CONTACT CONFIGURATION

Digit	Solder Type	Poke-Home Type	Taper Pin Type
0	—	Insert less contacts.	—
1	Single row connector with back-up springs.	Insert plus loose contacts for one row plus back-up springs.	Single row connector with back-up springs.
2	Two rows of independent contacts.	Insert plus loose contacts for two rows.	Two rows of independent contacts.
3	Two rows of bridged contacts with two tails.	—	—
5**	Two rows of bridged contacts with one tail.	—	—



1 2 3 5**

** Available in Phosphor Bronze only

DEVIATIONS

(115) Deviation is Phosphor Bronze contact material. Available only in solder eyelet.

(117) Economy version with Phenolic dielectric and .00002″ gold plating.

POLARIZATION (Optional

If factory insertion of polarizing key is desired, add position of key as suffix here. Key will be inserted to right of contact position shown. Example: 225-20631-10103 (115). Key to right of contact #3.

TAIL STYLE

Digit Group	Style
00	Taper Pin or Crimp
01	Eyelet Solder
03	Straight Dip Solder
04	Straight Dip Solder (economy version only)
05	Right Angle Dip
10	Short Dip Solder
11	Military Dip Solder
12	Open Eyelet Solder

CONTACT PLATING

Digit	Plating
1	.000030″ gold over copper (Industrial)
2	.000050″ gold over copper (MIL-C-21097)
4	.000020″ gold over copper (economy version)

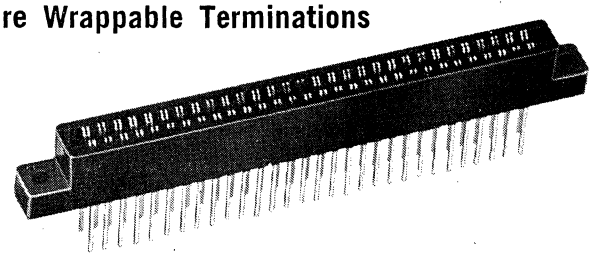
MOUNTING PROVISIONS

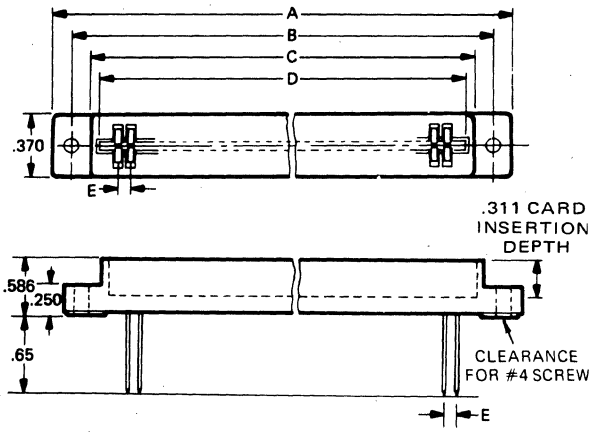
Digit	Provisions
1	.128″ clearance holes
2	Float busings for #4 screws
3	Threaded bushings (4-40)
4	.142″ clearance holes (solder type)
4	.250 mounting ears (taper pin)

PRINTED CIRCUIT CONNECTORS

BUNKER RAMO AMPHENOL

225 Series Printed Circuit Connectors
Wire Wrappable Terminations





ALL DIMENSIONS REFERENCE ONLY

AMPHENOL 225 Series Printed Circuit Connectors with wire wrappable terminations provide an economical and reliable connector for either automatic or hand wire wrapping applications.

Bifurcated bellows contacts on .100 x .200, or .125 x .250 grid spacings provide for smooth positive, two-point mating action no matter how irregular the board surface. These connectors are available in 22-, 30-, 43-, and 50-position models with either grid spacing.

Contact plating is .000030 minimum gold over copper. This along with the new high grade industrial material designed into these connectors combine to provide an economical answer to your needs for wire wrappable connectors.

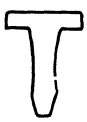
SPECIFICATIONS

Operating Voltage: 600VAC (RMS) at sea level — 150VAC (RMS) at 70,000 ft.
Current Rating: 5 amps
Dielectric Material: Electrical Grade Phenolic, Black
Insulation Resisance: 5,000 megohms minimum
Contact Material: Phosphor bronze plated .000030" gold over copper
Contact Resistance: 30 millivolts maximum at rated current
Board Thickness: .054" to .071"

DIMENSIONS AND ORDERING INFORMATION

Part Number	Positions Contacts	A	B	C	D	E
.125" CONTACT CENTERS						
225-804-22	22/44	3.680	3.380	3.080	2.945	.125
225-804-30	30/60	4.680	4.380	4.080	3.945	.125
225-804-43	43/86	6.305	6.005	5.705	5.570	.125
225-804-50	50/100	7.180	6.880	6.580	6.445	.125
.100" CONTACT CENTERS						
225-805-22	22/44	3.155	2.855	2.555	2.420	.100
225-805-30	30/60	3.955	3.655	3.355	3.220	.100
225-805-43	43/86	5.255	4.955	4.655	4.520	.100
225-805-50	50/100	5.955	5.655	5.355	5.220	.100

Polarizing Keys

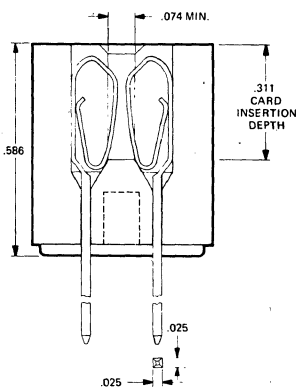


225-645

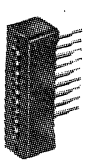
Over contact key can be used with 225 Series wire-wrappable connectors on .100" and .125" centers.

225-594

Between contact key may be used with .125" center wire-wrappable connectors.

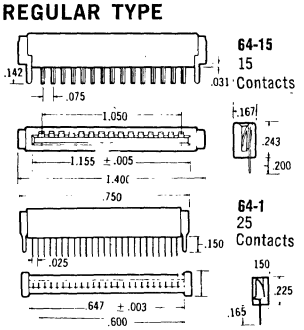


64 Series Micro-Edge® Edge Board Receptacles



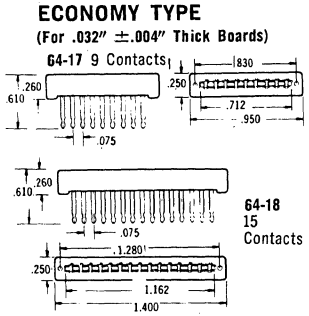
Micro-Edge contacts will not set. The Micro-Edge will accept even warped boards with firm contact action. Contacts are rounded and will not scrape or injure delicate circuits.

REGULAR TYPE



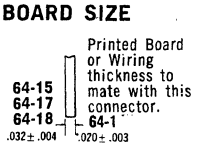
ECONOMY TYPE

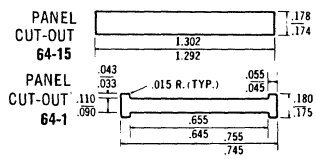
(For .032" ±.004" Thick Boards)



	64-1	64-15	Economy Units 64-17	Economy Units 64-18
No. of Contacts	25	15	9	15
Overall Length	.75	1.40	.950	1.40
Contact Centers	.025"	.075"	.075"	.075"
Contact Diameter	.008"	.010"		
Contact Resistance, Ohms	.020-.030	.010-.020	.010	.010
P.C. Board Width	.647	1.155	.712	1.162
P.C. Board Thickness	.020 ±.003	.032 ±.004	1/32	1/32
Current Rating, Amperes	.5	.5	1	1
Voltage Rating	200 V AC (RMS) at sea level		750 V VAC (RMS) at sea level	
Contact Material	.008" and .010" gold plated copper alloy wire		.00002" gold over .00015" silver plated, heat treated bryllium copper	
Dielectric Material	Glass-filled diallyl phthalate, Type GDI-30 per MIL-M-19833		Mineral-filled diallyl phthalate per MIL-M-14E-MDG	

BOARD SIZE

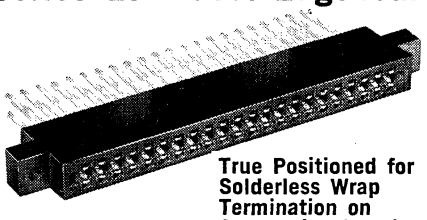




PRINTED CIRCUIT CONNECTORS

BUNKER RAMO AMPHENOL

261 Series Low Cost Edgeboard Connectors



True Positioned for Solderless Wrap Termination on Automatic Wrapping Machines

High Performance at Reasonable Cost

These high-performance edgeboard connectors provide dual readout of double-sided printed circuit boards. The pre-loaded cantilever type contacts are assembled into the dielectric with precise spacing to permit automatic solderless wrap termination. The phosphor bronze contacts have a minimum of 50 micro-inches of gold at the contacting surface. This results in extremely low contact resistance and permits over 500 insertion and withdrawal cycles without loss of continuity or significant increase in resistance.

An Extensive Line

- 15 to 43 positions providing up to 86 contacts
- Choice of .100", .125", .150", .156" or .200" spacing
- Choice of tail sizes: .025" sq., .035" sq., or .035" x .050".

Electrical Characteristics

Contact Spacing	Current Rating (Max.) Amps	Contact Resistance (Max.) Milliohms	Voltage Rating (Sea Level)	Voltage Breakdown (Min.)
.100" on Center	5.0	6.0	300 V RMS	1800 V RMS
.125" on Center	5.0	6.0	350 V RMS	2000 V RMS
.150" on Center	6.0	5.5	400 V RMS	2500 V RMS
.156" on Center	7.5	5.0	400 V RMS	2500 V RMS
.200" on Center	7.5	4.5	500 V RMS	4500 V RMS

SPECIFICATIONS

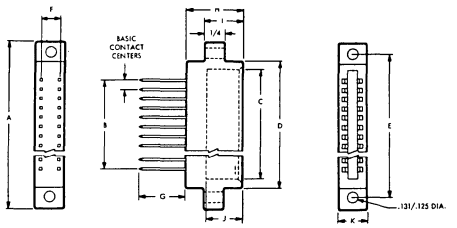
Block Material: Medium impact, electrical grade phenolic.

Contact Material: Grade A Phosphor Bronze with 50 micro-inches minimum thickness of gold on contacting surfaces.

Keying: Available on .200, .156 and .150 centers. On .125 and .100 centers key replaces one pair of contacts.

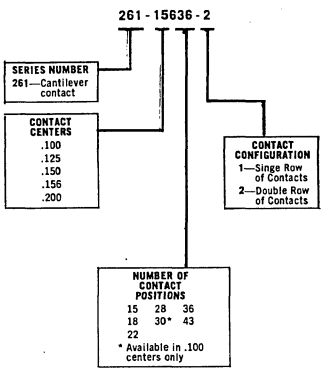
Tail length: Sufficient for three wire wraps plus space for bussing or PC board next to block. (See dimension G.)

DIMENSIONS (Inches)

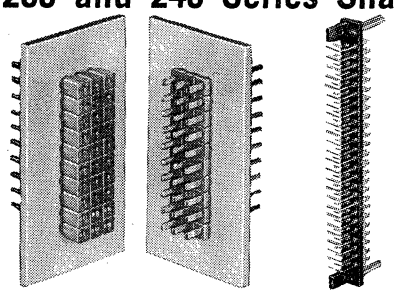


Contact Centers	Tail Dimensions	No. Contact Positions	A	B	C	D	E	F	G	H (Max.)	I (Max.)	J	K
.100	.025 square	15	2.474	1.400	1.720	1.874	2.156	.200	.623	.735	.494	.465	.343
		18	2.774	1.700	2.020	2.174	2.456						
		22	3.174	2.100	2.420	2.574	2.856						
		30	3.974	2.900	3.220	3.374	3.656						
		36	4.574	3.500	3.820	3.974	4.256						
		43	5.274	4.200	4.520	4.674	4.956						
.125	.025 square	15	2.824	1.750	2.070	2.224	2.506	.250	.623	.735	.494	.465	.365
		18	3.199	2.125	2.445	2.599	2.881						
		22	3.699	2.625	2.945	3.099	3.381						
		28	4.449	3.375	3.695	3.849	4.131						
		36	5.449	4.375	4.695	4.849	5.131						
		43	6.324	5.250	5.570	5.724	6.006						
.150	.035 square	18	3.624	2.550	2.870	3.024	3.306	.300	.760	.770	.512	.500	.443
		28	5.124	4.050	4.370	4.524	4.806						
		43	7.374	6.300	6.620	6.774	7.056						
.156	.035 x .050	15	3.258	2.184	2.504	2.658	2.940	.200	.760	.770	.512	.500	.343
		18	3.726	2.652	2.972	3.126	3.408						
		22	4.350	3.276	3.596	3.750	4.032						
		28	5.286	4.212	4.532	4.686	4.968						
		36	6.534	5.460	5.780	5.934	6.216						
		43	7.626	6.552	6.872	7.026	7.308						
.200	.035 x .050	22	5.274	4.200	4.520	4.674	4.956	.200	.760	.770	.512	.500	.343
		36	8.074	7.000	7.320	7.474	7.756						

Ordering Information



230 and 240 Series Snap-Wrap® and Mini-Wrap® Connectors



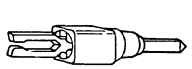
Simple Modular Construction

Permits Any Configuration Designed

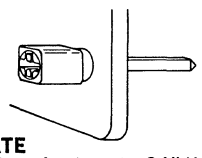
Snap-Wrap (230 Series) and Mini-Wrap (240 Series) connectors are based on a modular design concept which permits AMPHENOL to accommodate practically any configuration as a standard product. Design your own interconnection system using AMPHENOL's building block concept.

The base plate, available in various finishes, can be shaped, formed, notched, or have any kind of cutouts or mounting holes you need to fit your space and components. Holes may be punched (or omitted) in many configurations, including either military or commercial patterns with spacing of .200" x .200", .150" x .150", .150" x .075", .125" x .125", .100" x .100" or .100" x .050".

CONTACTS
Wide Variety Available



NYLON BUSHINGS
Available in Many Colors



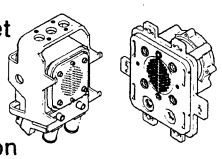
BASE PLATE
Any Size Required up to 24" Wide.

CABLES & HARNESSES
EMC INTERCONNECTIONS

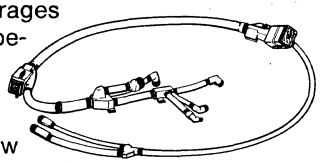
BUNKER RAMO AMPHENOL

SAMS puts it all together

When the link-up of an electronic or electrical system is your problem, SAMS is the answer. If the solution is not one of the literally thousands of standard connectors and connection systems already offered by Amphenol, then SAMS (Space and Missile Systems) Division delivers a custom-designed interconnection system specifically to meet your needs.



SAMS is dedicated to the design and integration of specialized interconnection systems. To work with you toward that end, SAMS provides a rapid-action, problem-solving team of specialists. The SAMS team quickly involves itself in the solution of your problem and in the manufacture of the highest quality interconnection systems available to industry today.



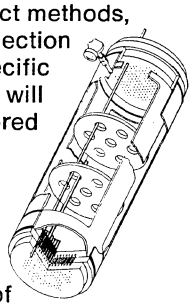
Every SAMS engineer averages more than a decade of experience in complex interconnect systems design. All are dedicated to the constant exploration of new materials and processes for both function and reliability in end-product use.

Vigorous investigation of new ways to make connectors perform more effectively

SPECIAL PURPOSE CONNECTORS
NUCLEAR PENETRATION ASSEMBLIES

BUNKER RAMO AMPHENOL

is a primary concern at SAMS. The result is new approaches to disconnect methods, contact design and interconnection assembly. Whatever your specific environment, the SAMS team will produce a better system tailored to meet your needs exactly.

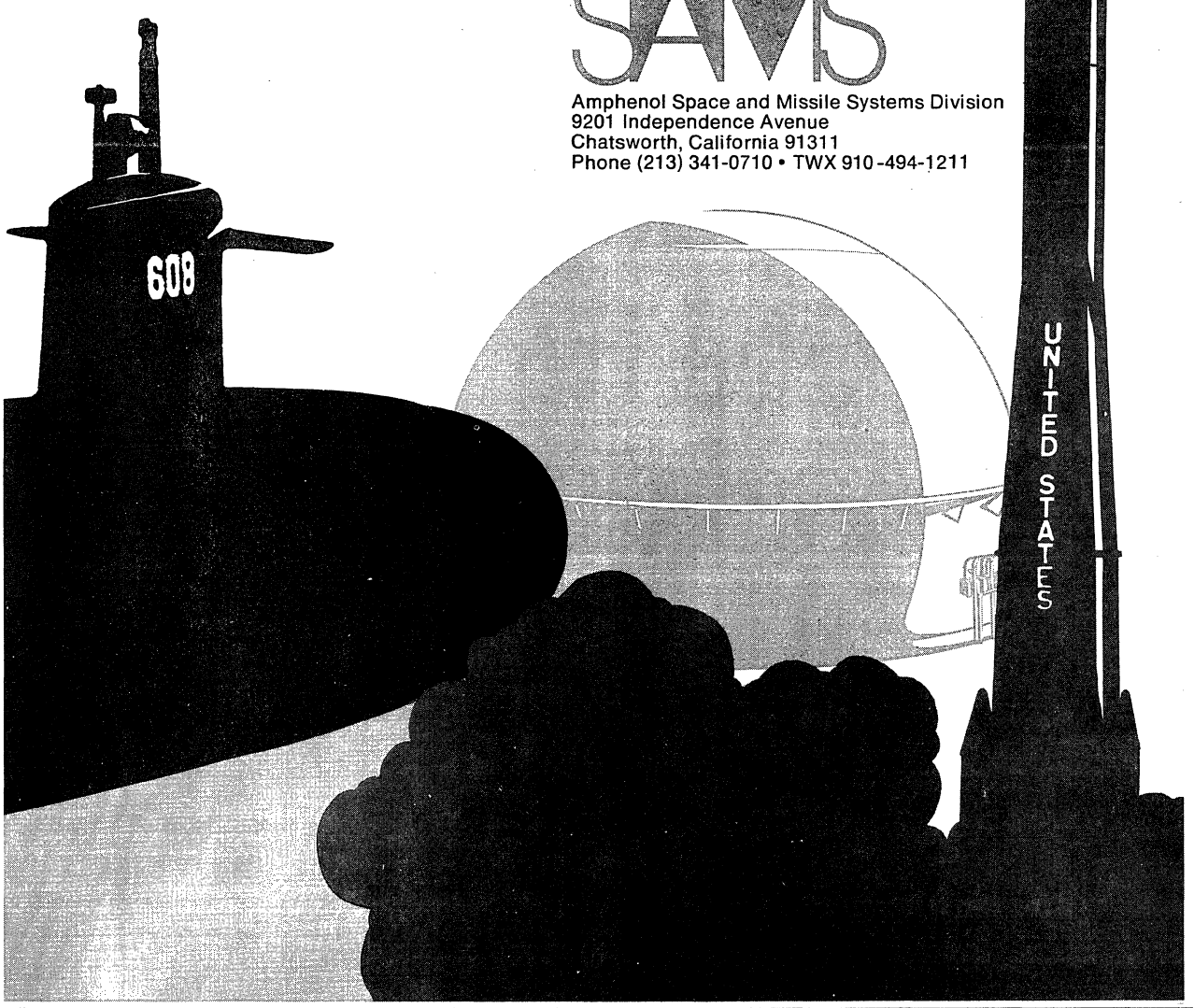


Close customer relationships and in-depth service have facilitated efficiency and discovery at SAMS. Our wide experience and long record of achievement in virtually all aerospace programs has contributed significantly to this important service capability. Your project or program stands to benefit from the expertise developed through our involvement with programs in other industries.

Whether your needs dictate special connectors and cable assemblies, or complex interconnection systems . . . whether your industry is aerospace, shipbuilding or nuclear power generation . . . your best connection is SAMS!

SAMS

Amphenol Space and Missile Systems Division
9201 Independence Avenue
Chatsworth, California 91311
Phone (213) 341-0710 • TWX 910-494-1211



CONNECTOR SELECTION GUIDE

BUNKER RAMO AMPHENOL

Amphenol provides superior environmental connectors

They offer the following design features in common:

MONOBLOCK CONSTRUCTION — Eliminates air voids and protects against degrading moisture and altitude conditions. Made with materials developed specifically for environmental connectors.

LIGHTWEIGHT — Shells are made of aluminum; inserts and grommets are made of strong lightweight dielectric.

HIGH DENSITY — AMPHENOL research and design has developed high density contacts in environmental connectors, using a dielectric retention system.

COMPLETE ENVIRONMENTAL SEALING — Wire grommet seals, resilient interfacial seals and peripheral "O" ring shell seals provide ultra-reliable environmental seals.

POKE-HOME® CONTACTS — AMPHENOL pin and socket contacts are front release and rear insertion. They provide easy servicing without disassembling the connector or disturbing adjacent contacts. Gold plating provides better contact surface and keeps contacts oxidation-free.

TOOLS — AMPHENOL designed (and M.S.) tools, for each type of connector, are available. Both hand tools and semi-automatic types.

Amphenol provides superior AN/MS connectors

MS connectors conform to Military Specification 5015 and are intermateable and interchangeable wtih AMPHENOL's AN connectors. AMPHENOL has been manufacturing reliable, high quality AN/MS standard circular connectors for over 35 years. Much of the research and development of these connectors has come from AMPHENOL, including diallyl phthalate, a resin that has near perfect dimensional stability, high arc resistance, and maintains high insulation resistance under both hiumidity and thermal stress. This is the dielectric material used in standard connector inserts, except for R construction connectors. These use resilient neoprene which is MIL approved and provides an environmental seal that exceeds MIL-C-5015 requirements.

SELECTOR GUIDE

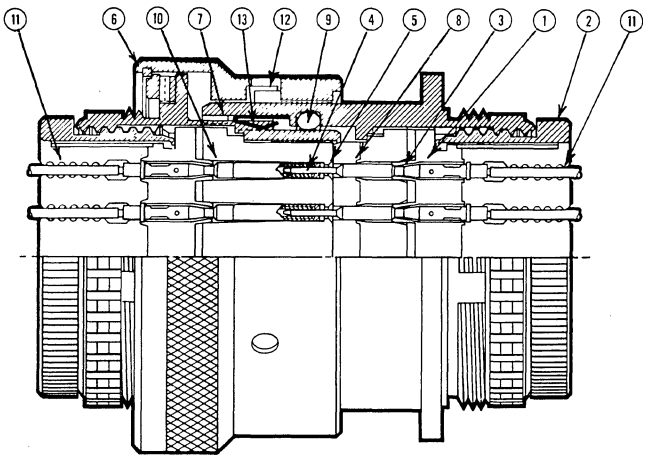
Page	Series	Meets/Exceeds MIL-Spec	Description	Contacts	Pressure Proof	Max. Temp.	Mates With
SUB-MINIATURE CIRCULAR							
2	348	MIL-C-81511 (Tri-Service)	Environmental, high contact density, "No-scoop" general purpose sub-miniature, O.D. finish, silicone rubber inserts, polymer retention disc.	3 to 155 Crimp	Yes	392°F	348 series
12	115	Does not apply	Subminiature MS type, tough highly reliable, Wt. less than ½ ounce, shells nickel-plated brass or stainless steel.	2 or 4 Pin-molded in Socket held with C washers	Depends on appli-cation	500°F 1000°F	115 series
MINIATURE CIRCULAR							
5	48	MIL-C-26500 (USAF) MIL-C-38300	Miniature, environmental, threaded and bayonet coupling. Black anodized finish. Silicone rubber dielectric.	3 to 61 Crimp/ Poke-Home®	Yes	392°F	48 series
9	67	MIL-C-5015	Miniature, environmental, Bayonet, gray anodized finish, Diallyl phthalate dielectric.	3 to 48 solder cup	Yes	257°F	67 series
13	165	MIL-C-19572	Miniature AN/MS, Pressure & Waterproof, bayonet. Diallyl phthalate dielectric.	5 to 24 solder cup	Yes	257°F	165, 182 series
13	182	Does not apply	Miniature AN/MS hermetic.	5 to 24 solder cup	Yes	392°F	165 series
STANDARD CIRCULAR							
15	270	Does not apply	Supersonic connector, impervious to fuels and solvents, fireproof polymer inserts, lightweight, "No-scoop".	3 to 19 Crimp/ Poke-Home®	No	500°F	270 series
17	246	MIL-C-5015E	MS type with crimp removable contacts. Environmental, fluid & damage resistant.	1 to 48 Crimp/ Poke-Home®	Yes	257°F	246, & all MIL-C-5015
17	208	MIL-C-5015E	MS type, Crimp Poke-Home contacts. High temp., fluid resistant.	2 to 37 Crimp/ Poke-Home®	Yes	347°F	208, & all MIL-C-5015
17	238	MIL-C-5015E	MS type, Crimp Poke-Home contacts. High temp. flame resistant.	2 to 37 Crimp/ Poke-Home®	Yes	2000°F	238 & all MIL-C-5015
16	69	MIL-C-5015	Environmental, threaded coupling. O.D. finish, neoprene dielectric.	2 to 37 Crimp/ Poke-Home®	Yes	257°F	69, all MS, 89, 172 series
18	MS-A	MIL-C-5015	Solid back shell, Threaded coupling, O.D. finish, Diallyl phthalate dielectric.	1 to 52 solder cup	No	257°F	All MS, 69, 89, 172 series
18	MS-B	MIL-C-5015	Solid back shell, Threaded coupling, O.D. finish, Diallyl phthalate dielectric.	1 to 52 solder cup	No	257°F	All MS, 69, 89, 172 series
18	MS-E	MIL-C-5015	Environmental. Threaded coupling, O.D. finish, Neoprene rubber dielectric.	1 to 48 solder cup	Yes	257°F	All MS, 69, 89, 172 series
18	MS-R	MIL-C-5015	Environmental, Lightweight Threaded coupling, O.D. finish, Neoprene rubber dielectric.	1 to 48 solder cup	Yes	257°F	All MS, 69, 89, 172 series
24	89	Does not apply	Submersible, threaded coupling, clear or O.D. cadmium finish. Diallyl phthalate dielectric.	2 to 52 solder cup	Yes	257°F	All MS, 69, 89, 172 series
RACK AND PANEL							
25	217	MIL-C-26518 (USAF) MIL-C-38300	Miniature, high environmental rectangular. Spring-loaded front or rear panel mount.	18 to 102 Crimp/ Poke-Home®	Yes	500°F	217 series
27	94	Does not apply	Rectangular available with standard Poke-Home or shielded contacts.	15 to 63 Crimp or solder cup	Yes	257°F	94 series
28	213	Does not apply	Completely environmental monoblock ARINC. Die-cast aluminum shell, O.D. finish, silicone rubber inserts, Standard and High Temp.	57 & 67 Crimp/ Poke-Home®	Yes	257°F	213 series, intermateable with all 404 ARINC connectors

HIGH DENSITY CONNECTORS

BUNKER RAMO AMPHENOL

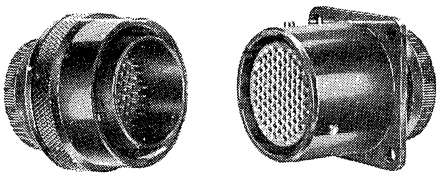
Amphenol ASTRO/348® MIL-C-81511* High Density Connectors

DESIGN FEATURES



1 Molded One-Piece Contact Retention Disc.
2 Captivated Rear-Locking Nut.
3 Individual Contact Risers.
4 Anti-Scoop Recessed Pin Contacts (in receptacle).
5 Closed Entry Socket Insert and Contacts.
6 Captivated Triple Bayonet Coupling System.
7 5 Key Polarization
8 Interfacial Mating Seal
9 Dynamic "O" Ring Peripheral Shell Ring.
10 Monoblock Construction—Inserts Bonded to Shells.
11 Self-Sealing Rear Grommets.
12 Visual Mating Indicator.
13 Shell to Shell Grounding Fingers.

50% No-Scoop construction cross-section is illustrated



Even if a plug with pin contacts and a receptacle with pin contacts are inadvertantly mated, 100% No-Scoop Astro/348 connectors offer full protection: .090 separates the two contact sides.

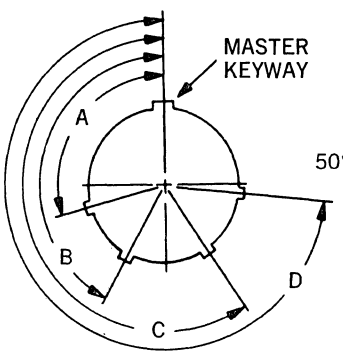
In the 100% No-Scoop connectors it has been possible to completely ring the interior of the plug with grounding fingers for improved EMI protection.

"3X" identifies the 100% No-Scoop construction in the How To Order information, page 3. "4X" is the standard Astro/348 construction. When pin contacts are used in the receptacle only (by usage, 80% of the time) these connectors are also No-Scoop.

Because "3X" and "4X" connectors have different shell position keying there is no possibility of intermating the two constructions.

"Order "3X" 100% No-Scoop when you have possible blind-mating or critical systems applications. Order "4X" (referred to in MIL-C-81511 as series 20) every other time.

NORMAL



Amphenol designed out the costly space-wasters in removable-contact connectors when we invented Astro/348. Problem-causing metal retention clips for each contact are gone. Instead, a single one-piece molded dielectric retention system locks Poke-Home contacts in place. Originally designed as a high density subminiature, Astro/348 turned out to be the best high density miniature and standard connector ever made. It packs more contacts of every size into standard shells than any other design. MIL-C-81511 has established the standard connector family for the next decade.

FOR EXAMPLE

Here's what Astro/348 in a size **18 shell** can give you:

Astro/348	Closest Alternative
85 #23-22 Contacts	67 #22M Contacts
37 #20 Contacts	32 #20 Contacts
19 #16 Contacts	11 #16 Contacts
18 #12 Contacts	None Available

All at less cost, and in less space, for each circuit carried.

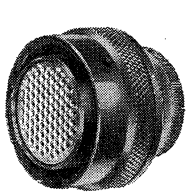
LARGER ON THE INSIDE

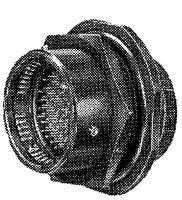
The single-piece retention disc gives other excellent advantages in addition to density. Dielectric wall thicknesses in the sub-miniature #23-22 contact arrangements **are equal to standard miniatures.** With greater contact density, #20's, #16's and #12's provide dielectric separation comparable to standard miniature and power connectors.

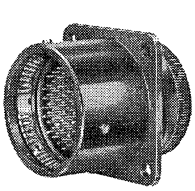
FIGHT SCOOPING

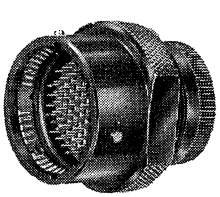
Scooping means that pin contacts in a connector can be damaged when the mating shell is accidentally wiped across the pin connector face. Astro/348 is available in two constructions: Series 1 and Series 2. Series 2 (50% No-Scoop) means that scooping is impossible when the pin contacts are in the receptacle shell (this is normal usage). In Series 1 (100% No-Scoop) constructions, scooping is impossible whether the pin contacts are in the plug or the receptacle.

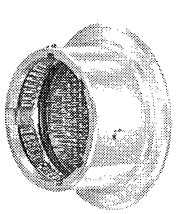
Shell Constructions

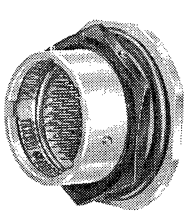

Plug


Single Hole Mtg. Receptacle


Square Flange Receptacle


Cable Receptacle


Hermetic Seal — Solder Flange Receptacle


Hermetic Seal — Recptacle Single Hole Mtg.

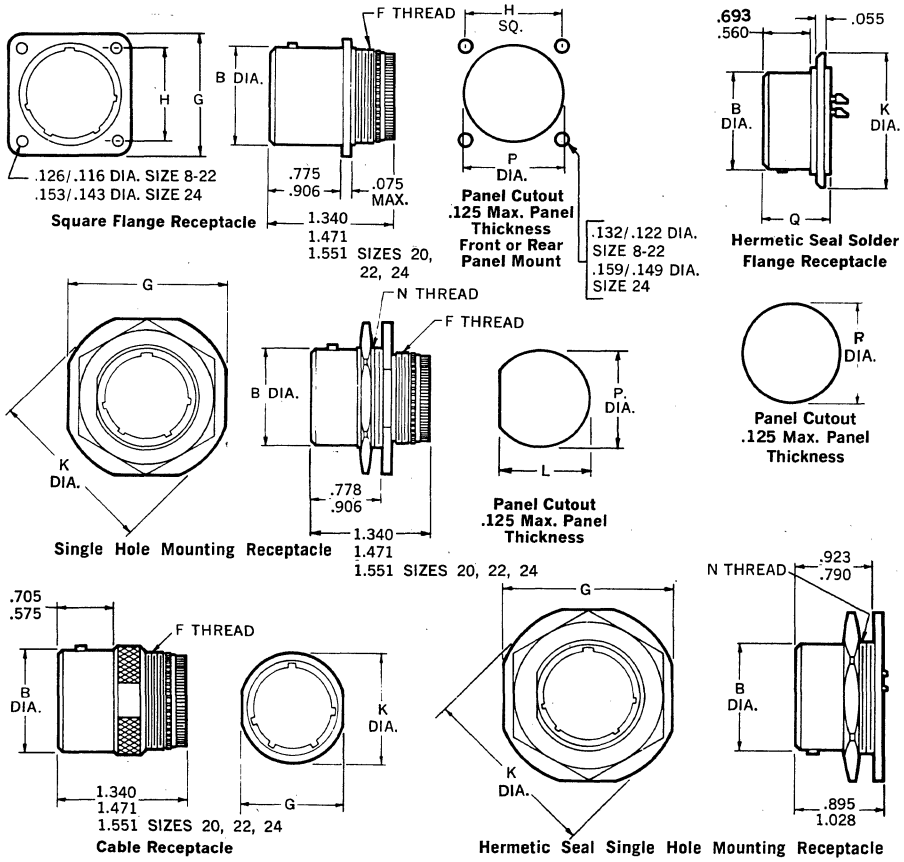
* MIL-C-81511 is a Military Specification for Connectors, Electric, Circular, High Density, Quick Disconnect, Environment Resistant.
Astro/348 and Poke-Home are Trade Marks of The Bunker-Ramo Corp.

HIGH DENSITY CONNECTORS

BUNKER RAMO AMPHENOL

Amphenol ASTRO/348 High Density Connectors (Continued)

Shell Style and Dimensions (inches) All dimensions are shown as MAX.



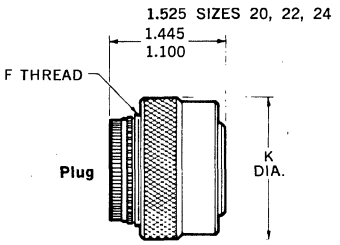
Color Denotes Series 1 design.

SHELL SIZE	8	10	14	16	18	24-100% No-Scoop
B Dia. Max.	.553	.678	.928	1.054	1.178	1.553
F Thread	½-28	⅝-28	⅞-28	1-28	1⅛-28	1½-28
G Max. Sq. Flange Receptacle	.820	.945	1.133	1.258	1.351	1.711
G Max. Cable Receptacle Flats	.565	.690	.940	1.066	1.190	1.565
G Max. Single Hole Mtg. Receptacle and Hermetic Seal "D" Hole Receptacle	.989	1.114	1.401	1.526	1.651	2.089
H ±.005	.594	.719	.906	.969	1.062	1.375
K Dia. Max. Cable Receptacle	.780	.900	1.150	1.280	1.400	1.775
K Dia. Max. Single Hole Mtg. Receptacle and Hermetic Seal Single Hole	1.072	1.197	1.510	1.635	1.745	2.165
K Dia. Max. Plug	.850	.975	1.225	1.350	1.475	1.900
K Dia. Hermetic Seal Solder Flange Receptacle	.945	1.070	1.320	1.446	1.570	2.066
L ±.005	.605	.730	.980	1.105	1.230	1.605
N Thread	⅝-20	¾-20	1-20	1⅛-20	1¼-20	1⅝-20
P Dia. ±.005	.635	.760	1.010	1.135	1.260	1.635
Q Max.	.710	.710	.710	.710	.740	.903
R Dia. ±.005	.661	.786	1.036	1.162	1.286	1.666

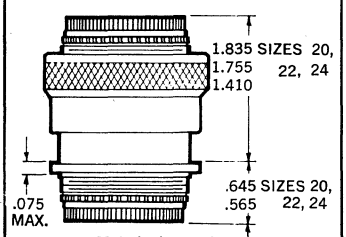
Note: Consult Factory for Dim. on 20 & 22 size connectors.

Table of Contacts

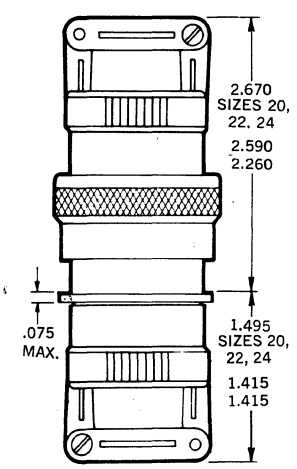
Contact Size		Wire Size	Amphenol Part Number Socket	Amphenol Part Number Pin	MS Part Number Socket	MS Part Number Pin
23-22	Series 2 Contacts	#22, #24, #26	348-100-2201S-02	348-100-2202P-02	MS90460A23-22	MS90461A23-22
23-28		#28, #30, #32	348-100-5047S-02	348-100-5047P-02	MS90460A23-28	MS90461A23-28
20-20		#20, #22, #24	348-100-2000S-02	348-100-2000P-02	MS90460A20-20	MS90461A20-20
16-16		#16, #18, #20	348-100-1600S-02	348-100-1600P-02	MS90460A16-16	MS90461A16-16
12-12		#12, #14	348-100-1200S-02	348-100-1200P-02	MS90460A12-12	MS90461A12-12
23-22	Series 1 Contacts	#22, #24, #26	348-100-2203S-02	348-100-2202P-02	MS3343A23-22	MS90461A23-22
23-28		#28, #30, #32	348-100-5048S-02	348-100-5047P-02	MS3343A23-28	MS90461A23-28
20-20		#20, #22, #24	348-100-2003S-02	348-100-2000P-02	MS3343A20-20	MS90461A20-20
16-16		#16, #18, #20	348-100-1603S-02	348-100-1600P-02	MS3343A16-16	MS90461A16-16
12-12		#12, #14	348-100-1203S-02	348-100-1200P-02	MS3343A12-12	MS90461A12-12



Mated Connectors Dimensions (inches)



Mated Plug and Square Flange Receptacle



Mated Plug and Square Flange Receptacle with Cable Supports

Grounding Fingers

Shell-to-shell grounding is established by beryllium spring fingers permanently fixed to the series 2 receptacle shell and the series 1 plug shell. These spring fingers are spaced 16 to the inch (exception: fingers omitted in keyways of series 2 receptacles). Grounding fingers make contact .090 prior to contact engagement.

Hardware Availability: Straight cable clamps, dummy receptacles, caps and chain assemblies & "J" type adapters are available for all shell sizes.

Tools for contact crimping, insertion and removal are available.

HIGH DENSITY CONNECTORS

BUNKER RAMO AMPHENOL

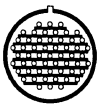
Amphenol ASTRO/348 High Density Connectors (Continued)

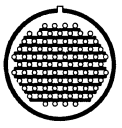
Available Inserts

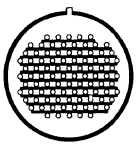
8-04
4 #23-22 CONTACTS

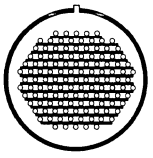
10-12
12 #23-22 CONTACTS

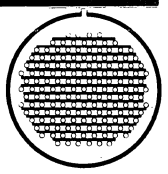
14-37
37 #23-22 CONTACTS


16-55
55 #23-22 CONTACTS


18-85
85 #23-22 CONTACTS

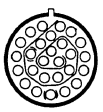

20-92
92 #23-22 CONTACTS

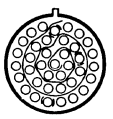

22-121
121 #23-22 CONTACTS


24-155
155 #23-22 CONTACTS

10-05
5 #20-20 CONTACTS

14-19
19 #20-20 CONTACTS


16-27
27 #20-20 CONTACTS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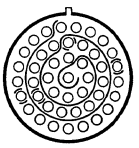
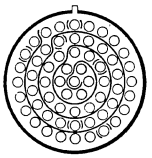
38 #20-20 CONTACTS


20-45
45 #20-20 CONTACTS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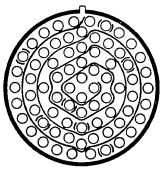
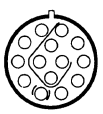
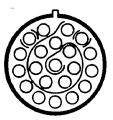
61 #20-20 CONTACTS

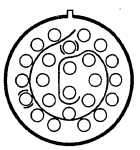

24-74
74 #20-20 CONTACTS

10-03
3 #16-16 CONTACTS

14-09
9 #16-16 CONTACTS


16-14
14 #16-16 CONTACTS


18-21
21 #16-16 CONTACTS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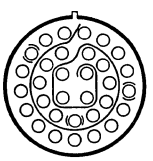
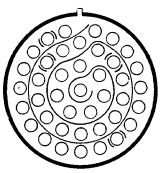
24 #16-16 CONTACTS


22-32
32 #16-16 CONTACTS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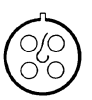
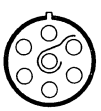
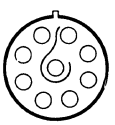
41 #16-16 CONTACTS


14-04
4 #12-12 CONTACTS


16-07
7 #12-12 CONTACTS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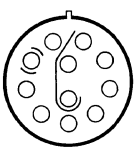
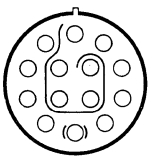
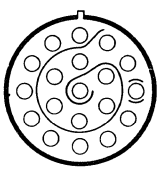
9 #12-12 CONTACTS


20-11
11 #12-12 CONTACTS


22-14
14 #12-12 CONTACTS


24-19
19 #12-12 CONTACTS

†Consult factory for availability.

High density points the way to the standard connector family for the next decade.

Shown are the high density insert arrangements now tooled for MIL-C-81511 Astro/348 connectors. This picture of availability illustrates the growth of Amphenol's new standard connector family. Comparisons are invited against other Military Standard connector lines through all contact sizes for engineering design, density of contacts, and cost per circuit.

How to order:

ASTRO/348 CONNECTORS

To get the specific Astro/348 connector you want, put together the part number as per the following example.

348 - 4 0 E 18 - 85 S 1 (200)

SERIES DESIGNATION

TYPE†
4-MIL-C-81511 — Series 2 (50% No-Scroop)
3-MIL-C-81511 — Series 1 (100% No-Scoop)

SHELL STYLE
0—Square Flange Receptacle
1—Cable Receptacle
3—Single Hole Mtg. Receptacle
5—Solder Flange Receptacle (Hermetic only)
6—Straight Plug

CLASS
E—Environmental
H—Hermetic
P—Potted

SHELL SIZE
08 10 14 16 18 20* 22* 24*
*Shell size available only in 100% No-Scoop Design.

DEVIATIONS
Omit if no cable clamp is desired.
(200)—Connector with cable clamp.
(201)—Connector less contacts.

ALTERNATE SHELL POSITIONS

1 NORMAL	4
2	5
3	6

CONTACT STYLE
P—Pin S—Socket

INSERT ARRANGEMENT
03 04 05 07 09 11 12 14
19 21 24 27 32 37 38 41
45 55 61 74 85 92 121 155

† Consult Factory for additional connector types available per MIL-C-81511C.
Note: Back Shell J — adapters, Straight, 40%, 90%, available. Consult Factory.

MILITARY STANDARD PART NUMBERS

MIL-C-81511B connectors can be ordered by military numbers also. The part number is put together as per the following example.

M81511 / 01 E 18 - 85 P 1

SPECIFICATION NUMBER

SHELL TYPE†
/01 Square Flange Receptacle — Series 2
/02 Solder Flange Receptacle, Hermetic — Series 2
/03 Single Hole Mtg. Receptacle — Series 2
/04 Single Hole Mtg. Receptacle, Hermetic — Series 2
/05 Cable Receptacle — Series 2
/06 Straight Plug — Series 2
/21 Square Flange Receptacle — Series 1
/22 Solder Flange Receptacle, Hermetic — Series 1
/23 Single Hole Mtg. Receptacle — Series 1
/24 Single Hole Mtg. Receptacle, Hermetic — Series 1
/25 Cable Receptacle — Series 1
/26 Straight Plug — Series 1

KEY POSITIONS
1, 2, 3, 4, 5, 6

CONTACT
P—Pin S—Socket

INSERT ARRANGEMENT
03 04 05 07 09 11
12 14 19 21 24 27
32 37 38 41 45 55
61 74 85 92 121 155

SHELL SIZE
08 10 14 16
18 20* 22* 24*
*Shell size available only in 100% No-Scoop Design.

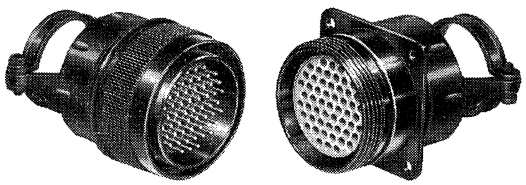
CLASS
P—Potted
E—Environmental
H—Hermetic

MINIATURE CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

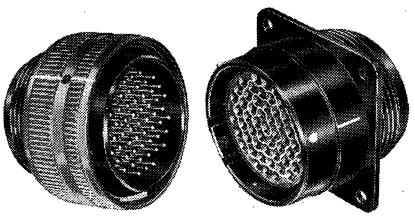
48 Series High-Reliability, Environment-Resistant Connectors

MIL-C-26500 PERFORMANCE

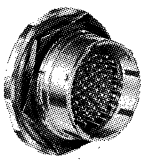


48 Series Regular

MIL-C-38300 PERFORMANCE



48 Series Ultra-Mate®



Hermetically Sealed Receptacle

SIGNIFICANT ADVANCE IN STATE-OF-THE-ART

On the ground or in space, wherever there is a requirement for superior environmental protection, high reliability, and minimum weight and bulk, 48 Series miniature environment-resistant connectors are the answer.

In developing this series, Amphenol faced the problem of satisfying reliability, logistics, and present and anticipated environmental requirements for connector usage. To solve the problem, Amphenol had to generate advanced design concepts, formulate materials specifically for connector usage, and work out new production techniques. The resulting connectors exceed the stringent requirements of MIL-C-26500 (USAF) and MIL-C-38300 (USAF) for performance and reliability.

FULL PERFORMANCE IN EXTREME ENVIRONMENTS

Advance materials technology and complete environmental sealing enable these remarkable connectors to:

- Operate continuously at 200°C (392°F)
- Withstand thermal shock cycling from −55°C (−67°F) to 260°C (500°F)
- Support 1500V RMS from sea level to 350,000 ft., mated
- Maintain environmental and electrical integrity during and after 0 to 2000 CPS vibration during exposure to 200°C (392°F) and −55°C (−67°F)
- Withstand physical shock of 100 gravity units
- Resist corrosion, ozone, sand and dust

ULTRA-MATE CLOSED ENTRY AND FRONT SERVICING

Ultra-Mate connectors are identical to the other connectors in the 48 Series, but the socket inserts have a hard face of glass-filled epoxy. They are the first to combine the positive reliability of closed entry with the speed and convenience of front servicing. In addition, the MIL-C-26636 contacts are tamper proof. Wrong-size contacts or oversize test prods cannot be inserted in the hard dielectric contact entryways on

OUTSTANDING DESIGN FEATURES

Complete Environmental Sealing — 48 Series connectors are fully sealed against extreme environmental conditions.

Amphenol-developed, silicone rubber dielectric provides resilience and unsurpassed resistance to tear, compression set, fluids and high temperatures.

When the connectors are mated, insert faces compress to form a resilient dielectric seal around each individual contact. A continuous barrier on the periphery of the socket insert mates with a recess around the pin insert to form an additional compression seal. A dynamic "O" ring seal between mated shells constitutes still another barrier to dirt and moisture, and protects the integrity of the face seals. Together with monoblock construction, this puts void-free, continuous dielectric around each contact through the entire connector length.

Monoblock construction, with bonded interfaces between the dielectric components (insert, anti-deflection disc, and grommet) eliminates air voids and protects connectors from degrading moisture and altitude conditions. A pressurizing seal around each contact at the major O.D. prevents the passage of air or moisture through the contact hole, and triple sealing riser design at each wire hole in the grommet seals each individual wire.

Go/No-Go Reliability — When an Ultra-Mate connector is mated, you can be sure there is proper contact. The socket contacts are closely surrounded by hard dielectric with a chamfered entry to guide in the pins accurately. However, if the pins are bent, the hard dielectric presents a closed entry and prevents mating.

Light Weight and High Contact Density — Connector shells are impact-extruded aluminum forgings with a high strength-to-weight ratio. The insert arrangement is designed for the maximum number of contacts within the area available.

Poke-Home Contacts — Poke-home contacts (front release, rear insertable) provide for easy servicing of connector circuits without disassembling the connector from its mounting, or disturbing adjacent contacts. MIL-C-26636 contacts are crimped quickly, consistently, and reliably with either hand or power tools. They have high electrical conductivity, present a smooth configuration, and completely protect electrical contact pressure-members from environmental and handling damage. The contacts come in sizes 20, 16, 12 and shielded, with rhodium-over-silver plating. (Other platings such as gold are available; write factory for details.)

MINIATURE CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

48 Series High-Reliability, Environment-Resistant Connectors (Continued)

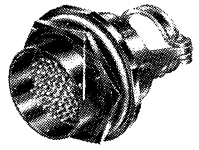
Shell Types

Threaded Plug
48-06RXX-XXX
MS24266RXXTXXX

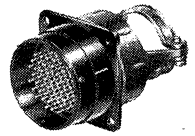
Threaded Square Flange Receptacle
48-00RXX-XXX
MS24264RXXTXXX

Threaded Single Hole Mounting Receptacle
48-03RXX-XXX
MS24265RXXTXXX

Bayonet Plug
48-16RXX-XXX
MS24266RXXBXXX



Bayonet Single Hole Mounting Receptacle
48-13RXX-XXX
MS24265RXXBXXX



Bayonet Square Flange Receptacle
4810RXX-XXX
MS24264RXXBXXX

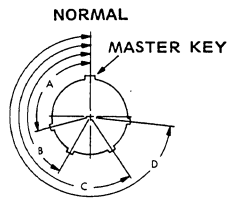
Alternate Shell Positions

	For Connectors Size 8 and 10				For Connectors Size 12, 14, 16, 18, 20, 22, and 24			
Position	A	B	C	D	A	B	C	D
Normal	105°	140°	215°	265°	105°	140°	215°	265°
6	102°	132°	248°	320°	18°	149°	192°	259°
7	80°	118°	230°	312°	92°	152°	222°	342°
9	64°	155°	234°	304°	24°	135°	199°	240°
8	35°	140°	205°	275°	84°	152°	204°	334°
10*	25°	115°	220°	270°	98°	152°	268°	338°

* Position 10 not available in size 8 connector.

Front Face of Receptacle Shown

Note: Alternate positions 6 through 10 incorporate special shell polarizing key and keyways. All inserts remain in the normal position.



Inserts Available (Showing front face of socket insert)

SHELL SIZE — 8

2 #20 contacts
Insert 8-2*

3 #20 contacts
Insert 8-3

SHELL SIZE — 10
MS-24260

5 #20 contacts
Insert 10-5‡

2 #20 contacts
Insert 10-2*

2 #16 contacts
Insert 10-20*

SHELL SIZE — 12
MS-24260

12 #20 contacts
Insert 12-12‡

3 #16 contacts
Insert 12-3

SHELL SIZE — 14
MS-24260

15 #20 contacts
Insert 14-15‡

9 #20 contacts
3 #16 contacts
Insert 14-12*

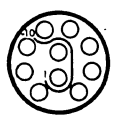
7 #16 contacts
Insert 14-7‡

4 #12 contacts
Insert 14-4†

2 #16 contacts
1 #2 shielded contact
Insert 14-3

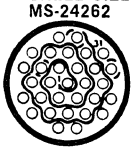
SHELL SIZE — 16
MS-24261

24 #20 contacts
Insert 16-24‡

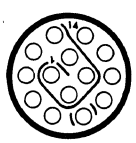


10 #16 contacts
Insert 16-10*

SHELL SIZE — 18
MS-24262



31 #20 contacts
Insert 18-31‡

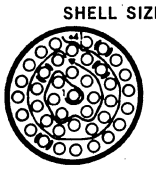


14 #16 contacts
Insert 18-14

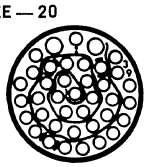
10 #16 contacts
1 #2 shielded contact
Insert 18-11

8 #12 contacts
Insert 18-8†

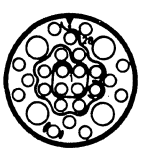
SHELL SIZE — 20



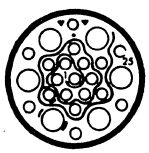
41 #20 contacts
Insert 20-41‡*



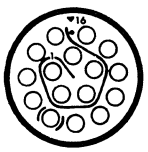
37 #20 contacts
2 #16 contacts
Insert 20-39*



24 #20 contacts
4 #12 contacts
Insert 20-28*†

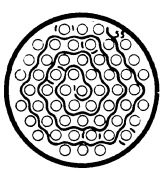


19 #20 contacts
6 #12 contacts
Insert 20-25*†

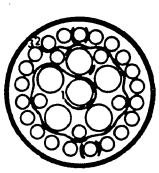


16 #16 contacts
Insert 20-16*

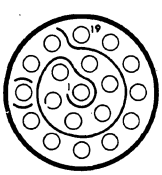
SHELL SIZE — 22
MS-24263



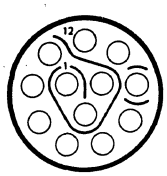
55 #20 contacts
Insert 22-55‡



26 #20 contacts
6 #12 contacts
Insert 22-32*†

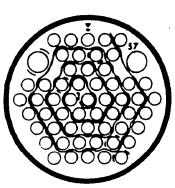


19 #16 contacts
Insert 22-19‡

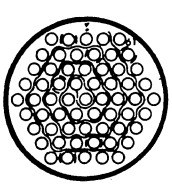


12 #12 contacts
Insert 22-12†

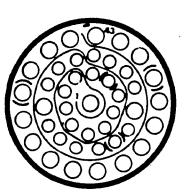
SHELL SIZE — 24



2 #12 contacts
55 #20 contacts
Insert 24-57*†



61- #20 contacts
Insert 24-61‡*



23 #20 contacts
20 #16 contacts
Insert 24-43*

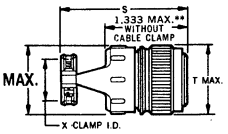
‡ Available with hard-dielectric face socket inserts for Ultra-Mate (MIL-C-38300) connectors. Pin inserts for MIL-C-38300 connectors have a resilient face and, except for marking, are identical to MIL-C-26500 pin inserts.
* Not included MS-2426X at time of printing.
† #1 shielded contact is interchangeable with #12 power contact

MINIATURE CIRCULAR CONNECTORS

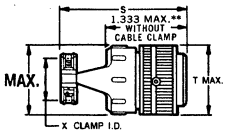
BUNKER RAMO AMPHENOL

48 Series High-Reliability, Environment-Resistant Connectors (Continued)

Plugs



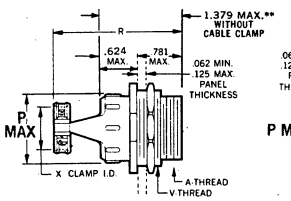
THREADED PLUG
48-06RXX-XXX
MS24266RXXT-XXX



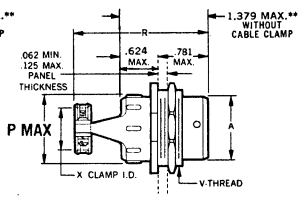
BAYONET PLUG
48-16RXX-XXX
MS24266RXXB-XXX

Shell Size	P Max.*	T Max.* Thrd.	T Max.* Bay.	X ±.015	S Max.
8	.582	.708	.766	.180	1.832
10	.731	.836	.906	.270	1.832
12	.919	1.025	1.078	.400	1.832
14	.981	1.125	1.141	.460	2.067
16	1.106	1.250	1.266	.610	2.067
18	1.231	1.375	1.375	.690	2.067
20	1.356	1.510	1.510	.830	2.067
22	1.481	1.625	1.625	.940	2.067
24	1.606	1.760	1.760	1.040	2.067

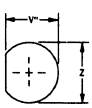
Single Hole Mounting Receptacles



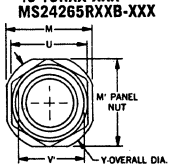
THREADED RECEPTACLE
48-03RXX-XXX
MS24265RXXT-XXX



BAYONET RECEPTACLE
48-13RXX-XXX
MS24265RXXB-XXX



PANEL
CUT-OUT



FLANGE AND NUT

BOTH THREADED AND BAYONET RECEPTACLES

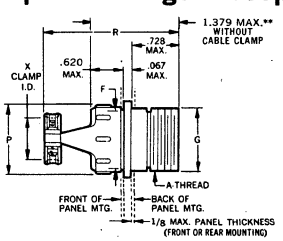
Shell Size	A Thrd.	A +.000 −.005	M Max.	M' Max.	P Max.*	U Max.	V Thrd.	V' ±.003	V'' ±.005	X ±.015	Y Max.	Z ±.005	R Max.
8	5/16-24	.536	.984	.938	.582	.828	5/8-20	.593	.605	.180	1.068	.635	1.890
10	11/16-24	.659	1.109	1.082	.731	.953	3/4-20	.718	.730	.270	1.192	.760	1.890
12	7/8-20	.829	1.296	1.299	.919	1.140	15/16-20	.905	.917	.400	1.380	.947	1.890
14	15/16-20	.898	1.396	1.371	.981	1.250	1-20	.968	.980	.460	1.505	1.010	2.125
16	1 1/16-18	1.025	1.521	1.515	1.106	1.329	1 1/8-20	1.093	1.105	.610	1.630	1.135	2.125
18	1 3/16-18	1.131	1.646	1.660	1.231	1.455	1 1/4-20	1.217	1.225	.690	1.740	1.260	2.125
20	1 5/16-18	1.256	1.771	1.770	1.356	1.642	1 3/8-18	1.342	1.350	.830	1.860	1.385	2.125
22	1 7/16-18	1.381	1.959	1.948	1.481	1.705	1 1/2-20	1.467	1.475	.940	2.040	1.510	2.125
24	1 9/16-18	1.506	2.084	2.084	1.606	1.892	1 5/8-18	1.592	1.600	1.040	2.160	1.635	2.125

**Add .042 for Ultra-Mate connectors with socket inserts.

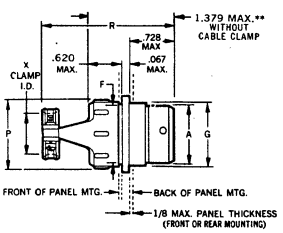
Recommended Minimum Torque for Jam Nut

Shell Size	8	10	12	14	16	18	20	22	24
Torque (Inch/Lbs.)	28	36	56	64.5	69	81	102	122.5	144

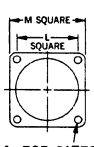
Square Flange Receptacles

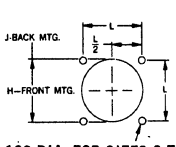


THREADED RECEPTACLE
48-00RXX-XXX
MS24264RXXT-XXX



BAYONET RECEPTACLE
48-10RXX-XXX
MS24264RXXB-XXX





PANEL CUT-OUT DIMENSIONS
FOR BOTH THREADED AND
BAYONET RECEPTACLES

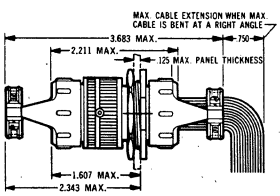
.125/.116 DIA. FOR SIZES 8 THRU 22
.152/.154 DIA. FOR SIZE 24

.132/.122 DIA. FOR SIZES 8 THRU 22
.159/.149 DIA. FOR SIZE 24

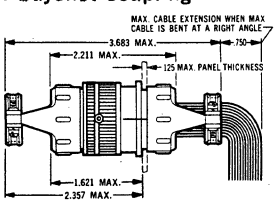
Shell Size	A. Thrd.	A +.000 −.005	F Max.	G Max.	H Min.	J Min.	L ±.005	M ±.005	P Max.	X ±.015	R Max.
8	5/16-24	.536	.437	.561	.447	.620	.594	.812	.582	.180	1.890
10	11/16-24	.659	.562	.696	.572	.748	.719	.937	.731	.270	1.890
12	7/8-20	.829	.750	.875	.760	.913	.812	1.031	.919	.400	1.890
14	15/16-20	.898	.812	.935	.822	.980	.906	1.125	.981	.460	2.125
16	1 1/16-18	1.025	.938	1.062	.948	1.107	.969	1.250	1.106	.610	2.125
18	1 3/16-18	1.131	1.062	1.187	1.072	1.209	1.062	1.343	1.231	.690	2.125
20	1 5/16-18	1.256	1.182	1.312	1.192	1.337	1.156	1.437	1.356	.830	2.125
22	1 7/16-18	1.381	1.312	1.437	1.322	1.452	1.250	1.562	1.481	.940	2.125
24	1 9/16-18	1.506	1.432	1.562	1.442	1.577	1.375	1.703	1.606	1.040	2.125

**Add .042 for Ultra-Mate connectors with socket inserts.

Mated Pairs Threaded or Bayonet Coupling

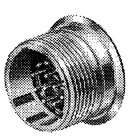


SINGLE HOLE MOUNTING
RECEPTACLE AND STRAIGHT PLUG



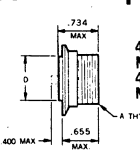
SQUARE FLANGE RECEPTACLE
AND STRAIGHT PLUG

Solder Flange Hermetic Receptacles

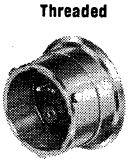


Threaded

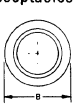
PANEL CUTOUT
Both threaded
and bayonet
receptacles



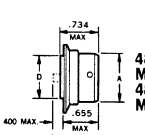
48-05HXX-XXP(108)
MS27034HXXT-XXP
48-05HXX-XXP
MS27034YXXT-XXP



Bayonet



FLANGE
Both threaded
and bayonet
receptacles



48-15HXX-XXP(108)
MS27034H-XXB-XXP
48-15HXX-XXP
MS27034Y-XXB-XXP

Shell Size	A+.000 −.005	A Thrd.	B Max.	D Max.	+.010 −.000 E
10	.659	11/16-24	.860	.557	.567
12	.829	7/8-20	1.065	.750	.755
14	.898	15/16-20	1.110	.807	.817
16	1.025	1 1/16-18	1.230	.933	.942
18	1.131	1 3/16-18	1.360	1.057	1.067
22	1.381	1 7/16-18	1.610	1.307	1.317

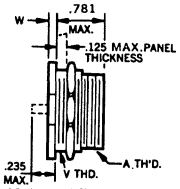
Write factory for information on sizes 8, 20 and 24.

MINIATURE CIRCULAR CONNECTORS

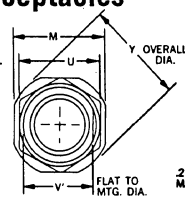
BUNKER RAMO AMPHENOL

48 Series High-Reliability, Environment-Resistant Connectors (Continued)

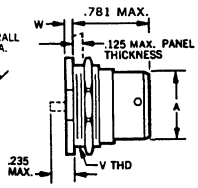
Single Hole Mounting Hermetic Receptacles



48-03HX-XXX
*MS24265HXXT-XXX



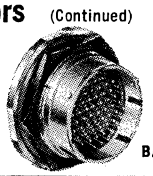
FLANGE AND NUT BOTH THREADED AND BAYONET RECEPTACLES



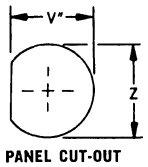
48-13HXX-XXX
*M24265HXXB-XXX

* Specify whether solder pocket or eyelet contact tail is desired. Write factory for information on sizes 18 and 24.

THREADED



BAYONET



PANEL CUT-OUT

Shell Size	A +.000 −.005	A Thrd.	Y Max.	M Max.	U Max.	V Thrd.	V' ±.003	V" ±.005	W Max.	Z ±.005
10	.659	11/16-24	1.192	1.109	.953	3/4-20	.718	.730	.137	.760
12	.829	7/8-20	1.380	1.296	1.140	15/16-20	.905	.917	.137	.947
14	.898	15/16-20	1.505	1.396	1.250	1-20	.968	.980	.137	1.010
16	1.025	1 1/16-18	1.630	1.521	1.329	1 1/8-20	1.093	1.105	.137	1.135
18	1.131	1 3/16-18	1.740	1.646	1.455	1 1/4-20	1.217	1.225	.137	1.260
22	1.381	1 7/16-18	2.040	1.959	1.705	1 1/2-20	1.467	1.475	.137	1.510

How to Order:

Amphenol Numbers

To get the specific 48 Series connector you want, put together the part number as per the following typical example.

48 – 0 6 R 22 – 55 P 6 – (102)

SERIES DESIGNATION	COUPLING TYPE	SHELL STYLE	ENVIRONMENTAL CLASS	SHELL SIZE	NUMBER OF CONTACTS	CONTACT STYLE	Alternate Shell Positions	DEVIATIONS
48—	0—Threaded 1—Bayonet	0—Square Flange Receptacle 3—Single Hole Mounting Receptacle ¶ 5—Solder Flange Mounting Receptacle (Hermetic only) ¶ 6—Straight Plug	R—Meets MIL-C-26500 (USAF) Hard Socket Insert *C—Meets MIL-C-38300 (USAF)* H—Hermetically Sealed ¶ G—Grounding F—Fluid Resistant	8, 10, 12, 14, 16, 18, 20, 22, 24	2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16, 19, 24, 25, 28, 31, 32, 39, 41, 43, 55, 57, or 61	P—Pin S—Socket	6, 7, 8, 9, 10 as per table on page 5	(100) Connector for Potting (102) Connector Less Cable Support (105) Connector Less Contacts (106) Connector Less Contacts and Less Cable Support (108) Hermetic Receptacle with Solder Cup Contact (135) Gold Iridite Finish on Shell — 48-XXGXX-XX(135) *(145) MIL-C-38300 Resilient Insert "P" contact only

See Table of available inserts
¶Hermetics are available in receptacle shell style "X3" (MS24265) and "X5" (MS27034).
*The 48 Series part numbers for Ultra-Mate connectors (MIL-C-38300) are 48-XXCXX-XXSX and 48-XXRXX-XXPX(145). MIL-C-38300 connectors are furnished without cable clamp. If a cable support is desired, it must be ordered separately.

Military Standard Part Numbers

You can use MS as well as Amphenol part numbers in ordering 48 Series connectors. The MS part numbers for MIL-C-26500 connectors are worked out on the basis shown in the table below. Whether you order by the MS or the 48 Series number, all qualified connectors are shipped with the MS marking.

The part numbers for MIL-C-38300 connectors start off with the identification M38300/ and take the form M38300/XXXX-XX. To determine the specific M numbers, refer to military specification MIL-C-38300.

MS24266 R 22 T 55 P 6 X

MS SHELL DRAWING	ENVIRONMENTAL CLASS	SHELL SIZE	COUPLING TYPE	NUMBER OF CONTACTS	CONTACT STYLE	Alternate Shell Positions	CABLE SUPPORT
MS24264—Square Flange Receptacle MS24265—Single Hole Mounting Receptacle ¶ MS24266—Straight Plug MS27034—Solder Flange Mounting Receptacle (Hermetic only)	R—Meets MIL-C-26500 (USAF) †G—Grounding H—Hermetically Sealed ¶ Solder Pocket Contacts Y—Hermetically Sealed ¶ Flattened and Pierced Contacts	8, 10, 12, 14, 16, 18, 20, 22, or 24	T—Threaded B—Bayonet	2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16, 19, 24, 25, 28, 31, 32, 39, 41, 43, 55, 57, or 61	P—Pin S—Socket	6, 7, 8, 9, 10	X—Less cable support (Omit if cable support is desired)

Part numbers, both Amphenol and Military Standard, for the contacts and assembly tools are listed below.
¶Hermetics are available in receptacle shell style (MS24265) and (MS27034).
†Contact nearest Amphenol sales office for availability.

Poke-Home Contacts and Tool Applications

CONTACTS — When you order 48 Series connectors with contacts, the contact package contains enough contacts to complete the insert arrangement and have at least 2 spares left. The package also includes enough sealing plugs for at least 15% of the contacts in the insert, in any case a minimum of 3 sealing plugs. To provide proper sealing, insert unwired contacts and sealing plugs in all unused holes. (Use a #12 contact for a #1 shielded hole.) To order contacts and sealing plugs separately use the part numbers in the table below. Contacts may also be ordered in reels for use with automatic crimping tools.

TOOLS — Note that various tools are available for crimping, inserting, and removing each size contact.

Contact Size	Wire Size AWG	Max. Current Rating Amps.	AMPHENOL Part No. Pin	AMPHENOL Part No. Socket	MS Part No. Pin	MS Part No. Socket	Crimping Tool	Bushing (Positioner)	Crimp Jaw Setting Dia. (Insp.)	Insertion Tool	Removal Tool: Standard Connector	Removal Tool: Ultra-Mate Connector
No. 20	24 22 20	3.0 5.0 7.5	48-1595-02	48-100-2000S-02 OR 248-136-2001S-02	MS24254-20P	MS24255-20S	294-126 294-186 294-243 294-293 294-358 294-506	Included 294-1266 Turret Hd. Turret Hd. 294-444 Automatic	.031-.041 .031-.041 .031-.041	294-88 (MS24256A20) or 294-213	294-89 (MS24256R20)	294-203, (MS24256RH20)
No. 16	18 16	16 22	48-1825-02	48-100-1600S-02 OR 248-136-1600S-02	MS24254-16P	MS24255-16S	294-126 294-243 294-293 294-358 294-506	Included Turret Hd. Turret Hd. 294-901 Automatic	.041-.053 .041-.053	294-96 (MS24256A16)	294-97 (MS24256R16)	294-180, (MS24256RH16)
No. 12	14 12	32 41	48-1827-02	48-1215-02	MS24254-12P	MS24255-12S	294-86 294-126 294-243 294-293 294-358 294-506	294-903 Included Turret Hd. Turret Hd. 294-903 Automatic	.0625 .062-.072 .062-.072	294-72 (MS24256A12)	294-73 (MS24256R12)	294-183, (MS24256RH12)

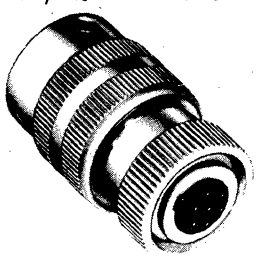
CONTACT FACTORY FOR INFORMATION AND SPECIFICATIONS ON SHIELDED CONTACTS

STANDARD CIRCULAR CONNECTORS

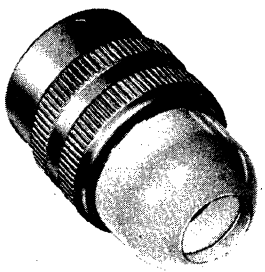
BUNKER RAMO AMPHENOL

67 Series MinniE® Environment Resistant Connectors

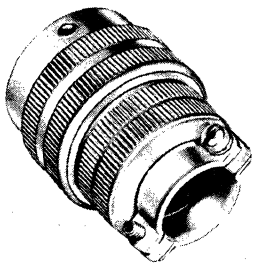
Miniature, Quick-Disconnect, Bayonet-Lock Connectors



E
With unitized grommet for individual use seal



P
Includes potting mold



C
Vise action with two screw strain relief

Environmentally Sealed

- Choice of unitized back end grommet or provision for potting. Both exceed moisture resistance requirements of MIL-C-5015.
- Face seal gasket has individual barriers to isolate each contact.
- No derating for altitude is required up to 70,000 feet if the sealed connectors are mated.
- Sealed connectors take 1500 V RMS at 70,000 feet.
- Vibration resistance per Method 204, MIL-STD-202A is 10 to 2,000 cps at 20 G's.
- Temperature cycling range per MIL-C-5015 is −67°F to
- +257°F.

Lightweight and Convenient

- Flattened incline angle of bayonet slots makes mating easier.
- Clamp and grommet combine to form a unitized seal for ease of assembly and maintenance.
- Connectors convert easily from E style to P style and vice versa.
- Yellow ring on receptacle shell gives visual indication of connector engagement.
- Weight is about half that of standard connectors with same number of contacts.
- Eighteen different insert configurations are available.
- Alternate insert positions are available.

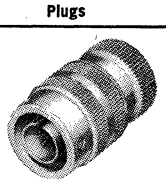
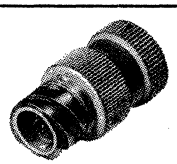
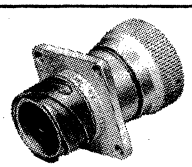
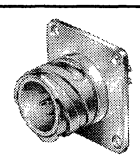
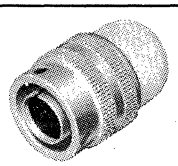
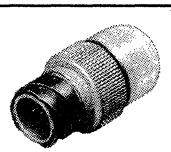
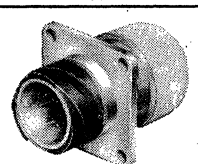
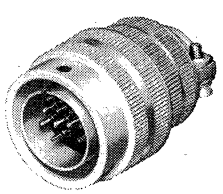
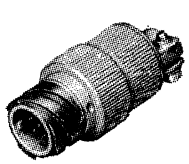
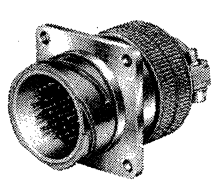
Efficient and Long-Lasting

- Spring-loaded coupling ring provides positive locking action in bayonet slot and a constant compensating force to counteract compression set of resilient face seal.
- Stainless steel bayonet slots and pins reduce wear and friction. Three-pin bayonet coupling minimizes rocking action of the mated plug and receptacle.
- Hooded female contacts resist test prod damage.
- Hard insert dielectric and resilient face seal on pin inserts positively retain contacts so there is no possibility of their being pushed out of the insert.

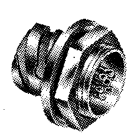
Hermetically Sealed

Hermetically sealed 67 Series connectors are available in two shell styles — hex nut mounted receptacles. Each shell style is available in 11 different insert configurations with up to 48 contacts.

Wide Variety for Wide Range of Applications

	Plugs	Cable-to-Cable Receptacles	Wall Receptacles	Panel Mounting Receptacles	Round Flange Receptacles
With Grommet for Individual Wire Seal	 67-06E	 67-01E	 67-00E	 67-02E	67-03E
With Form for Potting Seal	 67-06P	 67-01P	 67-00P		
With Standard Type Cable Clamp for Unjacketed Individual Wire Leads	 67-06C	 67-01C	 67-00C		

Hermetically Sealed



67-04H
Hermetically Sealed
Round Flange
Receptacle
Front Mount

67-04H(105)
Hermetically Sealed
Round Flange
Receptacle —
Stake-on Solder
Flange
Front Mount

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

67 Series MinniE Environment Resistant Connectors (Continued)

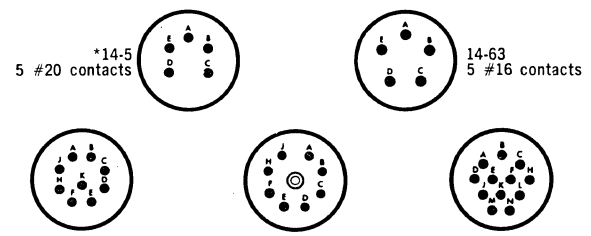
Inserts Available (showing front face of pin insert)

SIZE 12 INSERTS

*12-60
3 #16 contacts

*12-7
7 #20 contacts

SIZE 14 INSERTS



*14-5
5 #20 contacts

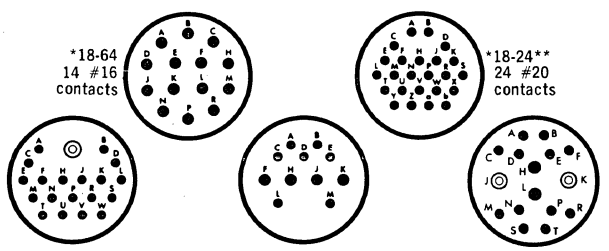
14-63
5 #16 contacts

*14-9
9 #20 contacts

*16-61
8 #20 plus
1 shielded contact

*14-12**
12 #20 contacts

SIZE 18 INSERTS



*18-64
14 #16
contacts

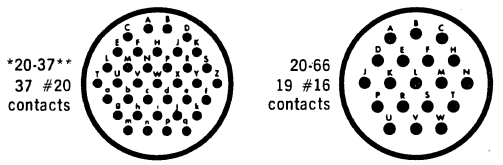
*18-24**
24 #20
contacts

*18-62
19 #20 plus
1 shielded contact

18-65
7 #20 and
4 #16 contacts

18-16
2 shielded contacts
2 #16 contacts
12 #20 contacts

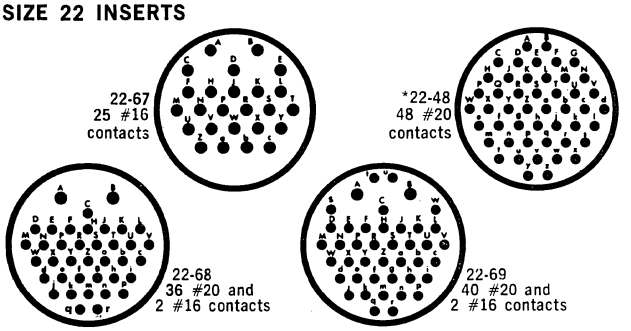
SIZE 20 INSERTS



*20-37**
37 #20
contacts

20-66
19 #16
contacts

SIZE 22 INSERTS



22-67
25 #16
contacts

*22-48
48 #20
contacts

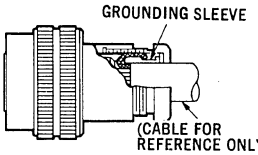
22-68
36 #20 and
2 #16 contacts

22-69
40 #20 and
2 #16 contacts

*Available in hermetically sealed receptacles.
**Also available with Poke-Home contact insert.
Current rating— #20 contact: 7.5 amps, #16 contact: 12 amps.
Shielded contact: 7.5 amps.

All inserts listed here are available for all shell styles and classes except hermetics. Inserts available in hermetically sealed receptacles are indicated by an asterisk. (The first two digits of the insert number show the shell size; the 3rd and 4th digits are a code for the insert configuration.)

R.F.I. Shielded Connectors



Special internal hardware enables these 67-06J style connectors to have the braid of a shielded cable terminated within the connector backshell. Alodine plated per Amphenol Specification 617 Type "C", the shell has a conductive finish and acts as a continuation of the cable braid.

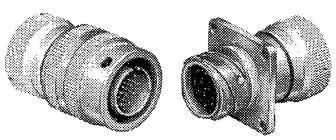
The following R.F.I. Shielded connectors are now in production:

67-5009 Size 18 shell with 24 #20 pin contacts
67-5011 Size 20 shell with 37 #20 pin contacts

These two connectors are also available with crimp Poke-Home contacts in the same insert configurations.

The mating receptacles are standard except for the Alodine finish. This can be obtained by ordering deviation (113). For other 67 Series connectors with R.F.I. shielding, consult factory.

67-906 and 67-907 Poke-Home MinniE Connectors



Removable Poke-Home crimp contacts are available in the 67-906 receptacle and 67-907 plug. They use standard 67 Series hardware (67-00E receptacle 67-06E plug, size 14) to take 12 #20 contacts and oversize contact pockets to accept larger diameter wire. The front insert is neoprene and the contact retention disc is nylon.

Poke-Home Contacts and Tools

Contact Size	Wire Size AWG	Max. Current Rating	AMPHENOL Part No. Pin	AMPHENOL Part No. Socket	Crimping Tool	Bushing (Positioner)	Crimp Jaw Setting	Insertion and Removal Tool
#20	24 22 20	3.0 5.0 7.5	67-1890	67-1772	294-358 294-1166	294-1035 294-1081	.033-.041 .031-.041	294-152
#20	24 22 20	3.0 5.0 7.5	18-313	175-257	294-358 294-1166	294-1035 294-1081	.033-.041 .031-.041	294-193

* Bushing is supplied as part of crimp tool.

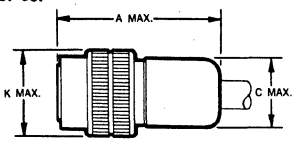
STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

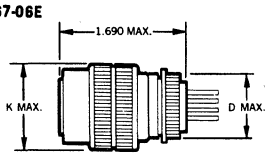
67 Series MinniE
Environment Resistant Connectors
(CONTINUED)

DIMENSIONS (Inches)

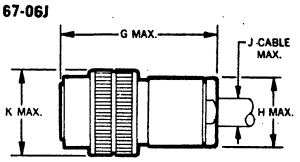
67-06P



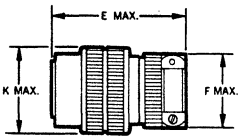
67-06E



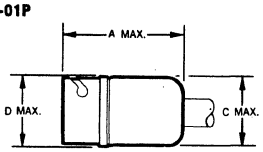
67-06J



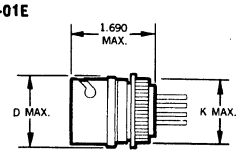
67-06C



67-01P



67-01E



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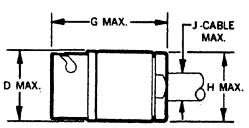

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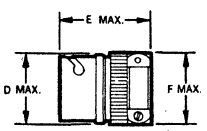

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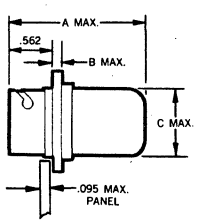

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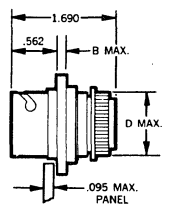

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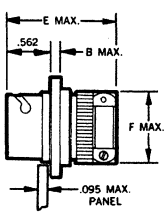


Connector Size	A	B	C	D	E	F	G	H	J	K
12	1.687	.062	.795	.895	1.870	.817	1.937	.706	.250	.957
14	1.687	.093	.920	1.000	1.870	.967	1.937	.812	.375	1.082
18	1.687	.093	1.170	1.250	1.870	1.185	1.937	1.062	.656	1.375
20	1.734	.093	1.223	1.375	1.970	1.312	2.312	1.187	.750	1.500
22	1.734	.093	1.352	1.468	1.970	1.440	2.312	1.317	.875	1.625

How to Order: To get the 67 Series connector you want, put together the part number as per the example in the following chart.

67 06 E 12-7 P W (100)

SERIES DESIGNATION 67 —

SHELL STYLE
- **00**—Wall Mounting Receptacle
- **01**—Cable Mounting Receptacle
- **02**—4-Hole Mount Panel Receptacle
- **03**—1-Hole Rear Panel Mount Round Flange Receptacle
- **04**—Hermetic Seal Round Flange Receptacle
- **06**—Cable Plug — Straight

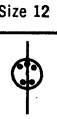
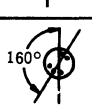
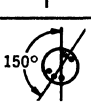
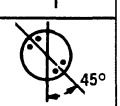
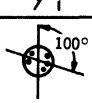
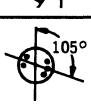
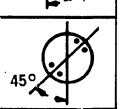
CONSTRUCTION
- **E**—Environmentally sealed (Unitized grommet)
- **P**—Environmentally sealed (Disposable Polyethylene Potting Form Furnished)
- **J**—Sealed Clamp for Jacketed Cable (Waterproof)
- **C**—Mechanical Clamp (Sealed only when potted)
- **H**—Hermetically Sealed (Available only on 04 Shell Style)

INSERTS AVAILABLE

TYPE OF CONTACTS
P—Pin **S**—Socket

DEVIATIONS
- **(100)**—.0001 Gold plate over silver on contacts.
- **(104)**—100% filled solder pockets with 60/40 solder.
- **(105)**—67-04H receptacle except, modified for staking and soldering on to panel.
- **(106)**—Tinned solder pockets.
- **(108)**—.0001 gold over .0001 copper, pre-filled solder pockets, 617 type "C" connector finish (conductive).
- **(112)**—EIA date code.
- **(113)**—All aluminum parts have 617 type "C" finish (conductive).

ALTERNATE INSERT POSITIONS

	Size 12	Size 14	Sizes 18, 20, 22
No letter			
X			
W			

SUBMINIATURE CONNECTORS

BUNKER RAMO AMPHENOL

115 Series Multi-Purpose Subminiature Connectors

Whenever lightweight, rugged, high-reliability connectors are needed to withstand very high temperatures, severe vibration and corrosion, 115 Series subminiatures are the connectors to consider.

Tiny and Tough Standard Version

Designed to stand up under grueling conditions, 115 Series 2- and 4-contact connectors are subminiature in size but "big" in performance. Most of the connectors in this series weigh less than ½ ounce and, when mated, are less than 1¼ inch long. Yet their current rating is 7.5 amps and their voltage rating is 1500 V (RMS). In the standard version, they have an operating range of −65°F to 500°F.

Fuel-resistant Viton "B" face seals, flame-retardant diallyl phthalate inserts, and corrosion-resistant rhodium over silver plated contacts enable these connectors to work well even under adverse conditions. When hermetic sealing is required use the 115-5040 receptacle. When waterproofing is necessary, any of the 115 Series subminiature connectors can be potted.

Pin contacts are molded in, and socket contacts are held in place with "C" washers. The inserts are held in the shells by spinning and/or bonding. Alternate insert positions are available.

The 115-5050 plug features a foolproof coupling ring locking mechanism that keeps the connector fully mated even under extreme vibration. It also features contacts which can be quickly crimped with the MS 3191 tool, Amphenol No. 294-1166 with special positioners. Insertion and removal tools are not needed for the contacts.

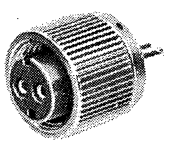
1000°F High-Temperature Version

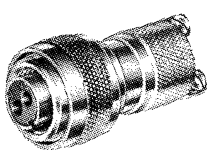
In addition to the many advantages offered by the standard version, the 115 Series high-temperature version provides for exceptionally high ranges of temperature. With stainless steel shells, contacts and hardware and with inserts of Amphenol ceramic, 115 Series high-temperature plugs serve excellently in temperatures up to 1000°F or more.

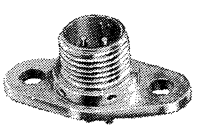
A Representative Selection of Connector Availability

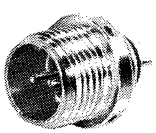
Consult factory for particular applications

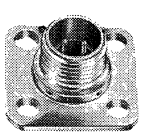
STANDARD VERSION

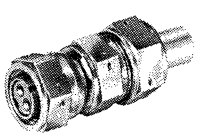












Connector	Dimensions (Inches)	Mating Connectors	Special Characteristics
2 Contacts			
115-5035 Plug	.562 dia. x .843	115-5036, -5037, -5038, -5042, -5043 and -5060	Stainless steel, passivated, coupling ring.
115-5035-1000 Plug (Same as 115-5035 except for keyway)	.562 dia. x .843	115-5043-1000	Keyway 30° counterclockwise. Stainless steel, passivated, coupling ring.
115-5035-1001 Plug	.687 dia. x 1.300	115-5036, -5037, -5038, -5042, -5043 and -5060	(Same as 115-5035 but has a mechanical strain relief clamp.)
115-5050 Plug	.700 dia. x 1.500	115-5036, -5037, -5038, -5042, -5043 and -5060	Improved version of 115-5035, including coupling ring locking mechanism & crimp Poke-Home contacts.
115-5036 Receptacle	.532 dia. x .687	115-5035, -5050 and 115-5035-1001	Flange notched 90° clockwise.
115-5037 Receptacle	.559 dia. x .687	115-5035, -5050 and 115-5035-1001	Nickel plated steel housing silver brazed to connector.
115-5038 Receptacle	1.210 x .640 x .687	115-5035, -5050 and 115-5035-1001	Nickel plated elliptical steel flange silver brazed to connector.
115-5042 Receptacle	7/16-27NS-2A x .687	115-5035, -5050 and 115-5035-1001	Threaded shell (flangeless).
115-5043 Receptacle	.532 dia. x .687	115-5035, -5050 and 115-5035-1001	No notch on flange.
115-5043-1000 Receptacle (Same as 115-5043 except for key)	.552 dia. x .687	115-5035-1000	Key 30° clockwise.
115-5060 Receptacle	.875 x .875 x .687	115-5035, -5050 and 115-5035-1001	Nickel plated square steel flange silver brazed to connector.
4 Contacts			
115-5040 Receptacle	.624 dia. x .776	115-5041	Hermetically sealed. Leakage less than .1 micron cu. ft. per hour.
115-5041 Plug	.625 dia. x .650	115-5040	Stainless steel, passivated, coupling ring.

HIGH TEMPERATURE VERSION

Connector	Dimensions	Mating Connectors	Special Characteristics
115-5059 Plug	.625 Hex. x 1.500	115-5037	For braided stainless steel armor wire.
115-5059-1 Plug	.625 Hex. x 1.500	115-5037	For ⅛" diameter 2-conductor hard-line cable.
115-5061 Plug	.562 Hex. x 1.300	115-5037	Like 115-5059-1 but smaller & lighter.

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

165 Series Miniature MS-Type Connectors

COMPACT AND CONVENIENT

Connectors in the 165 Series are only about one-third the size and weight of standard MS connectors with the same number of contacts.

Bayonet coupling provides quick disconnect.

WIDELY APPLICABLE

Eight different insert configurations and five different shell styles in two sizes — large and small — provide enough variations for a wide range of applications.

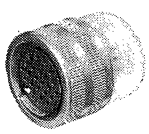
Plugs and cable receptacles are available with either a built-in cable clamp to provide positive strain relief or with provision for potting. On all connectors, alternate insert positions are available for gang mounting.

WEATHERPROOF AND PRESSURE PROOF

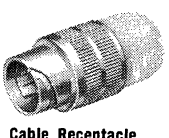
When mated, 165 Series connectors are pressure proof and completely waterproof. The connectors using female inserts feature a sandwich construction with the insert spun into a cartridge; the connectors are factory sealed to prevent leakage. O-ring seals are used in both plugs and receptacles. They meet the exacting pressure seal requirements of MIL-C-5015, Class C construction.

Cable Receptacle for Jacketed Cable

Plug for Jacketed Cable



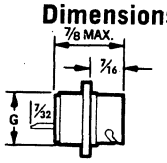
Plug for Potting

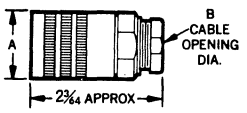


Cable Receptacle for Potting

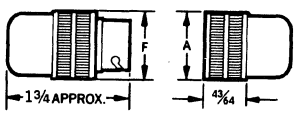
Square Flange Receptacle

Dimensions (Inches)

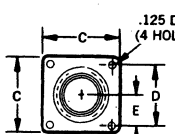




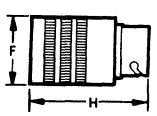
Plug



Potting Constructions



Receptacle



Cable Receptacle

	A	B	C	D	E	F	G	H
Small	57/64	3/8	1 1/16	23/32	23/64	7/8	13/16	1 59/64
Large	1 7/64	21/32	1 5/16	31/32	31/64	1 1/8	1 1/16	1 13/16

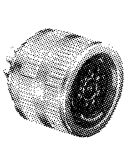
See 182 Series for insert positions

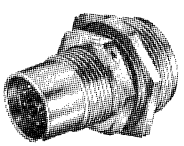
Connectors with Shielded Contact and Ground Shield

- Important in aircraft and instrumentation applications, for example, fuel gaging.
- Shield continuity was recently upgraded by additon of heat treated beryllium copper finger pressure members to the socket shield.
- Available in a number of shell styles, including potting construction plug and cable receptacle, plugs with spring-loaded coupling ring, and square flange receptacle.
- Available also in combination of environmentally sealed and cable clamp construction.
- Two different insert configurations

  Eight #20 contacts, 1 shielded contact

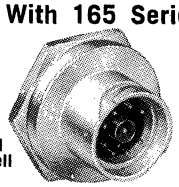
  Nineteen #20 contacts, 1 shielded contact



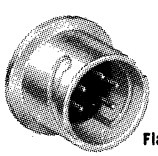


182 Series Hermetic Miniature MS-Type Connectors

Mate With 165 Series



Type 2 Threaded Back Shell



Type 1 Solder Flange Shell

HIGHLY RELIABLE

The 182 Series features a rugged compression seal which is extremely strong and highly resistant to thermal shock; it also has very high insulation resistance. To assure strictest adherence to requirements, 182 Series receptacles are tested by mass spectrometer at the maximum sensitivity of the instrument.

WIDELY APPLICABLE

Like 165 Series connectors, 182 Series receptacles come in two sizes — large and small — and are available in most 165 Series insert configurations. There are two shell styles — Type I, Solder Flange, and Type II, Threaded Back Shell, with and without O ring. There are two types of contacts available: solder pocket, and flat and pierced. Alternate insert positions (shown at right) allow for gang mounting.

THERMOCOUPLE CONTACTS (FOR BOTH 165 AND 182 SERIES)

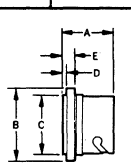
Special Thermocouple contact inserts are available for use in 165 and 182 Series connectors. Consult your Amphenol Sales Representative for any you may require.

Alternate Insert Positions

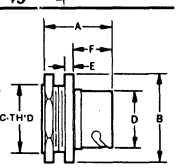
Applicable to both 165 and 182 Series

	Normal	Position X	Position W
Small			
Large			

Dimensions (Inches)



Type 1



Type 2

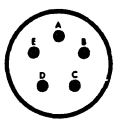
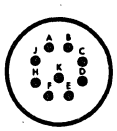
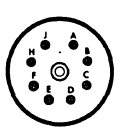
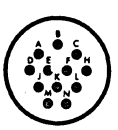
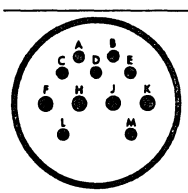
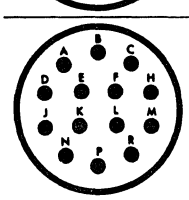
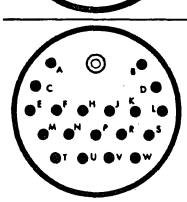
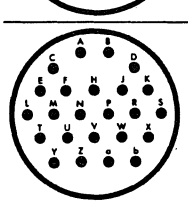
Type I	A ±.006	B ±.006	C ±.003	D ±.002	E ±.006	F —
Small	.641	.841	.685	.042	.109	—
Large	.641	1.082	.926	.042	.204	—
Type II	**±.009**	**±.006**	**C-Thrd.**	**±.006**	**±.006**	**±.006**
Small 182-1	.791	1.064	13/16-28	.688	.127	.439
182-1-1001	.791	1.064	13/16-28	.688	.127	.439
182-1-1008	.791	1.064	13/16-28	.688	.127	.439
182-15-1002	.791	1.064	13/16-28	.688	.127	.439
All Others	.783	.877	3/4-20	.688	.074	.534
Large	.822	1.439	1 1/16-18	.925	.127	.439

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

165 and 182 Series Availability and Ordering Information

Showing front face of pin insert, socket insert is reversed.

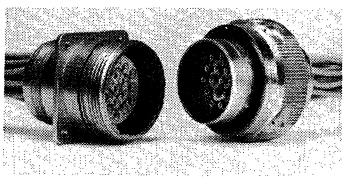
	INSERT ARRANGEMENTS (Approx. 3/5 actual size)	Insert Style	Plug	Receptacle Sq. Flange	Cable Receptacle	Hermetic Seal Receptacles				Potting Constructions	
						Type 1— Solder Flange Shell		Type 2— Threaded Back Shell			
						Flat & Pierced Contacts	Solder Pocket Contacts	Flat & Pierced Contacts	Solder Pocket Contacts	Plug	Cable Receptacles
	5 #20 contacts Current rating (Amperes) 7.5 Voltage rating (Volts RMS at sea level) 600	PIN	165-33	165-35	165-35-1002	182-35-1000	182-35-1001	182-35	182-35-1002	165-33-1000	165-35-1000
		SOCKET	165-34	165-36	165-36-1003	—	—	—	—	165-34-1000	165-36-1000
	9 #20 contacts Current rating (Amperes) 7.5 Voltage Rating (Volts RMS at sea level) 500	PIN	165-13	165-15	165-15-1002	182-15	182-15-1000	182-15-1001	182-15-1002*	165-13-1000	165-15-1000
		SOCKET	165-14	165-16	165-16-1003	—	—	—	—	165-14-1000	165-16-1000
	8 #20 contacts 1 Shielded Current rating (Amperes) 10 Voltage rating (Volts RMS at sea level) 500	PIN	165-82	165-73	165-73-1001	182-1-1007	182-1-1000	182-1-1008*	182-1-1001*	165-82-1000	165-73-1000
		SOCKET	165-61-1008	165-83	165-83-1001	—	—	—	—	165-61	165-83-1000
	12 #20 contacts Current rating (Amperes) 7.5 Voltage rating (Volts RMS at sea level) 500	PIN	165-9	165-11	165-11-1002	182-11-1001	182-11	182-11-1005	182-11-1002	165-9-1000	165-11-1000
		SOCKET	165-10	165-12	165-12-1002	—	—	—	—	165-10-1000	165-12-1000
	7 #20 contacts 4 #16 contacts Current rating (Amperes) no. 20 7.5 no. 16 17 Voltage rating (Volts RMS at sea level) 500	PIN	165-17	165-19	165-19-1002	—	—	—	—	165-17-1000	165-19-1000
		SOCKET	165-18	165-20	165-20-1003	—	—	—	—	165-18-1000	165-20-1000
	14 #16 contacts Current rating (Amperes) 17 Voltage rating (Volts RMS at sea level) 500	PIN	165-29	165-31	165-31-1003	182-31	182-31-1002	182-31-1003*	182-31-1001*	165-29-1000	165-31-1000
		SOCKET	165-30	165-32	165-32-1006	—	—	—	—	165-30-1000	165-32-1000
	19 #20 contacts 1 Shielded Current rating (Amperes) 10 Voltage rating (Volts RMS at sea level) 500	PIN	165-86	165-84	165-84-1001	182-2-1004	182-2-1000	182-2-1005*	182-2-1001*	165-86-1000	165-84-1000
		FEMALE	165-62-1007	165-85	165-85-1001	—	—	—	—	165-62	165-85-1000
	24 #20 contacts Current rating (Amperes) 7.5 Voltage rating (Volts RMS at sea level) 500	PIN	165-25	165-27	165-27-1005	182-27-1000	182-27-1006	182-27*	182-27-1005*	165-25-1000	165-27-1000
		SOCKET	165-26	165-28	165-28-1003	—	—	—	—	165-26-1000	165-28-1000

*Supplied with "O" ring.

ENVIRONMENTAL RESISTANT CONNECTORS

BUNKER RAMO **AMPHENOL**

Super270® A NEW generation electrical connector

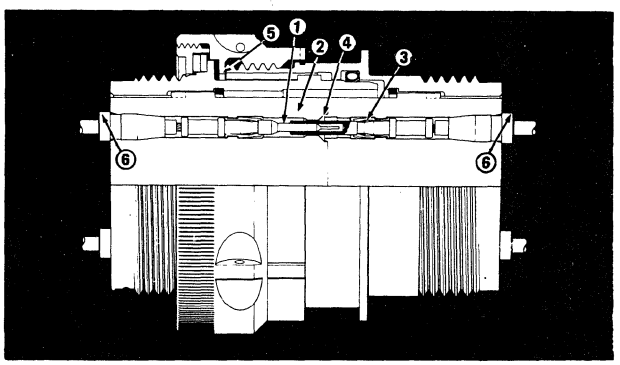


Amphenol's 270 Series radically deviates from conventional design concepts. This connector is able to withstand temperatures from −65°F to 500°F, remain environmentally sealed at the connector mating interface and wire sealing areas, and is impervious to jet fuels, oil, and solvent used in aircraft.

This performance is achieved by using new materials, new monoblock inserts with no bonded interfaces along the entire length of the contacts, and a new method of rear wire sealing.

The polymer molding compound is unaffected when subjected to 500°F constant temperature, is fungus resistant, and with regard to fire resistance is self-extinguishing.

Size 20 contacts are machined from high strength chromium copper, while the larger size contacts are leaded copper. The contact bodies are rhodium plated to withstand the temperatures. Shells are impact extruded 2014-T6 Aluminum Alloy with tensile strength between 400°F and 500°F. The gold anodized finish resists corrosion and is light weight. Wire seals and shell seal are made of a teflon material which maintains environmental integrity at 500°F.



1. SHROUDED PIN CONTACTS: eliminates pin bending in small diameter contacts.

2. NO SCOOP CAPABILITIES: socket contacts and pin insert face are recessed.

3. CONTACT RETENTION CLIP: shrouded within a hard dielectric precludes overstressing during removal cycle & eliminates misalignment.

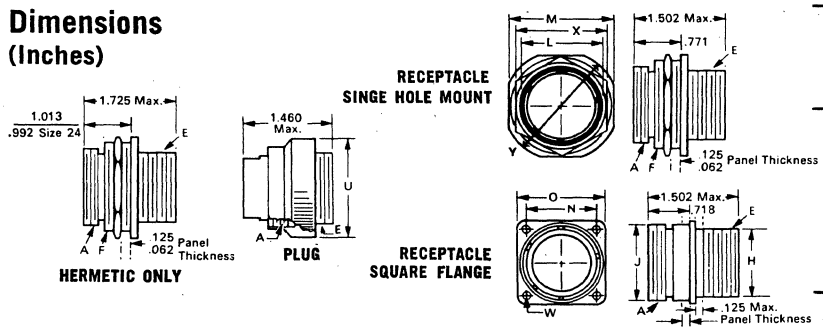
4. LEAD-IN CHAMFER: positive contact alignment. Contacts misaligned as much as .039 inch from true position can be mated.

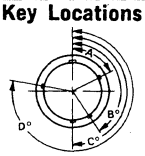
5. METAL-TO-METAL BOTTOMING: when the connectors are in a mated condition. Interfacial compression is provided by an assist spring. Prevents degradation to the connector.

6. WIRE SEALS: assembled and locked in place individually allowing contact servicing without disturbing adjacent contacts or wire seals.

7. SELF LOCKING COUPLING RING DESIGN: The connector plug can be supplied with a threaded coupling ring which incorporates a locking device. Intended to eliminate the use of safety wiring.

Dimensions (Inches)

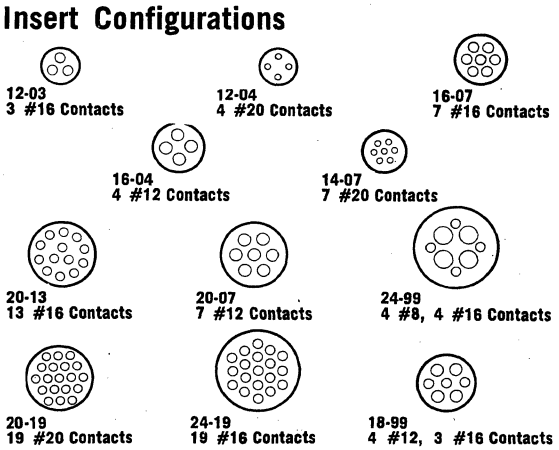




Shell Size	Position	A°	B°	C°	D°
12 Thru 24	Normal-N	62	145	180	280
	1	79	153	197	272
	2	135	170	200	310
	3	49	169	200	244
	4	66	140	200	257
	5	80	142	146	293

Size	A Thd. UNEF-2B	E Thd. UNEF-2A	F Thd. UNEF-2A	H Min. Dia. Front Mtg. Hole	J Min. Dia. Back Mtg. Hole	L Mtg. Flat ±.003	M Length Side ±.010	N Mtg. Hole ±.005	O Length Side	U Max. O.D. Coupling Nut (Self Lock)	W Dia.	X Max. Hex	Y Dia. Max.	V Mtg. Flat ±.005	Z Mtg. Dia. ±.005
12	7/8-20	3/4-20	15/16-20	.760	.913	.905	1.291	.812	1.031	1.290	.125/.116	1.140	1.380	.917	.947
14	15/16-20	13/16-20	1-20	.822	.980	.968	1.391	.906	1.125	1.352	.125/.116	1.250	1.505	.980	1.010
16	1 1/16-18	15/16-20	1 1/8-20	.948	1.107	1.093	1.516	.969	1.250	1.477	.125/.116	1.329	1.630	1.105	1.135
18	1 3/16-18	1 1/16-18	1 1/4-20	1.072	1.209	1.217	1.641	1.062	1.343	1.602	.125/.116	1.455	1.740	1.225	1.260
20	1 5/16-18	1 3/16-18	1 3/8-18	1.192	1.337	1.342	1.766	1.156	1.437	1.727	.125/.116	1.642	1.860	1.350	1.385
24	1 7/16-18	1 7/16-18	1 5/8-18	1.442	1.577	1.592	2.079	1.375	1.703	1.977	.152/.145	1.892	2.160	1.600	1.635

Insert Configurations



How to Order:

270 - 0 6 R 20-07 P N

SERIES

COUPLING STYLES
0—Threaded
*1—Bayonet (Reserved)

SHELL STYLES
0—Square flange receptacle
*1—Cable receptacle
3—Single hole receptacle
6—Straight plug
*9—Straight plug with locking coupling ring

ENVIRONMENTAL CLASS
R—Environmental resistant
G—Grounding, environmental resistant
H—Hermetic

DEVIATION
(105) Less contacts

ALTERNATE SHELL POSITIONS

CONTACT STYLE
P—Pin
S—Socket

INSERT CONFIGURATION

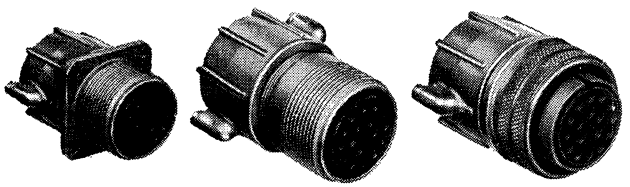
SHELL SIZE
12, 14, 16, 18, 20, 24
Standard—Intermountable with MIL-C-26500 and MIL-C-26482

*Consult Factory for availability.

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

69 Series Connectors
R Type, Poke-Home Contacts



69-0R 69-1R 69-6R

The Ideal Environmental Connectors for Industrial and Commercial Applications

Of exclusive Amphenol design, these connectors offer all the lightweight, environment-resistant features of MIL-C-5015, Class R, plus the exceptional versatility of Poke-Home contacts. These connectors are interchangeable and intermatable with standard MS types.

Quick, Reliable, Versatile Poke-Home Contacts

With AMPHENOL-developed Poke-Home contacts, assembly is simple, quick, and reliable — up to 4 times as fast as soldering with far more consistent reliability. Connector installation is far easier, too, especially in tight spots, because contact terminations can be made where convenient, then the wired contacts inserted in the connector. Circuit rearrangement or repair is exceptionally convenient because only contacts affected need to be removed — not the connector. And all that is needed for removal and insertion is a simple tool.

Outstanding Environmental Resistance

Altitude-Immersion — 69 Series connectors surpass requirements of MIL-C-5015. After being entirely immersed in water and altitude-cycled to 70,000 feet for 30 minutes, they meet MIL-C-5015 dielectric withstanding voltages while still in water, and have a minimum insulation resistance of 100 megohms.

Moisture Resistance — Under 20-day moisture condensation testing per Class "R" procedure of MIL-C-5015, 69 Series connectors meet every test requirement; insulation resistance at conclusion of test is 100 megohms minimum.

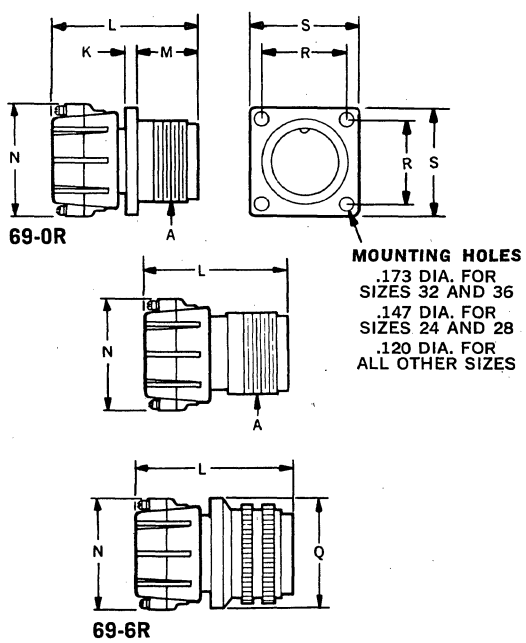
Corrosion Resistance — Resistant to Salt spray per MIL-STD-202, Method 101, Condition B.

Sand and Dust Resistance — 69 Series connectors perform reliably after exposure to sand and dust velocities of 200 feet per minute for 6 hours per MIL-E-5772, Condition B.

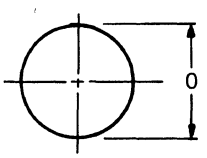
Fluid Immersion — Unmated 69 Series connectors meet all MIL-C-5015 requirements after immersion in hydraulic fluid and aviation oil for 20 hours.

All-Around Reliability — In all other mechanical and electrical features such as durability, resistance to shock and vibration, temperature range, voltage ratings, insulation resistance and other requirements, 69 Series connectors fully conform to the "R" requirements of MIL-C-5015.

Dimensions (inches)



PANEL OPENING



The drawings and dimensions shown here represent 69-XR(100) connectors. Drawings and dimensions for 69-0R(137). 69-1R(137), and 69-6R(137) connectors are the same as those for MS3100E, MS3101E, and MS3106E.

Connector Size	A Coupling Threads	K	L	M	N	O	Q	R	S
8S	1/2-28	5/64		5/16	1 3/64	.562	3/4	1 3/32	7/8
10S	5/8-24	5/64		5/16	1 3/64	.688	7/8	2 3/32	1
10SL	5/8-24	5/64	1 47/64	5/16	1 1/8	.812	7/8	2 3/32	1
12S	3/4-20	5/64	1 47/64	5/16	1 1/8	.812	1	1 3/16	1 3/32
14S	7/8-20	5/64	1 47/64	5/16	1 11/32	.938	1 1/8	2 3/32	1 3/16
16S	1 -20	5/64	1 47/64	5/16	1 31/64	1.062	1 1/4	3 1/32	1 3/32
16	1 -20	5/64	2 1/16	3/4	1 31/64	1.062	1 1/4	3 1/32	1 3/32
18	1 1/8-18	1/8	2 1/16	3/4	1 39/64	1.188	1 11/32	1 1/16	1 3/8
20	1 1/4-18	1/8	2 1/16	3/4	1 57/64	1.312	1 15/32	1 5/32	1 1/2
22	1 3/8-18	1/8	2 1/16	3/4	1 57/64	1.438	1 15/32	1 1/4	1 5/8
24	1 1/2-18	1/8	2 1/16	1 3/16	2 1 1/64	1.562	1 23/32	1 3/8	1 3/4
28	1 3/4-18	1/8	2 1/16	1 3/16	2 1 1/64	1.812	1 31/32	1 9/16	2
32	2 -18	1/8	2 1/16	7/8	2 17/32	2.062	2 7/32	1 3/4	2 1/4
36	2 1/4-16	1/8	2 1/16	7/8	2 49/64	2.312	2 15/32	1 15/16	2 1/2

To order a 69 Series wall receptacle wtihout a cable clamp put the prefix 69-0R in front of the desired insert number and the suffix (100) after it. For example, 69-0R12S-35(100). To get the same insert in a cable receptacle without a cable clamp, use the prefix 69-1R instead of 69-0R and order 69-1R12S-35(100). To get the same insert in a straight plug without cable clamp, use the prefix 69-6R. To order the same inserts in a shell with a cable clamp, use the suffix (317) instead of (100).

How to Order: To get the specific 69 Series connector you want, put together the part number as per the following example.

69 6R 16S-8 S Y (100)

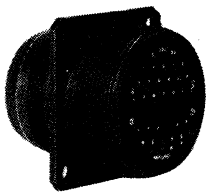
SERIES NUMBER	SHELL TYPE 0R—Wall Receptacle 1R—Cable Receptacle 6R—Straight Plug	INSERT NUMBER Same as MS	CONTACT Same as MS	ALTERNATE INSERT POSITION Same as MS	(100)—Complete with contacts (101)—Connector less contacts (137)—With cable clamp and contacts (138)—With cable clamp less contacts

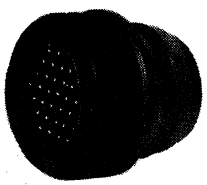
STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

246, 238 and 208 Series

3 New AMPHENOL Connector Series with Crimp Removable Contacts For MIL-C-5015E and Many Other Requirements





	246 Series MS340X, Class R	238 Series MS340X, Class K	208 Series Proposed MS340X, Class D and T
Application	General purpose Environmental	Aircraft firewalls and other extreme temperature situations	General purpose. High temperature and/or fluid environments
Special Features	Environmental resistant	Environmental Resistant Withstands 2000°F flame. Resistant to fuels, lubes and contaminating fluids	Environmental Resistant Resistant to high temperatures, fuels, lubes, and contaminating fluids
Overall Specification	MIL-C-5015E	MIL-C-5015E	To be included in MIL-C-5015E
Temperature Range — Extended Operation	125°C (257°F) down to −55°C	Class T: 200°C (392°F) down to −55°C (−67°F) Class K and D: 175°C (347°F) down to −55°C (−67°F)	
Shell	Aluminum — Cadmium plated followed by black chromate conversion	Cold rolled steel — Black Chrome plated over nickel	Aluminum — Black anodized
Dielectric	Resilient parts of special neoprene rubber. Retention disk of nylon	Resilient parts of fluorosilicone rubber. (Class T Vinyl Silicone) Retention disk of high-temperature glass-filled dielectric	
Contacts	Standard MS90453 pins and MS90454 sockets		
Tools	Standard MS3191 crimp MS90455 insertion and MS90456 removal tools		
Versatility	Can be intermated, intermounted, interchanged with any AN or MIL-C-5015 connector		

Dimensions

Size	A Max. With #12 & 16 Contacts	A Max. With #8, 4 & 0 Contacts	B	C	D	E Max. R, T, D	E Max. Class K	F	G	H R, T, D	H Class K	J R, T, D	J Class K	L Thrd.	M Ref.
8S	2.031	—	.577	.594	.875	.844	.715	½-28	.621	.083	.083	.123	.153	⅜-32	.562
10S	2.031	—	.577	.719	1.000	.969	.841	⅝-24	.747	.083	.083	.123	.153	½-28	.688
10SL	2.031	—	.577	.719	1.000	.969	.841	⅝-24	.747	.083	.083	.123	.153	⅝-24	.688
12S	2.031	—	.577	.812	1.094	1.062	1.092	¾-20	.937	.083	.083	.123	.153	⅝-24	.812
12	2.125	—	.765	.812	1.094	1.062	1.092	¾-20	.937	.083	.083	.123	.153	⅝-24	.812
14S	2.031	—	.577	.906	1.188	1.156	1.164	⅞-20	1.000	.083	.083	.123	.153	¾-20	.938
14	2.125	—	.765	.906	1.188	1.156	1.164	⅞-20	1.000	.083	.083	.123	.153	¾-20	.938
16S	2.031	—	.577	.969	1.281	1.250	1.309	1-20	1.125	.083	.083	.123	.153	⅞-20	1.062
16	2.125	2.500	.765	.969	1.281	1.250	1.309	1-20	1.125	.083	.083	.123	.153	⅞-20	1.062
18	2.125	2.500	.765	1.062	1.375	1.344	1.453	1⅛-18	1.250	.125	.083	.123	.180	1-20	1.188
20	2.125	2.500	.765	1.156	1.500	1.469	1.598	1¼-18	1.375	.125	.101	.123	.180	1⅛-18	1.312
22	2.125	2.500	.765	1.250	1.625	1.594	1.742	1⅜-18	1.500	.125	.101	.123	.180	1¼-18	1.438
24	2.125	2.500	.827	1.375	1.750	1.719	1.886	1½-18	1.625	.125	.101	.150	.180	1⅜-18	1.562
28	2.125	2.500	.827	1.562	2.000	1.969	2.175	1¾-18	1.875	.125	.101	.150	.180	1⅝-18	1.812
32	2.125	2.500	.890	1.750	2.250	2.219	2.464	2-18	2.125	.125	.101	.176	.212	1⅞-16	2.062
36	2.125	2.500	.890	1.938	2.500	2.469	2.752	2¼-16	2.375	.125	.132	.176	.212	2⅛-16	2.312
40	2.125	2.500	.890	2.188	2.750	2.719	2.846	2½-16	2.627	.125	.132	.176	.212	2⅜-16	2.562

Insert Configurations Available

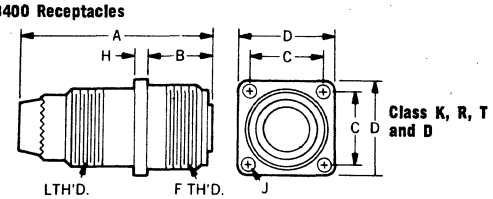
*10SL-3	18-1	20-17	24-28
*10SL-4	18-4	*20-27	*28-11
*12S-3	18-9	20-29	28-12
12-5	18-10	20-33	28-15
*14S-2	18-11	22-8	*28-21
*14S-5	18-12	22-14	*28-22
*14S-7	18-19	22-19	32-7
14S-9	18-22	*24-10	*32-17
*16S-1	20-4	24-20	*36-5
*16-11	20-6	24-27	36-10

*Denotes 208 and 238 also available

Accessory Tools

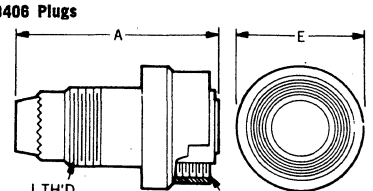
294-126	MS 3191-1 Univ. Crimp Tool
294-229	#12 Contact Insertion Tool
294-230	#12 Contact Removal Tool
294-192	#16 Contact Insertion Tool
294-219	#16 Contact Removal Tool

3400 Receptacles

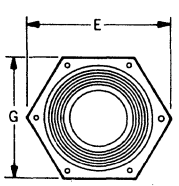


Class K, R, T and D

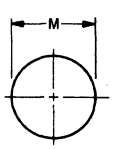
3406 Plugs



Class K, R, T and D



Class K



PANEL CUT-OUT

How to Order:

To get the specific connector you want, put together the part number as per the following example. For the military part number, use the letters MS as the series designation. For the Amphenol part number, use 208, 238, or 246 as applicable.

246 - 3406 R 28 - 21 P W 101

SERIES
MS—Military Standard
246—General Purpose Environmental
238—2000° Flame Resistant
208—High Temperature Fluid Resistant

SHELL STYLE
3400—Wall Receptacle
3401—Cable Receptacle*
3402—Box Mounting Receptacle*†
3406—Straight Plug

CLASS
R—General Purpose Environmental (MS or 246 only)
K—2000°F Flame and Fluid Resistant (MS or 238 only)
T—High Temperature 200°C (208 or 238 only)
D—High Temperature 175°C Fluid Resistant (208 only)

DEVIATIONS
101—Connector less contacts

INSERT POSITION
Blank for normal position MIL-C-5015E

CONTACT TYPE
P—Pin S—Socket

INSERT CONFIGURATION
Per MIL-C-5015E
See above for available inserts.

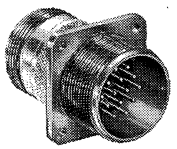
Note: Cable clamps and accessory hardware are ordered separately or by Amphenol deviation.
*Not available in 238 Series Class K. †Contact factory for availability.

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

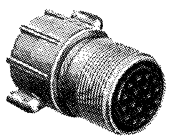
MIL-C-5015 Connector Shell Types

Wall Mounting Receptacles



MS 3100 A
Solid Shell

Cable Receptacles



MS 3101 R
Environmental
Resistant

Box Mounting Receptacles

MS 3102 A
Solid Shell

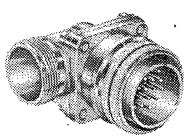
Straight Plugs

MS 3106 A
Solid Shell

Quick Disconnect Plugs

MS 3107 B
Split Shell

Angle Plugs



MS 3108 A
Solid Shell

NOMENCLATURE

The MS prefix (for example, MS3100) in a connector part number indicates an approved connector under the curent military specification, MIL-C-5015.

A 97 prefix indicates that the connector is an exclusive Amphenol design of A or B construction, probably a connector with special purpose contacts and a variation from MS requirements or one for which no MS part number has yet been assigned.

The 246 or 69 are intermateable and interchangeable with standard MS types and offer improved "R" performance over MIL-C-5015 requirements.

Interchangeability of MS and AN Connectors. In accordance with MIL-C-5015, "Connectors bearing an MS part number may replace an AN marked connector of any modification marking if all other identifying symbols are identical." However, if a contract requires use of connectors with the formerly approved AN marking, they are still available from Amphenol.

FINISHES

The standard finish is cadmium plate with olive drab chromate conversion coating. This finish has excellent conductivity.

Shell finish 639 is a clear cadmium plate and is ideal for commercial applications.

INSERTS

The dielectric material used in inserts for A and B constructions is diallyl phthalate. It has near perfect dimensional stability, high arc resistance, and maintains high insulation resistance under both humidity and thermal stress.

Insert material in R construction connectors is MIL approved neoprene. This resilient insert material provides an environmentally sealed connector that exceeds MIL-C-5015 performance.

CONTACTS

Standard — MS contacts under MIL-C-5015 are silver plated and have pretinned solder pockets. Amphenol also offers as optional a superior gold plating process for MS contacts.

How to Order:

EXAMPLE: To get a straight plug with 35 contacts in a size 28 shell with black anodized finish and contacts to accept taper pins, order 97-3106A 28-15S(432) (608).

See page 18 for E & R constructions.

MS 3101 A 28-21 S Y (847) (639)

SERIES NUMBER
MS—Military Standard for A, B, E, & R construction
97 Like MS, but AMPHENOL exclusive design for A & B construction

SHELL TYPE
3100—Wall Receptacle
3101—Cable Receptacle
3102—Box Receptacle
3106—Straight Plug
3107—Quick Disconnect Plug
3108—Angle Plug

SHELL CONSTRUCTION
A—Solid
B—Split
R—Environment resistant
E—Environment resistant
Omitted in ordering construction for potting.

INSERT NUMBER — Consists of

SHELL SIZE
8S, 10SL, 12S, 12, 14S, 14, 16S, 16, 18, 20, 22, 24, 28, 32, 36, 40,
(Size is "A" thread in 16ths)

CONFIGURATIONS
Code numbers (from 1 up) for insert configurations.
Note: Code numbers are specific for each shell size. The same code number represents different configurations in different shell sizes.

SHELL FINISH
Omit for standard finish
(604)—Anodized with bichromate seal
(608)—Black anodized
(639)—Clear cadmium plate

DEVIATION FROM STANDARD
Omit this suffix if standard construction desired
(02) —High -temperature silicone compound } **Insert Materials**
(04) —High-temperature phoenolic (400°F) } **Insert Materials**
(23) —High-temperature silicone compound } **Insert Materials**
(115)—Small Flange Receptacle
(231)—Small Flange Receptacle, pressurized
(258)—Connector furnished with protective caps assembled to both ends.
(288)—Connector furnished with protective cap on mating end.
(426)—Gold over silver plating on contacts.
(432)—Taper pin terminal contacts.
(438)—Construction for potting.
(496)—High temperature construction.
(847)—Contacts plated .0001" min. gold over copper, marked with date of manufacture.

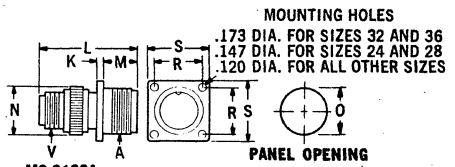
ALTERNATE INSERT POSITION
Omit for standard position.
W, X, Y, or Z for alternate positions, depending on insert.

CONTACT
P—Pin **S**—Socket

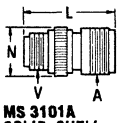
STANDARD CIRCULAR CONNECTORS

BUNKER RAMO **AMPHENOL**

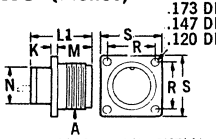
MS-A and B Hard Dielectric Dimensions (inches)



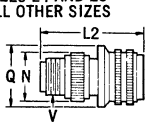
MS 3100A
SOLID SHELL
WALL MOUNTING RECEPTACLES



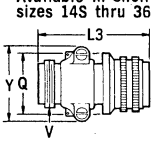
MS 3101A
SOLID SHELL
CABLE RECEPTACLES



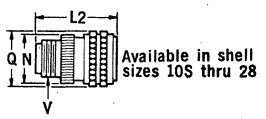
MS 3102A (SOLID SHELL)
BOX RECEPTACLES



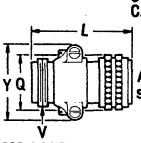
MS 3106A
SOLID SHELL
STRAIGHT PLUG



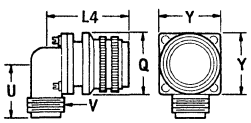
MS 3106B
SPLIT SHELL
STRAIGHT PLUG



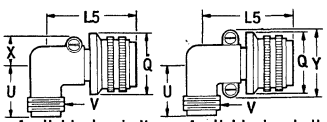
MS 3100A (SOLID SHELL)
WALL MOUNTING RECEPTACLES



MS 3107B
SPLIT SHELL
QUICK-DISCONNECT PLUGS



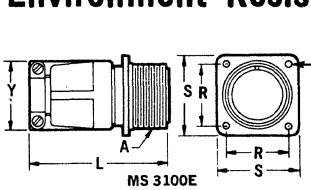
MS 3108A
SOLID SHELL
ANGLE PLUGS



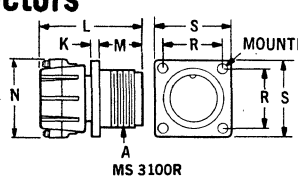
MS 3108B SPLIT SHELL ANGLE PLUGS

Connector Size	A Coupling Threads	K	L	L_1 MS 3102A	L_2	L_3	L_4	L_5	M	N	O	Q	R	S	U	U_1	Y	X_1	Y_1	Fitting Threads
8S	½-28	5/64	1¼	27/32	1¼	—	1¼	—	5/16	17/32	.562	¾	19/32	⅞	⅞	—	25/32	—	—	½-28
10S	⅝-24	5/64	1 5/16	27/32	1 5/16	—	1¼	1⅜	5/16	⅝	.688	⅞	23/32	1	⅞	⅞	25/32	—	—	½-28
10SL	⅝-24	5/64	1 5/32	27/32	1⅜	—	1 5/16	1½	5/16	⅝	.812	⅞	23/32	1	1	1	1 1/16	—	—	⅝-24
12S	¾-20	5/64	1 15/32	61/64	1 7/16	—	1⅜	1 5/16	5/16	25/32	.812	1	13/16	1 3/32	1	1	1 1/16	½	—	⅝-24
12	¾-20	5/64	1 27/32	1 5/16	1⅞	—	1⅜	1⅞	¾	25/32	.812	1	13/16	1 3/32	1	1	1 1/16	½	—	⅝-24
12SL	¾-20	5/64	—	27/32	1 13/64	—	1 13/64	—	—	—	—	1	—	—	1	—	1 1/16	—	—	¾-20
14S	⅞-20	5/64	1 7/16	1 5/16	1 7/16	1 11/16	1⅜	1 23/32	5/16	⅞	.938	1⅛	25/32	1 3/16	1	1 1/16	1 1/16	2 1/32	—	¾-20
14	⅞-20	5/64	1 27/32	1 5/16	1⅞	—	1 13/16	1 13/16	¾	⅞	.938	1⅛	25/32	1 3/16	1	1 1/16	1 1/16	2 1/32	—	¾-20
16S	1 -20	5/64	1 31/64	1 5/16	1 23/64	1 11/16	1½	1¾	5/16	1	1.062	1¼	31/32	1 3/32	1⅛	1⅛	1 5/16	—	1½	⅞-20
16	1 -20	⅛	1 57/64	1 11/32	1 57/64	—	1 15/16	2⅛	¾	1	1.062	1¼	31/32	1 3/32	1⅛	1⅛	1 5/16	—	1½	⅞-20
18	1⅛-18	⅛	2	1 11/32	2	2 1/16	1 15/16	2 13/32	¾	1⅛	1.188	1 1/32	1 1/16	1⅜	1⅛	1 3/16	1 5/16	—	1 41/64	1 -20
20	1¼-18	⅛	2⅛	1 11/32	2⅛	2⅛	2 1/16	2 5/32	¾	1¼	1.312	1 15/32	1 5/32	1½	1 5/16	1 5/16	1⅝	—	1 13/16	1 3/16-18
22	1⅜-18	⅛	2⅛	1 11/32	2⅛	2⅛	2 1/16	2 13/32	¾	1⅜	1.438	1 19/32	1¼	1⅝	1 5/16	1 5/16	1⅝	—	1 15/16	1 3/16-18
24	1½-18	⅛	2¼	1 11/32	2¼	2 5/32	2 15/32	2⅝	1 3/16	1½	1.562	1 23/32	1⅜	1¾	1½	1 7/16	2	—	2 1/16	1 7/16-18
28	1¾-18	⅛	2¼	1 11/32	2¼	2 5/32	2 15/32	2⅝	1 3/16	1¾	1.812	1 31/32	1 1/16	2	1½	1 7/16	2	—	2 5/16	1 7/16-18
32	2 -18	⅛	2⅜	1 7/16	2⅜	2 5/16	2 11/16	2 13/16	⅞	2 1/32	2.062	2 5/32	1¾	2¼	1 25/32	1¾	2½	—	2 5/32	1¾-18
36	2¼-16	⅛	2⅜	1 7/16	2⅜	2 11/32	2 11/16	2 27/32	⅞	2¼	2.312	2 15/32	1 13/16	2½	1 25/32	1 13/16	2½	—	2 27/32	2 -18

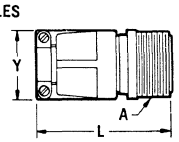
Environment Resistant MS Connectors



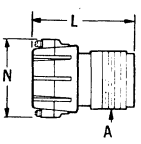
MS 3100E



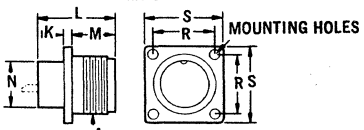
MS 3100R



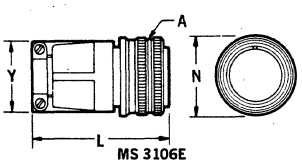
MS 3101E



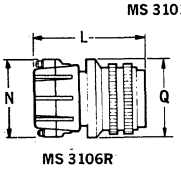
MS 3101R



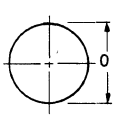
MS 3102E & MS 3102R



MS 3106E



MS 3106R



PANEL OPENING

This complete line of "E" and "R" environment resistant connectors satisfies aircraft and missile requirements as well as most applications calling for sealed components. The difference in the two types is that the "E" type has an integral MS type cable clamp as part of the connector back shell.

The "E" type meets or exceeds the "E" requirements of MIL-C-5015. Contacts and resilient inserts are factory preassembled in the shell. The integral MS type cable clamp provides extra strain relief.

The "R" type meets or exceeds both the "E" and "R" requirements of MIL-C-5015. Construction of the grommet and back shell assembly provides a great measure of wire support, eliminating the need for a cable clamp in most applications. This design also results in a size and weight reduction.

Connector Size	A Coupling Threads	K	L 3100E, 3101E, 3106E	L 3100R, 3101R, 3106R	L 3102E & R	M	N 3100R, 3101R, 3106R	N 3102E & R	O	Q	R	S	Y
8S	½-28	.078	—	1.640	1.000	.562	1.046	.437	.562	.750	.593	.875	—
10S	⅝-24	.078	—	1.640	1.000	.562	1.046	.500	.688	.875	.718	1.000	—
10SL	⅝-24	.078	2.140	1.640	1.000	.562	1.125	.625	.812	.875	.718	1.000	.865
12S	¾-20	.078	2.140	1.640	1.000	.562	1.125	.687	.812	1.000	.812	1.093	.865
14S	⅞-20	.078	2.213	1.640	1.000	.562	1.343	.750	.938	1.125	.906	1.187	.990
16S	1 -20	.078	2.273	1.640	1.000	.562	1.484	.875	1.062	1.250	.969	1.281	1.120
16	1 -20	.078	2.536	1.968	1.343	.750	1.484	.875	1.062	1.250	.969	1.281	1.120
18	1⅛-18	.125	2.608	1.968	1.343	.750	1.609	1.000	1.188	1.343	1.062	1.375	1.211
20	1¼-18	.125	2.666	1.968	1.343	.750	1.890	1.125	1.312	1.468	1.156	1.500	1.468
22	1⅜-18	.125	2.666	1.968	1.343	.750	1.890	1.250	1.438	1.593	1.250	1.625	1.468
24	1½-18	.125	2.897	1.968	1.343	.812	2.171	1.375	1.562	1.718	1.375	1.750	1.750
28	1¾-18	.125	2.897	1.968	1.343	.812	2.171	1.625	1.812	1.968	1.562	2.000	1.750
32	2 -18	.125	2.952	1.968	1.343	.875	2.531	1.906	2.062	2.218	1.750	2.250	2.056
36	2¼-16	.125	2.952	1.968	1.343	.875	2.765	2.125	2.312	2.468	1.937	2.500	2.250

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

MS Quick Reference Insert Specifications

Insert No.	Total Contacts	Ampere Rating 245 135 73 41 22	CONTACT SIZE 0 4 8 12 16	VOLTS DC	VOLTS AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
8S-1	1		1	700	500	X					
10S-2	1		1	700	500	X					
10SL-3	3		2	700	500	X	X				
10SL-4	2		2	700	500	X	X				
12ST-844	4		4								
12S-2	Like 12S-3 Rotated 250° R										
12S-1	Like 12S-3 Rotated 100° R										
12S-3	2		2	700	500	X	X	70	145	215	290
12S-4	1		1	1250	900						
12-5	1		1	1250	900						
12S-6	2		2	THERMO.							
14S-1	3		3	700	500						
14S-2	4		4	250	200	X	X	120	240		
14-3	1	1		700	500						
14S-4	1		1	1250	900						
14S-5	5		5	250	200	X	X	110			
14S-6	6		6	250	200	X					
14S-7	3		3	700	500			90	180	270	
14S-9	2		2	700	500			70	145	215	290
14S-10	Like 14S-2 Rot'd 100° R			700	500						
14S-11	Like 14S-2 Rotated 250° R										
14S-12	Like 14S-7 Rotated 100° R										
14S-13	Like 14S-7 Rotated 260° R										
16S-1	7		7	700	500	X	X	80			280
16-2	1		1	1750	1250						
16S-3	1		1	2450	1750						
16S-4	2		2	1250	900	X	X	35	110	250	325
16S-5	3		3	700	500	X		70	145	215	290
16S-6	3		3	700	500			90	180	270	
16-7	3	1	2	700	500			80	110	250	280
16-9	4		2 2	700	500			35	110	250	325
16-10	3		3	700	500	X	X	90	180	270	
16-11	2		2	700	500	X		35	110	250	325
16-12	1	1		700	500						
16-13	2		2	THE. 700	500			35	110	250	325
16S-14	3		3	700	500						
16S-15	Like 16S-4 Rotated 100° R										
16S-16	Like 16S-4 Rotated 250° R										
16S-17	Like 16S-5										
18-1	10		4	700	500	X	X	70	145	215	290
			6	250	200						
18-3	2		2	1250	900	X		35	110	250	325
18-4	4		4	1250	900	X	X	35	110	250	325
18-5	3		2 1	1250	900			80	110	250	280
18-6	1	1		1250	900						
18-8	8		1 7	700	500	X	X	70			290
18-9	7		2 5	250	200			80	110	250	280
18-10	4		4	700	500				120	240	
18-11	5		5	700	500	X	X		170	265	
18-12	6		6	700	500	X		80			280
18-13	4	1	3	700	500			80	110	250	280
18-14	2	1	1	700	500			80	110	250	280
18-15	4		4 THE.	700	500				120	240	
18-16	1		1	4200	3000						
18-17	Like 18-9 Rotated 100°R										
18-18	Like 18-9 Rotated 250° R										
18-19	10		10	700	500				120	240	
18-20	5		5	700	500			90	180	270	
18-22	3		3	1250	900			70	145	215	290
18-23	Like 18-1 Rotated 100° R										
18-24	Like 18-1 Rotated 250° R										
18-25	Like 18-3 Rotated 100° R										
18-26	Like 18-3 Rotated 250° R										
18-27	Like 18-5 Rotated 100° R										
18-28	Like 18-5 Rotated 250° R										
18-29	5		5	700	500			90	180	270	
18-30	Like 18-20 Rotated 110° R										
18-31	Like 18-20 Rotated 260°R										
18-404	Like 18-3 Except Thermocouple										
18-420	1	High Voltage Contact									
20-1	Replaced By 20-27										

Insert No.	Total Contacts	Ampere Rating 245 135 73 41 22	CONTACT SIZE 0 4 8 12 16	VOLTS DC	VOLTS AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
20-2	1	1		1250	900						
20-3	3		3	1250	900			70	145	215	290
20-4	4		4	1250	900	X		45	110	250	
20-5	2		2	1750	1250			35	110	250	325
20-6	3		3	1250	900			70	145	215	290
20-7	8		4	1250	900	X	X	80	110	250	280
			4	700	500						
20-8	6		2 4	250	200			80	110	250	280
20-9	8		1	1250	900			80	110	250	280
			7	700	500						
20-11	13		13	250	200						
20-12	2	1	1	700	500			80	110	250	280
20-14	4	2	3	700	500			80	110	250	280
20-15	7		7	700	500	X	X	80			280
20-16	9		2 7	700	500	X	X	80	110	250	280
20-17	6		5 1	700	500			90	180	270	
20-18	9		3 6	700	500	X	X	35	110	250	325
20-19	3	3		700	500			90	180	270	
20-20	4	1	3	700	500			80	110	250	280
20-21	9		1 8	700	500			35	110	250	325
20-22	6		3 3	700	500			80	110	250	280
20-23	2		2	700	500			35	110	250	325
20-24	4		2 2	700	500			35	110	250	325
20-25	Like 20-11 Rotated 100°R										
20-27	14		6	700	500	X	X	35	110	250	325
			8	250	200						
20-29	17		17	700	500	X	X	80			280
20-33	11		11	700	500						
22-1	21	2		1250	900			35	110	250	325
22-2	3	3		1250	900			70	145	215	290
22-3	2	1	1	1250	900			80	110	250	280
22-4	4	2 2		700	500			35	110	250	325
22-5	6	2	4	1250	900			35	110	250	325
22-6	3	2	1	1250	900			80	110	250	280
22-7	1	1		1750	1250						
22-8	2	2		1750	1250			35	110	250	325
22-9	3	3		1750	1250			70	145	215	290
22-10	4		4	1750	1250			35	110	250	325
22-11	2		2	2450	1750			35	110	250	325
22-12	5	2	3	1250	900			80	110	250	280
22-13	5		1	1250	900			35	110	250	325
			4	700	500						
22-14	19		19	700	500	X	X	80	110	250	280
22-15	6		1	1750	1250			80	110	250	280
			5	700	500						
22-16	9		3 6	700	500			80	110	250	280
22-17	9		1 7	700	500			80	110	250	280
			1	1250	900						
22-18	8		5	1250	900			80	110	250	280
			3	700	500						
22-19	14		14	700	500	X		80	110	250	280
22-20	9		9	700	500			35	110	250	325
22-21	3	1	2	700	500			80	110	250	280
22-22	4	4		700	500				110	250	
22-23	8		1	1250	900			35		250	
			7	700	500						
22-24	6		3	1250	900			80	110	250	280
			2 1	700	500						
22-25	3	1	2	700	500			80	110	250	280
22-26	7		2 5								
22-27	9		1	1250	900			80		250	280
			8	700	500						
22-28	7		7	700	500			80			280
22-29	7	1	6	700	500			80	110	250	280
22-30	Like 22-14 Rotated 260° R										
22-32	Like 22-5 Rotated 260° R										
22-23	7		4	1250	900			80	110	250	280
			3	700	500						
22-34	5		3 2	1250	900			80	110	250	280
22-36	8	THERMO.	1	1250	900			90		270	
			7	700	500						

Insert No.	Total Contacts	Ampere Rating 245 135 73 41 22	CONTACT SIZE 0 4 8 12 16	VOLTS DC	VOLTS AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
22-404	8	THERMO	8								
24-1	2	1	1	1250	900			80	110	250	280
24-2	7		7	1250	900			80			280
24-3	7		2 5	1250	900			80	110	250	280
24-4	4	1	3	1250	900			80	110	250	280
24-5	16		16	700	500	X		80	110	250	280
24-6	8		3	1250	900			80	110	250	280
			5	700	500						
24-7	16		2 14	700	500			80	110	250	280
24-9	2	2		700	500			35	110	250	325
24-10	7	7		700	500			80			280
24-11	9	3 6		700	500			35	110	250	325
24-12	5	2	3	700	500			80	110	250	280
24-14	3	1	2	700	500			80	110	250	280
24-15	Like 24-5 Rotated 100° R										
24-16	7	1	3	1250	900			80	110	250	280
			3	700	500						
24-17	5		2 3	1250	900			80	110	250	280
24-18	4		4					(Short Circuit Con.)			
24-19	12		12								
24-20	11		2 9	1250	900	X	X	80	110	250	280
24-21	10	1	9	1250	900			80	110	250	280
24-22	4	4		1250	900			45	110	250	
24-23	5	3	2	1250	900			80	110	250	280
24-24	Like 24-5 Rotated 250° R										
24-25	Like 24-6 Rotated 100° R										
24-26	Like 24-6 Rotated 250° R										
24-27	7		7	1750	1250			80			280
24-28	24		24	250	200	X	X	80	110	250	280
24-768	5	1 4		700	500						
24-835	1	High Voltage		*10000							
28-1	9	1 2		1250	900			80	110	250	280
		2 4		700	500						
28-2	14	2	12	1250	900	X		35	110	250	325
28-3	3	3		1750	1250			70	145	215	290
28-4	9	2	4	1250	900			80	110	250	280
			3	1750	1250						
28-5	5	2	1 2	1250	900			35	110	250	325
28-6	3	3		1250	900			70	145	215	290
28-7	2	2		1250	900			35	110	250	325
28-8	12		9	700	500						
			1	1250	900			80	110	250	280
			2	1750	1250						
28-9	12		6 6	1250	900			80	110	250	280
28-10	7		2	1200	900			80	110	250	280
		2 2	1	700	500						
28-11	22		4 18	700	500	X	X	80	110	250	280
28-12	26		26	700	500	X	X	90	180	270	
28-13	Like 28-12 Rotated 100° R										
28-14	11		11	1250	900			80	110	250	280
28-15	35		35	700	500	X		80	110	250	280
28-16	20		20	700	500	X		80	110	250	280
28-17	15		1	2450	1750						
			3	1250	900			80	110	250	280
			11	700	500						
28-18	12		1	4200	3000						
			5	1250	900			70	145	215	290
			2	700	500						
			4	250	200						
28-19	10		2	2450	1750						
			2	1250	900			80	110	250	280
			4 2	700	500						
28-20	14		10 4	700	500	X	X	80	110	250	280
28-21	37		37	700	500	X	X	80	110	250	280
28-22	6	3	3	1250	900			70	145	215	299
28-410	4		1	High Voltage Cont.							
			3								
28-766	10	2 6	2								
28-833	7	2	5								
28-840	4	2 2									
28-880	3	Coax. Contacts									

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO **AMPHENOL**

MS Quick Reference Insert Specifications (Continued)

Insert No.	Total Contacts	Ampere Rating 245	135	73	41	22	VOLTS■ DC	AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
		CONTACT SIZE 0	4	8	12	16								
32-1	5				1		1750	1250			80	110	250	280
		2			2		1250	900						
32-2	5		3			2	1750	1250			70	145	215	290
32-3	9	1	2		2	4	1250	900			80	110	250	280
32-4	14					4	700	500			80	110	250	280
					2	8	1250	900						
32-5	2	2					1250	900			35	110	250	325
32-6	23		2	3	2	16	700	500			80	110	250	280
32-7	35				7	24	700	500	X	X	80	125	235	280
						4	250	200						
32-8	30				6	24	700	500			80	125	235	280
32-9	14		2			12	1250	900			80	110	250	280
32-10	7					1	2450	1750			80	110	250	280
				2			1250	900						
			2				700	500						
						2	1750	1250						
32-12	15				1	4	700	500			80	110	250	280
					4	6	1250	900						
32-13	23				5	18	1250	900			80	110	250	280
32-15	8	2			6		1250	900			35	110	250	280
32-16	Like 32-6 Rotated 100° R													
32-17	4		4				1250	900			45	110	250	
32-18	Like 32-4 Rotated 100° R													
32-19	Like 32-1 Rotated 100° L													
32-20	Like 32-6 Rotated 100° L													
32-101	12	Two Coax. Cont.				2	4200	3000						
						8	1250	900			65	125	225	310
		Two Coax. Cont.												

Insert No.	Total Contacts	Ampere Rating 245	135	73	41	22	VOLTS■ DC	AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
		CONTACT SIZE 0	4	8	12	16								
32-102	14	One Coax. Cont.*				1	4200	3000			65	125	225	310
						6	1250	900						
						6	700	500						
		One Coax. Cont.												
32-414	52					52	700	500						
36-1	22				4	18	1250	900			80	110	250	280
36-2	5	3			2		1250	900						
36-3	6	3			3		1250	900			70	145	215	290
36-4	3	1					1250	900			70	145	215	290
		2					700	500						
36-5	4	4					700	500				120	240	
36-6	6	2	4				700	500			35	110	250	325
36-7	47				7	40	700	500			80	110	250	280
36-8	47				1	46	700	500			80	110	250	280
36-9	31		1	2	14	14	700	500			80	125	235	280
36-10	48					48	700	500	X	X	80	125	235	280
36-11	Like 36-10 Rotated 100° R													
36-12	Like 36-10 Rotated 110° L													
36-13	17					3	1750	1250			80	110	250	280
					2	12	700	500						
36-14	16			5	5	6	1250	900			90	180	270	
36-15	35					34	700	500			60	125	245	305
						1	1250	900						
36-16	Like 36-7 Rotated 100° R													
36-17	Like 36-7 Rotated 110° L													
36-18	Like 36-9 Rotated 100° R													
36-21	Like 36-9 Rotated 100° L													

Insert No.	Total Contacts	Ampere Rating 245	135	73	41	22	VOLTS■ DC	AC	MS-E/R	PokeR	ALTERNATE POSITIONS Degrees to Right Front Pin Insert W	X	Y	Z
		CONTACT SIZE 0	4	8	12	16								
36-403	52					52	700	500						
					12			5000						
36-405	15				2			*9000						
					1			†5000						
36-406	37		1	2	18	16	700	500						
36-407	15					12		5000						
					2			†9000						
					1			15000						
36-853	7				2	5								
40-1	30				6	24	1250	900			65	130	235	300
40-2	23					5	2450	1750						
						18	1250	900			80	110	250	280
40-3	23		1		4	18	1250	900			80	110	250	280
40-4	23		2	3	2	16	1250	900			80	110	250	280
40-5	15	3	2	4	6		700	500			80	110	250	280
40-6	26	1			1	24	1250	900			80	110	250	280
40-9	47			1	22	24	700	500			65	125	225	310
40-10	29		4	9		16	700	500			65	125	225	310
40-11	25	1	1	1	4	18	1250	900			80	110	250	280
40-13	Like 40-2 Rotated 100° R													

**For 7MM High Tension Cable. 20 Amps. Max. ■Limiting operating voltage at 50,000 feet altitude are approximately 25% of the sea level values. †VOLTAGE BREAKDOWNS: 15,000 V. RMS between "A" and nearest Contacts; 3,500 V. RMS between High Voltage Contacts; 5,000 V. RMS to ground; 5,000 V. RMS between small Contacts. * 5,000 V. to ground. • Insert 20-11 contains 13 size No. 16 contacts, 10 of which have size No. 20 solder cups.*

MS/AN Insert Contact Arrangement As viewed from the front of the pin insert

1 CONTACT
8S-1
10S-2
2S-4
12-5
14-3
14S-4
16-2
16S-3
16-12
18-6

1 CONTACT
18-7
18-16
18-420*
20-2
22-7
24-835*

2 CONTACT
10SL-4
12S-3
12S-6*

2 CONTACT
14S-9
16S-4
16-11
16-13
18-3
18-14
18-404*
20-5
20-12

2 CONTACT
20-23
22-1
22-3
22-8
22-11
24-1
24-9

2 CONTACT
28-7
32-5

3 CONTACT
10SL-3
14S-1
14S-7
16S-5
16S-6
16-7

3 CONTACT
16-10
18-5
18-22
20-3
20-6
20-19
20-26
22-2

3 CONTACT
22-6
22-9
22-21
22-25
24-14
28-3
28-6

3 CONTACT
28-880*
36-4

4 CONTACT
12SL-844*
14S-2
16-9
18-4
18-10
18-13

4 CONTACT
18-15
20-4
20-20
20-24
22-4
22-10
22-22

4 CONTACT
24-4
24-18
24-22
28-410
28-840
32-17

4 CONTACT
36-5

5 CONTACT
14S-5
18-11
18-20
18-29
20-14

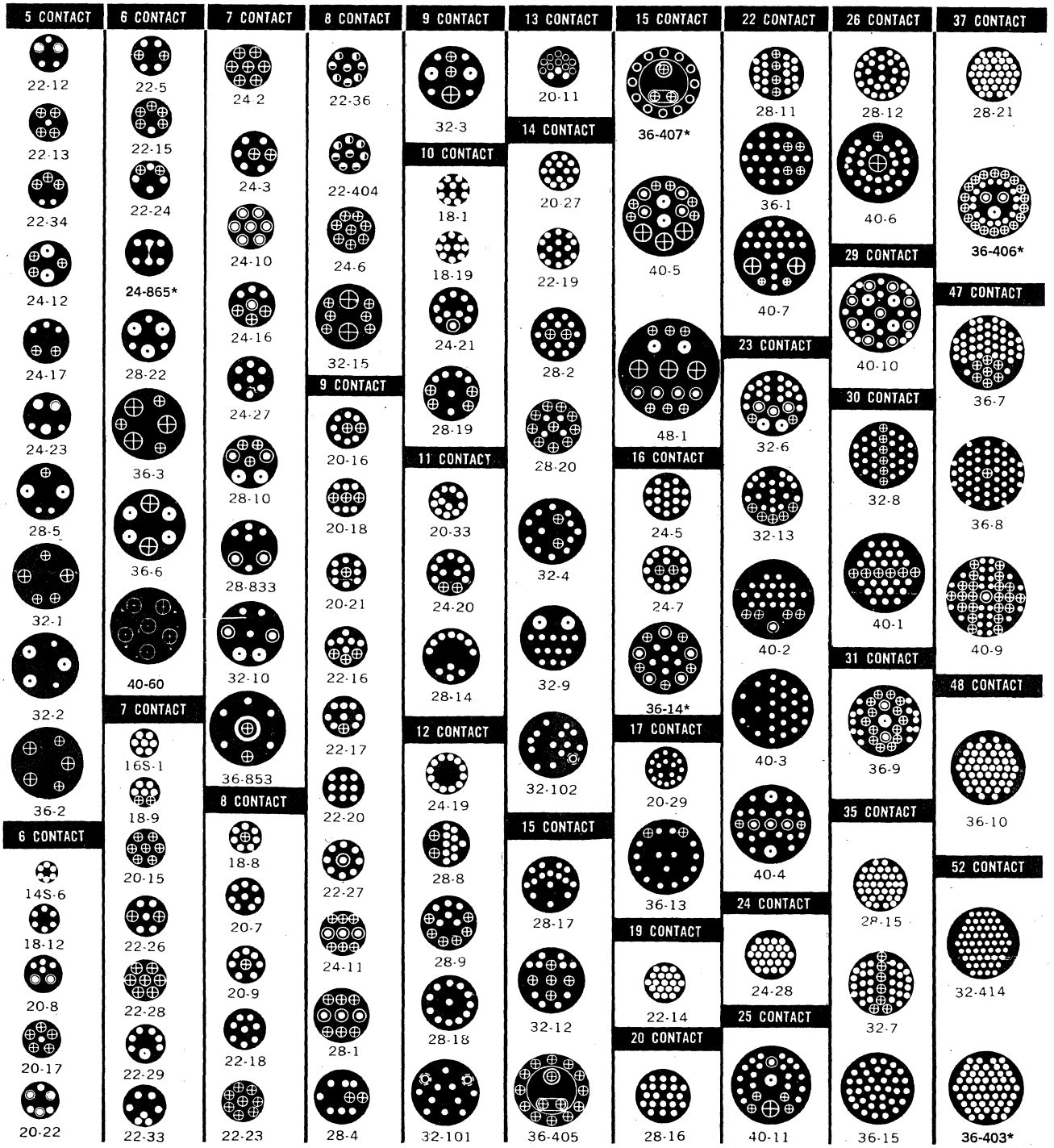
(Continued)

* MS number not assigned as yet. Use 97 prefix in place of MS.

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

MS/AN Insert Contact Arrangement (Continued)



* MS number not assigned as yet. Use 97 prefix in place of MS.

CODE OF WIRE SIZES

CURRENT RATING

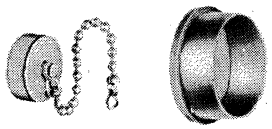
Contact Size	20	16	12	8	4	0
Amperes	10	22	41	73	135	245

Each insert is available with all male or female contacts. Contacts are non-rotating with all solder cups aligned for maximum wiring speed. Contact sizes correspond in number coding to wire sizes.

STANDARD CIRCULAR CONNECTORS

BUNKER RAMO AMPHENOL

Caps - 97 Series



Two types of protective caps are available for use with MS Connectors:

Cap & Chain — For use when MS Connectors are not in use. The 9760 is made of aluminum with an olive drab chromate conversion seal and is available for either receptacles or plugs. To order the cap less chain, add the suffix G to the catalog number.

Disposable Dust Caps — Expendable polyethylene dust caps provide added protection to precision built MS Connectors during storage or shipment or completed apparatus.

Automatic Ordering — A disposable cap may be ordered with any MS Connector by adding the suffix (288) to the catalog number of the connector.

ORDERING INFORMATION

MS Connector Size	CAP & CHAIN For Engagement On		DISPOSABLE DUST CAP For Mating End	
	Receptacles 9760-	Plugs 9760-	Receptacles 97121-	Plug 97121-
8S	-8	-8P	-208	-308
10S	-10	-10P	-210	-310
10SL	-10	-10P	-210	-310
12, 12S	-12	-12P	-212	-312
12SL	-12	-12P	-212	-312
14, 14S	-14	-14P	-214	-314
16, 16S	-16	-16P	-216	-316
18	-18	-18P	-218	-318
20	-20	-20P	-220	-320
22	-22	-22P	-222	-322
24	-24	-24P	-224	-324
28	-28	-28P	-228	-328
32	-32	-32P	-232	-332

Thermocouples - 97 Series

For MS Connectors

Designed to provide a disconnect in thermocouple circuits without the introduction of dissimilar metals.

There are six thermocouple insert configurations. Each of these utilizes an equal number of iron and constantan contacts. However, any MS Connector with size 16 contacts may be ordered with any of the contacts listed at right. For ease in wiring, each thermocouple contact is color coded on the solder cup end of the contact.

Contacts	Description	Color Code
Alumel	94% Nickel, 2.5% Manganese, 2% Aluminum, 1% Silicone, .5% Iron	Orange
Constantan	45% to 60% Copper, 40% to 55% Nickel, 0 to 1.4% Manganese, .1% Iron	Red
Copper	87.5% to 90% Copper, 1.8% to 2.2% Lead, .1% Iron, .5% Nickel, .5% Normal Impurities and balance Zinc	Yellow
Iron	84.4% Iron, 2% Sulphur, .4% Silicone, 2% Carbon, 3.6% Manganese, .6% Phosphor, .1% Copper, .9% Tin	White
Chromel	90% Nickel, 10% Chromium	Green

MS Fittings Cable Clamps, Adapters

AN3057 Cable Clamp — Standard cable clamp, threads onto all MS Connectors with threaded back shell. Provides reliable sturdy support. Illustration does not show one rubber and two fiber washers which seat clamp to connector.

AUTOMATIC ORDERING — By adding deviation number (559) to the MS catalog number, the correct AN3057 cable clamp will be shipped with the MS Connector.

Basic 9767-X — Identical to AN3057 cable clamp, but the rubber washer and one of the two fiber washers are replaced with a rubber boot. Recommended for applications in which cable is subject to considerable flexing.

9767-X-X Weatherproof Cable Clamp—Same as BASIC 9767-X above with addition fo AN3055 reducing adapter. The inside of the AN3055 is tapered to the same dimensions of the front end of the rubber boot —thus providing a weatherproof seal.

AN3055 Reducing Adapter — Permits smaller cable clamps to be used with MS Connectors.

AN3420 Bushing — Rubber bushing designed specifically for MS3057A Cable Clamp. Protects wire bundle and unjacketed cable from possible damage by a cable clamp. Can also be used for a reducing bushing.

MS3057A Cable Clamp — For rubber covered cable or wires protected by tubing. Both clamping halves float so cable is always centered, affording maximum strain relief. With unjacketed cable or wire bundles without tubing, use corresponding AN3420 Bushing.

Common MS Deviations

MS Connectors are available with minor deviations from standard. Deviations are ordered by adding the deviation suffix to the MS part number. Deviation numbers always appear in parenthesis.

(288) Includes 97-121 dust cap for mating end.

(417) Plugs only, type W washer cemented.

(426) Minimum of .00002" gold over .0002/.0003" silver on contacts. Use 97 prefix instead of MS.

(432) No. 16 contact. For use with AMP No. 53 taper pin. Use 97 prefix instead of MS.

(559) AN 3057 cable clamp included with connector.

(639) Cadmium plate finish wtih clear chromate conversion seal. Use 97 prefix instead of MS.

(866) Contacts with minimum of .00002" gold over. 0002/.0003" silver with tinned solder cups.

MS Potting

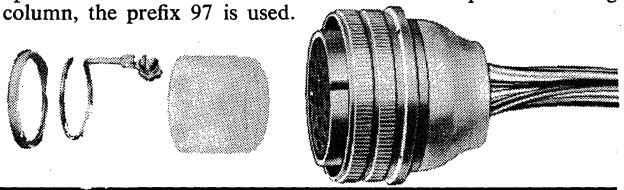
MS Connectors for potting are available in all connector styles except the MS3102. The back shell of the connector is removed and replaced with a potting mold retainer ring No. 9755-270-XX. (XX indicates connector size.) This describes the basic (438) construction.

ORDERING INFORMATION

Since the solid or split back shell is removed from the connector shell prior to potting, the A and the B is dropped from the part number of an MS potted connector.

For example: 97-3106-18-11P (596) or 97-3101-14S-4P (438)

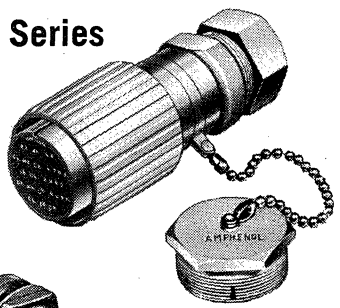
Since the potting construction does not fall under Military Specifications unless so indicated under the special marking column, the prefix 97 is used.



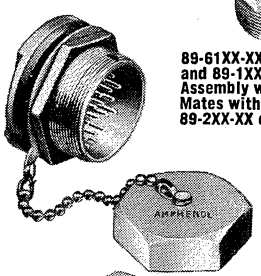
SUBMERSION-PROOF CONNECTORS

BUNKER RAMO AMPHENOL

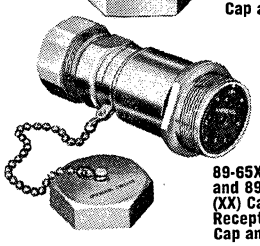
89 Series



89-61XX-XX (XX) and 89-1XX-XX (XX) Plug Assembly with Cap and Chain. Mates with 89-2XX-XX or 89-5XX-XX.



89-62XX-XX and 89-2XX-XX Panel Receptacle with Cap and Chain.



89-65XX-XX (XX) and 89-5XX-XX (XX) Cable Receptacle with Cap and Chain.

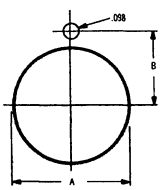
Connectors used in Ground Support Equipment must be rugged and reliable — and easy to handle under all conditions. Fully meeting these particulars, AMPHENOL's popular 89 Series GSE connectors are used in many top missile projects. In fact, nearly every basic industry around the world depends on these heavy duty connectors. The growing list includes agriculture, mining, transportation, petroleum, marine, construction, and basic metals production. In short, they're a must wherever a rugged, completely waterproof electrical connection is required.

GSE connectors are completely waterproof and provide dependable service even when submerged in mud, ice or water. An internal rubber gasket in the cable clamp adapter, a type "W" washer at the mating faces and another washer used with panel mounting receptacles provide assured protection. Shells and cable clamp adapters are machined from top quality aluminum bar stock to achieve far greater strength than is possible to obtain with die cast methods.

For rough weather handling, coupling rings are extra-long and heavily grooved. Flats are conveniently located for field-servicing with standard open-end wrenches. Caps and chains are standard on all connectors.

AMPHENOL GSE connectors are available in a large number of standard MS inserts. They are interchangeable with AN/MS connectors with the same shell size and insert arrangement. Connectors exceed the water immersion requirements of MIL-C-12520. Inserts conform to MIL-C-5015.

Panel and Polarizing Pin Cutout



Dimensions (Inches)

Shell Size	89-1 Length*	89-1 Dia.	89-2 Length	89-2 Dia.	89-5 Length*	89-5 Dia.	Min. Chassis Hole Dia.	Max. Chassis Thick.
22	5 1/16	1 3/32	1 13/32	1 7/8	5	1 3/4	1 25/64	5/16
28	5 1/16	2 1/32	1 13/32	2 1/4	5	2 1/8	1 49/64	5/16
32	5 3/16	2 11/32	1 13/32	2 1/2	5 1/8	2 3/8	2 1/64	5/16

* Includes cable clamp adapter

Shell Size	A +.010 −.000	B ±.002
22	1.385	.796
28	1.760	.984
32	2.010	1.109

Insert Availability

Insert Number	No. of Contacts	Insert Number	No. of Contacts	Insert Number	No. of Contacts	Insert Number	No. of Contacts	Insert Number	No. of Contacts	Insert Number	No. of Contacts	Insert Number	No. of Contacts
22-1	2	22-12	5	22-23	8	28-1	9	28-12	26	28-833	7	32-9	14
22-2	3	22-13	5	22-24	6	28-2	14	28-14	11	28-840	4	32-10	7
22-3	2	22-14	19	22-25	3	28-3	3	28-15	35	28-880	3	32-12	15
22-4	4	22-15	6	22-26	7	28-4	9	28-16	20	32-1	5	32-13	23
22-5	6	22-16	9	22-27	9	28-5	5	28-17	15	32-2	5	32-15	8
22-6	3	22-17	9	22-28	7	28-6	3	28-18	12	32-3	9	32-17	4
22-7	1	22-18	8	22-29	7	28-7	2	28-19	10	32-4	14	32-101	12
22-8	2	22-19	14	22-33	7	28-8	12	28-20	14	32-5	2	32-102	14
22-9	3	22-20	9	22-34	5	28-9	12	28-21	37	32-6	23	32-414	52
22-10	4	22-21	3	22-36	8	28-10	7	28-22	6	32-7	35		
22-11	2	22-22	4	22-404	8	28-11	22	28-410	4	32-8	30		

How to Order:

89 — 6528 — 15P (07) 105

SERIES NUMBERS

Cadmium Plate O.D. Chromate For anodized finish omit this digit

CONNECTOR TYPE
1—Plug
2—Cable Receptacle
5—Cable Receptacle

INSERT NUMBER
Same as for MS Connectors, pages 48-55

CONTACT
P—Pin Contacts
S—Socket Contacts

CABLE CLAMP ADAPTER NUMBER
Use numbers as per CABLE CLAMP ADAPTER TABLE, below. (Not used for panel receptacles.)

ESTABLISHED DEVIATIONS
(105) Connector less cap and chain
(563) Gold plated contacts
(604) Anodized aluminum (Dichromate Seal)
(608) Anodized aluminum (black)
(699) Hard anodized aluminum coating
(712) Black anodized olive drab enamel

Other finishes, special insert arrangements, contact platings, and accessories are available to custom-match GSE connectors to your application. Ask your local Amphenol Sales Engineer for details.

Cable Clamp Adapters

Cable Clamp Adapter No.	Will Take Cable O.D. of	Mates With Connector Size 22	28	32
(04)	.188 to .250	X	X	X
(05)	.250 to .312	X	X	X
(06)	.313 to .375	X	X	X
(07)	.375 to .437	X	X	X
(08)	.438 to .500	X	X	X
(09)	.500 to .562	X	X	X
(10)	.563 to .625	X	X	X

Cable Clamp Adapter No.	Will Take Cable O.D. of	Mates With Connector Size 22	28	32
(11)	.625 to .687	X	X	X
(12)	.688 to .750	X	X	X
(13)	.750 to .812		X	X
(14)	.813 to .875		X	X
(15)	.875 to .937		X	X
(16)	.938 to 1.000		X	X
(17)	1.000 to 1.062		X	X

Cable Clamp Adapter No.	Will Take Cable O.D. of	Mates With Connector Size 22	28	32
(18)	1.063 to 1.125		X	X
(19)	1.125 to 1.187			X
(20)	1.188 to 1.250			X
(21)	1.250 to 1.312			X
(22)	1.313 to 1.375			X

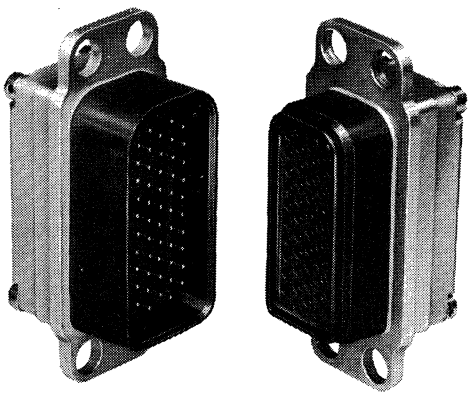
Clearance between maximum cable O.D. and minimum clamp I.D. has been allowed

RACK AND PANEL CONNECTORS

BUNKER RAMO AMPHENOL

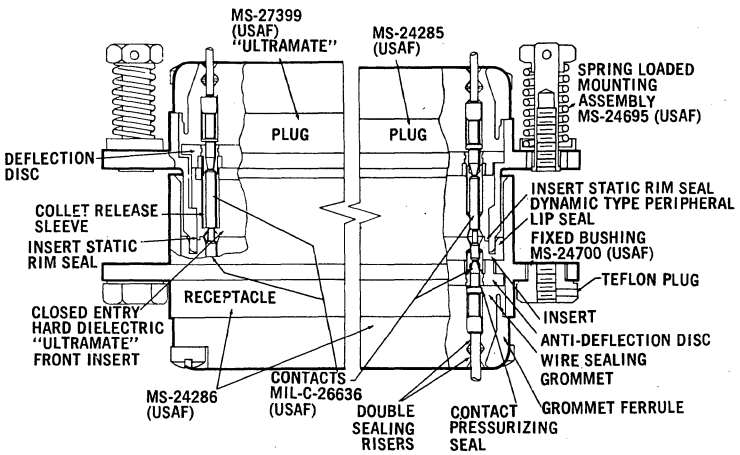
217 Series Miniature Environment Resistant Connectors

This connector offers AMPHENOL's Ultra-Mate® design and uses Poke-Home® contacts.



FEATURES:

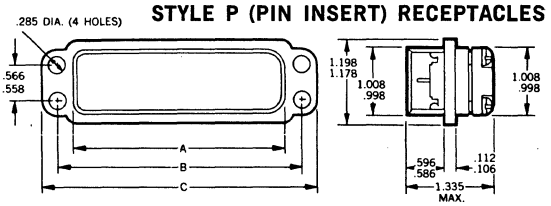
- Two Versions.
  1. Both mating faces silicone rubber, Mil-C-26518
  2. Hard dielectric face on plug. Mil-C-38300
- Complete inter-mateability of both with receptacle
- Mono-block construction provides complete environmental sealing
- Cannot mate without assured electrical contact
- Lightweight, high-strength, impact-extruded aluminum shells
- Maximum number of contacts within area available
- Poke-Home contacts can be inserted or removed without disassembling connector or disturbing adjacent contacts
- Both versions have desirable front release contacts.
- Contacts can be quickly crimped with hand or power tools
- Completely protects contact pressure-members from environmental or handling damage
- Connectors are mated under tension by dual spring-loadad mounting assemblies and fixed bushings.
- Either plug or receptacle may be spring loaded
- Receptacle mounts on panel, front or rear



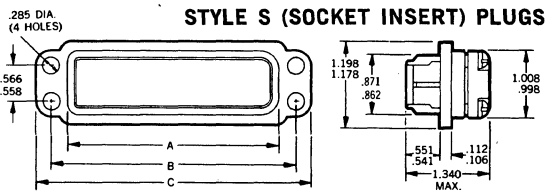
217 SERIES ULTRAMATE & MIL-C-26518 RACK & PANEL CONNECTORS
EMPLOYING MIL-C-26636 (USAF) CRIMP CONTACTS

Dimensions (inches)

STYLE P (PIN INSERT) RECEPTACLES



STYLE S (SOCKET INSERT) PLUGS

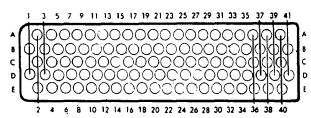


Shell Size	STYLE P RECEPTACLES A ±.005	B ±.004	C ±.005	STYLE S PLUGS A ±.005	B ±.004	C ±.005
A	3.375	3.875	4.296	3.239	3.875	4.296
B	1.945	2.445	2.866	1.809	2.445	2.866
C	1.516	2.000	2.421	1.380	2.000	2.421

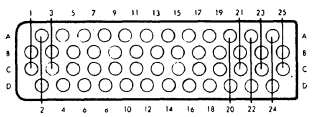
Available Insert Arrangements

Showing Rear Face of Pin Inserts

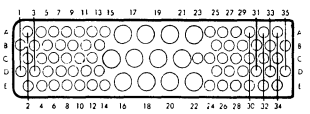
SIZE A SHELL



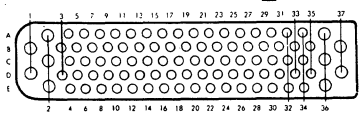
102—SIZE NO. 20 CONTACTS△



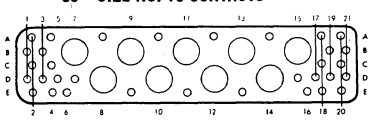
50—SIZE NO. 16 CONTACTS



65—SIZE NO. 20 CONTACTS△
***12—SIZE NO. 12 CONTACTS**



82—SIZE NO. 20 CONTACTS△
10—SIZE NO. 16 CONTACTS

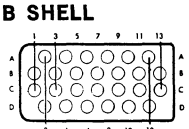


33—SIZE NO. 20 CONTACTS△
9—SIZE NO. 2 SHIELDED CONTACTS

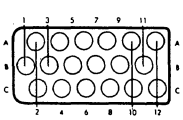
* No. 1 Shielded contact is interchangeable with size No. 12 contact.

△Available in closed entry hard dielectric "Ultra-mate".

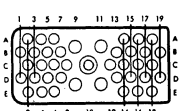
SIZE B SHELL



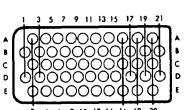
26—SIZE NO. 16 CONTACTS



***18—SIZE NO. 12 CONTACTS**



36—SIZE NO. 20 CONTACTS△
4—SIZE NO. 16 CONTACTS
***1—SIZE NO. 1 SHIELDED CONTACT**



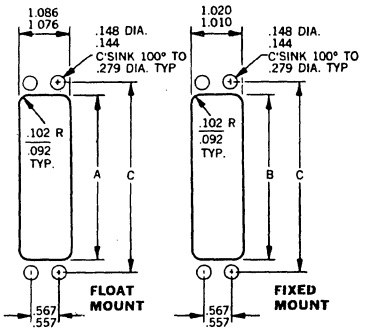
52—SIZE NO. 20 CONTACTS△

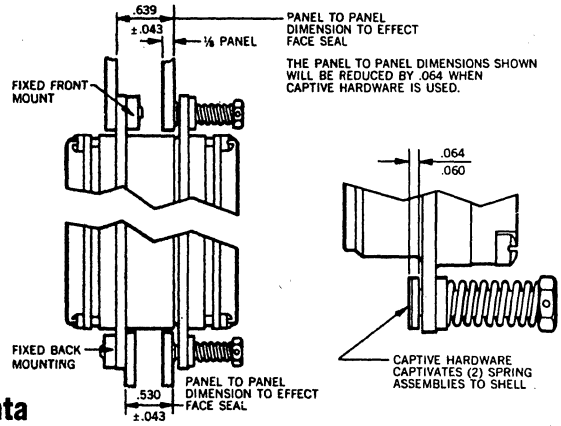
RACK AND PANEL CONNECTORS

BUNKER RAMO AMPHENOL

217 Series Miniature Environmental Resistant Connectors (CONTINUED)

Mounting Dimensions





Shell Size	Dimension A	B	C
A	3.459 3.449	3.393 3.383	3.880 3.870
B	2.030 2.020	1.964 1.954	2.450 2.440
C	1.585 1.575	1.533 1.523	2.005 1.995

Contact Data

Contact Size	Max. Current Rating	Wire Size	AMPHENOL Part No. Pin	Socket	MS Part No. Pin	Socket
No. 20	7.5 amps	24-22-20 AWG	48-1595-02	248-136-2001S-02	MS24254-20P	MS24255-20S
No. 16	22 amps	18-16 AWG	48-1825-02	48-100-1600S-02	MS24254-16P	MS24255-16S
No. 12	41 amps	14-12 AWG	48-1827-02	48-1215-02	MS24254-12P	MS24255-12S
No. 1 (shielded)* Resilient Hard Front	3 amps 3 amps	* * * *	48-1226-02	48-1227-02 48-1227-50	MS27184-22P —	MS27185-22S MS27450-22S
No. 2 (shielded)* Resilient Hard Front	7.5 amps 1 amp	* * * RG-195/U	48-2187-02 48-2187-50	48-2188-02 48-2188-50	MS27184-20P —	MS27185-20S —

* Replaces No. 12 power contact.
Can accommodate cables RG179/U, RG179A/U, RG187/U, RG188/U and RG161/U as well as shielded contacts. Cables RG195/U, RG178/U, RG178A/U and RG196/U can also be accommodated with modification to shielded contacts.

** Cable MIL-C-27500KIN6 (Extruded) or 22 AWG per MIL-C-7078 type II.

*** Cable MIL-C-27500KIN6; 20KIN6; 18KIN6 (Extruded) or 22, 20, 18 AWG per MIL-C-7078 type II.

How to Order: The part numering system has been set up to provide a complete and exact description through the part number. To find the AMPHENOL part number to order, put together the four groups of digits and letters that specify the particular 217 Series connector you want, as per the following example.

217 — 24 C — A 077 S — 10

SERIES DESIGNATION 217-

SHELL AND CONTACT TYPE
Use number in appropriate column below.

Socket Contacts (Plug)	Pin Contacts (Receptacle)	Number of Contacts
20	21	102
22	23	92
24	25	77
28	29	52
30	31	26
32	33	18
48	49	50
50	51	42
54	55	41

INSERT CONSTRUCTION
C—Closed Entry, Hard Dielectric, Ultra-Mate
R—Resilient Front

SHELL SIZE — A, B

TOTAL NUMBER OF CONTACTS

	#20	#16	#12	No. 1 Shielded	No. 2 Shielded
102	102				
092	82	10			
077	65		12		
052	52				
026		26			
018			18		
042	33				9
041	36	4		1	
050		50			

COMPONENTS INCLUDED
0 Plug or Receptacle Connector **with** contacts and spare sealing plugs.
1 Plug or Receptacle Connector **without** contacts.
2 Connector with captive retainer and spring mounting assemblies assembled to connector **without** contacts.
3 Same as 2 except **with** contacts included, packaged separately.
4 Connector, **without** contacts, with retainer nuts (aluminum) (MS* fixed bushing) packaged separately.
5 Same as 4 except **with** contacts included, packaged separately.
6 Connector, **without** contacts, with spring loaded mounting assembly (MS**) packaged separately.
7 Same as 6 except **with** contacts included, packaged separately.
8 Connector **without** contacts, with retainer nuts (stainless) (MS* fixed bushing) packaged separately.
9 Same as 8 except **with** contacts included, packaged separately.

* Fixed Bushing:

MS No.	AMPHENOL No.
MS 24700-1	217-537 (Set of 4) (aluminum)
MS 24700-2	217-955 (Set of 4) (stainless)

** Spring Loaded Mounting Assembly:

MS 24695-1	217-678 (A Size) (Set of 4)
MS 24695-2	217-679 (B Size) (Set of 4)

SHELL FINISH
1 MIL-C-26518 hard coat anodize on front of shell, gold iridite on flange and on grommet ferrule
5 Gold Iridite
6 Black Anodize

TYPE OF CONTACT
P—Pin S—Socket

RECTANGULAR CONNECTORS

BUNKER RAMO AMPHENOL

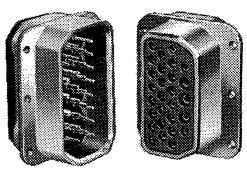
94 Series Poke-Home Rectangular Connectors

Offers both standard and/or shielded contacts

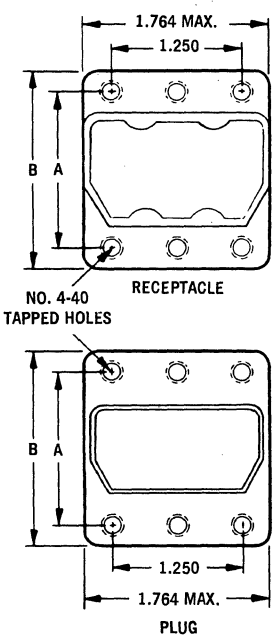
FEATURES:

- Both solder and crimp type available
- All shielded contacts are solder type
- Solder pockets recessed in dielectric body; protective sleeving unnecessary
- Female contacts are hooded
- Shells are aluminum, cadmium plated, chromate treated
- Crimp contacts are silnic bronze, gold-over-silver plating
- Solder contacts: pin are "half-hard" brass, socket are brass alloy, both gold-over-silver plating
- Hard insert, fibre filled diallyl phthalate Resilient insert, silicone rubber

Ordering Information Connectors with Both Standard and Shielded Contacts



AMPHENOL Part Number		Number of Contacts			Dimensions (Inches)	
Plug With socket contacts	Receptacle With pin contacts	#16	#20	Shielded	A	B Max
94-11320	94-21320	2	13	—	1.000	1.217
94-32530	94-42530	3	25	—	1.281	1.498
94-31722	94-41722	2	17	2 RG-58/U	1.281	1.498
94-52548	94-62548	4	25	8 RG-180/U	1.921	2.144
94-55940	94-65940	4	59	—	1.921	2.144
94-54352	94-64352	5	43	2 RG-58/U	1.921	2.144



DEVIATIONS (Use no more than one suffix on any one part number)

To order crimp contacts, add the suffix -1 to the standard part number

To order connectors for use with hood and cable clamp assemblies*, add one of the following suffixes, as applicable, to the standard part number:

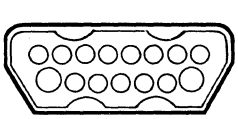
-11 With solder contacts but less hood and clamp assembly
-12 With crimp contacts but less hood and clamp assembly
-13 With solder contacts with hood and clamp assembly
-14 With crimp contacts with hood and clamp assembly
-23 With solder contacts and cable clamp mounting assembly 94-520
-24 With crimp contacts and cable clamp mounting assembly 94-520

*Note: When cable clamps are used, the center tapped hole on the flange of the connector must be drilled out.

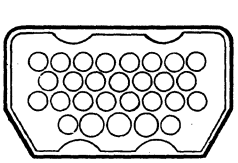
To order connectors for use with RG-195/U cable, add one of the following suffixes, as applicable, to the standard part number:

-25 Solder contacts
-26 Crimp contacts
-27 Solder contacts but less hood and cable clamp assembly
-28 Crimp contacts but less hood and cable clamp assembly
-29 Solder contacts with hood and cable clamp assembly
-30 Crimp contacts with hood and cable clamp assembly
-31 Solder contacts and cable clamp mounting assembly 94-520
-32 Crimp contacts and cable clamp mounting assembly 94-520

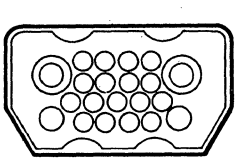
Insert Arrangements (Face View)



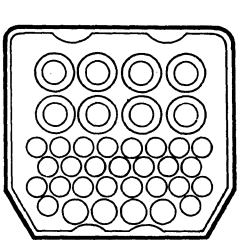
94-11320 and 94-21320



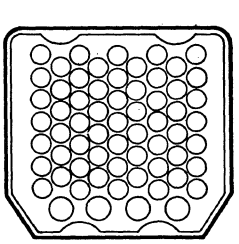
94-32530 and 94-42530



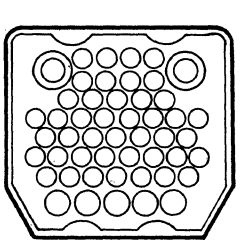
94-31722 and 94-41722



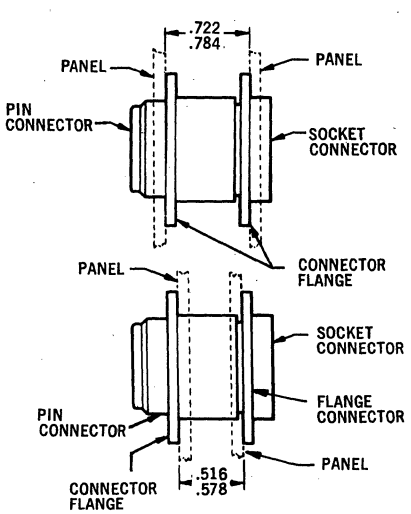
94-52548 and 94-62548



94-55940 and 94-65940



94-54352 and 94-64352



RACK AND PANEL CONNECTORS

BUNKER RAMO AMPHENOL

94 Series Poke Home Rectangular Connectors (CONTINUED)

Ordering Information

Part numbering for the 94 Series is descriptive. Here is the basic system.

94 — X XX X X — 1

SERIES NUMBER
1 Shell size (Plug) using socket contacts
2 Shell size (Receptacle) using pin contacts
3 Shell size (Plug) using socket contacts
4 Shell size (Receptacle) using pin contacts
5 Shell size (Plug) using socket contacts
6 Shell size (Receptacle) using pin contacts

Number of size 20 contacts

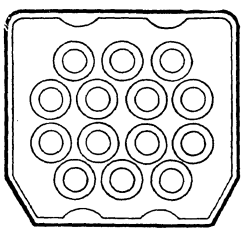
Number of size 16 contacts

Number of shielded contacts

Deviation for crimp type contacts (shielded not included). Any other number in this position signifies a deviation from the standard connector.

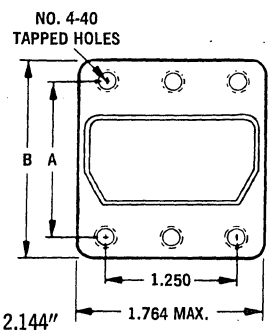
Ordering Information

Connectors with Shielded Contacts Only

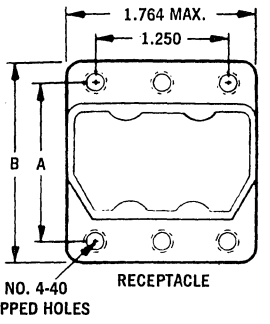


94-50014-5 and 94-60014

INSERT ARRANGEMENTS
14 Shielded Contacts
Terminates RG-58/U
or RG-159/U Cable



DIMENSIONS:
A — 1-.921″, B — 2.144″



To order connectors for RG-58/U cable, use the following numbers:

94-50014-5	Plug
94-50014-8	Plug less hood and cable clamp but center hole drilled out
-9	Plug with hood and cable clamp and center hole drilled out
-10	Plug with cable clamp and mounting assembly 94-520
94-60014-5	Receptacle
94-60014-8	Receptacle less hood and cable clamp but center hole drilled out
-9	Receptacle with hood and cable clamp and center hole drilled out
-10	Receptacle with cable clamp mounting assembly 94-520

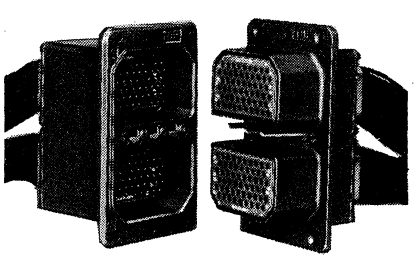
To order connectors for RG-195/U cable, use the following numbers:

94-50014-6	Plug
94-50014-11	Plug less hood and cable clamp assembly but center hole drilled out
-12	Plug with hood and cable clamp assembly with center hole drilled out
-13	Plug with cable clamp mounting assembly 94-520
94-60014-7	Receptacle
94-60014-11	Receptacle less hood and cable clamp assembly but hole drilled out
-12	Receptacle with hood and cable clamp assembly with hole drilled out
-13	Receptacle with cable clamp mounting assembly 94-520

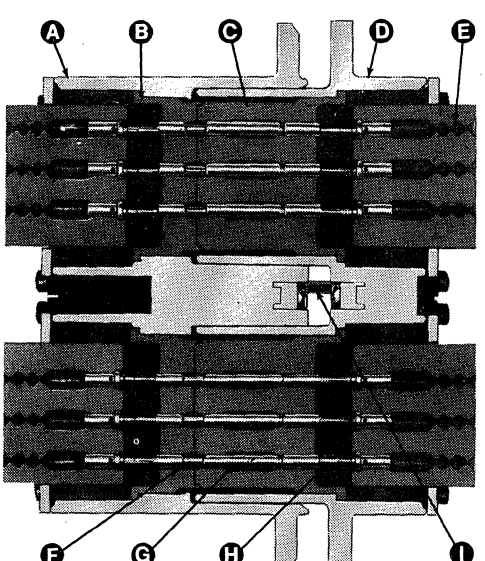
Note: When cable clamps are used, the center tapped hole on the flange of the connector must be drilled out.

213 Series ARINC

Amphenol 213 Series Rack and Panel connectors feature intermateability with other ARINC connectors, Crimp Poke-Home front release contacts, and a complete environmental seal to reduce failure and provide extra safety margins.

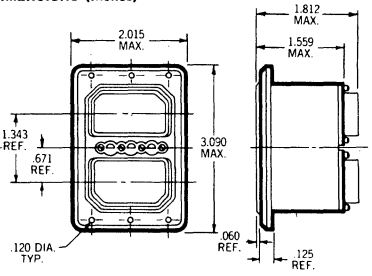


A. Receptacle shell
B. Bonded monoblock construction
C. Resilient inserts
D. Plug shell
E. Environmental sealing grommet
F. Pin contact
G. Socket contact
H. Contact retention clip
I. Polarizing key

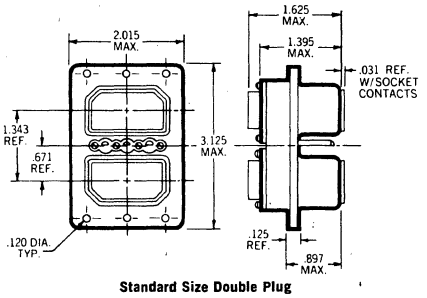


213 Series ARINC (Continued)

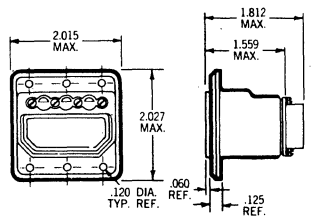
DIMENSIONS (Inches)



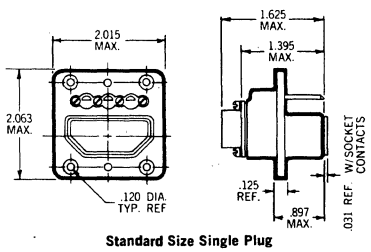
Standard Size Double Receptacle



Standard Size Double Plug

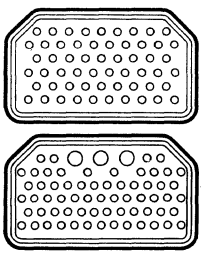


Standard Size Single Receptacle



Standard Size Single Plug

Insert Arrangements Showing Front Face of Pin Insert



ARRANGEMENT #57
57 #20 Contacts

ARRANGEMENT #67
64 #20 Contacts
3 #16 Contacts

How to Order:

213 — 1 P 57 S — 00 01

- SERIES
- NUMBER OF PADS 1 2
- SHELL STYLE P — Plug R — Receptacle
- INSERT CONFIGURATION 57 67
- KEY POSITIONS 1 through 99
- DEVIATIONS
- CONTACT STYLE P — Pin S — Socket

ACCESSORIES

All series are complimented by a complete selection of cable restraints, caps and chains, dust covers, potting molds where applicable, dummy receptacles, right angle adapters and supports, and tools.

Contact your nearest Sales Office for further information.

Series	Potting	Cable Clamps	Cap & Chains	Protective Caps	Dummy Receptacle	Right Angle Supports	Adapters
AN/MS	(438)Const.	5 types	4 types	2 types	Yes	Yes	Yes
48	No	1 type	2 types	No	Yes	Yes	Yes
67	Yes	1 type	1 type	No	No	No	No
69	No	Yes	No	No	No	No	No
89	No	Yes	Yes	Yes	No	No	Yes
348	Yes	1 type	2 types	Yes	Yes	Yes	Yes
165	Yes	Built-In	No	Yes	No	No	No
182	No	No	No	Yes	No	No	No
217	No	No	No	Yes	No	No	No
94	No	2 types	No	No	No	No	No
213	No	No	No	No	No	No	No
115	Yes	No	No	No	No	No	No
270	No	Yes	No	No	No	No	No
246	Yes	Yes	No	No	No	No	No
208	Yes	Yes	No	No	No	No	No
238	Yes	Yes	No	No	No	No	No

HERMETICS

Wide Variety

AMPHENOL offers 5 different series of hermetic receptacles, each with a number of receptacles of different types, sizes, and contact configurations.

High Strength Compression-Glass Seals

Glass has tremendous instrinsic strength and can take great stress if its surface weakness is counteracted. This is done by prestressing. The glass preform is put into the steel shell and the assembly heated until the glass flows. It is then cooled and, in effect, the glass is cast within the shell. However, the glass hardens first, then the metal. The metal shrinks into the glass and prestresses it. This gives the glass great strength.

Because the steel and glass have different coefficients of expansion the seal remains strong and tight over a wide temperature range. Because most AMPHENOL hermetic receptacles use a single glass insulator for all the contacts in the receptacle (instead of a separate bead for each contact), AMPHENOL hermetics are unusually strong and leak-proof. Depending on insert size and mounting, they can withstand pressures up to 500 psi or more.

Less than .01 Micron Leakage Rate

AMPHENOL guarantees less than .01 micron cubic foot leakage per hour on its 48 Series hermetic receptacles. This performance is 100 times as good as the industry standard of 1 micron cubit foot per hour. On most of its other series hermetics, AMPHENOL guarantees less than .1 micron cubic foot per hour — 10 times as good as the standard.

AMPHENOL hermetic receptacles maintain their high performance under extremes of temperature, humidity, pressure, thermal and physical shock, vibration, and corrosive atmospheres.

Immediate Delivery

AMPHENOL maintains large shelf stocks of the most popular types and sizes of hermetic receptacles and can fill most orders right away.

Hermetics available as shown

Hermetic	Mates With	No. of Shell Sizes Available	No. of Contacts Available	Insert Arrangements Available
172	AN/MS	11	1 to 48	40
48	48	6	2 to 55	28
67	67	2	3 to 48	12
182	165	2	5 to 24	7
348	348	8	4 to 155	Consult Factory

See page 12 for 182 Series Hermetics

Consult your nearest AMPHENOL Sales Office for detailed information.

TOOLS

BUNKER RAMO AMPHENOL

Poke-Home Contacts and Tool Applications

48 Series and 217 Series

Contact Size	AMPHENOL Part No.		MS Part No.		Crimping Tool With Turret Head Assembly	Contact Locator	Crimp Jaw Setting Dia.	Insertion Tool	Removal Tool	
	Pin	Socket	Pin	Socket					Standard Connector	Ultra-Mate Connector
#20	48-1595-02	48-100-2000S-02	MS24254-20P	MS24255-20S	294-293	Included	Information on Data Plate	294-88 (MS24256A20)	294-89 (MS24256R20)	294-203 (MS24256RH20)
#16	48-1825-02	48-100-1600S-02	MS24254-16P	MS24255-16S	294-293	Included		294-96 (MS24256A16)	294-97 (MS24256R16)	294-180 (MS24256RH16)
#12	48-1827-02	48-1215-02	MS24254-12P	MS24255-12S	294-293	Included		294-72 (MS24256A12)	294-73 (MS24256R12)	294-183

SHIELDED CONTACTS

Drawing	Shielded Contact	Contact Pin or Sockets	Crimp Tools Center Contact (Amphenol Nos.)			Outer Ferrule Crimp Tool*	Cable Application
			Tool	Nest Bushing	Crimp Setting		
1 #1 Shielded	48-1226-02 48-1227-02, 48-1227-50	P S S	294-289	294-1631	#3	294-529	#22 AWG per MIL-C-7078, Type II and MIL-C-27500-22 Kin6 RG-174/U, -188/U
					#1	294-529	RG-161/U, -179/U, -179A/U, -187/U
	48-1226-57 48-1227-57	P S	294-289	294-1631	#1	294-528	Raychem 9530A11
2 #1 Shielded	48-1226-51, -54 48-1227-51, -54, -56	P S	294-289	294-1631	#1	294-528	RG-180/U, -180A/U, -180B/U, -195/U
3 #1 Shielded	48-1226-55, 48-1227-55	P S	294-289	294-1631	#1	294-529	RG-178/U, -178A/U, -178B/U, -196/U
4 #2 Shielded	48-2187-02 48-2188-02	P S	294-289	294-1630	#1	294-528	#18, 20, 22 AWG per MIL-C-7078, Type II and MIL-C-27500-18, -20, -22 Kin6 Extruded Jacket
	48-2187-50, -51 48-2188-50, -51, -53, -54	P S	294-289	294-1630	#1	294-528	RG-180/U, -180A/U, -180B/U, -195/U
5 #2 Shielded	48-2187-52 48-2188-52	P S	294-289	294-1630	#1	294-530	RG-59/U and 21-541

* Includes Hex Die Set

67 Series

Contact Size	AMPHENOL Part No.		Crimping Tool	Contact Locator	Crimp Jaw Setting	Insertion and Removal Tool
	Pin	Socket				
#20	67-1890-XX	67-1772	294-1166	294-1081	.031-.041	294-152
#20	18-313-XX	175-257-XX	294-1166	294-1081	.031-.041	294-193

69 Series

#12	69-1115-XX	69-1100-XX	294-293	Included	Info on Data Plate	294-40
#16 & 16S	69-1120-XX 69-1125-XX	69-1105-XX 69-1110-XX				294-39
Coax	69-14500	69-14501	Center Contact Soldered. Outer Ferrule Crimped With 294-531			294-71

94 Series

Contact Size	AMPHENOL Part No.		Crimping Tool	Contact Locator	Crimp Jaw Setting	Insertion Tool	Removal Tool
	Pin	Socket					
#20	94-686-02	94-688-02	294-1166	294-1169	.031/.041	Not Req'd.	294-58
#20	94-741-XX	175-098-XX	294-1166	294-1169	.031/.041	Not Req'd.	294-58
#20	94-556	94-570	294-1166	294-1169	.031/.041	Not Req'd.	294-58
#16	94-557	94-572	294-1166	294-1170	.041/.053	Not Req'd.	294-48
#16	94-683-02	94-685-02	294-1166	294-1170	.041/.053	Not Req'd.	294-48
#16	94-742-XX	175-101-XX	294-1166	294-1170	.041/.053	Not Req'd.	294-48

115 Series

Contact Size	AMPHENOL Part No.		Crimping Tool	Contact Locator	Crimp Jaw Setting	Insertion Tool	Removal Tool
	Pin	Socket					
#20	N/A	115-2234	294-1166	294-1469	.044/.054	Not Req'd.	Not Req'd.
#22	N/A	175-272-02	294-1166	284-1385	.041/.053	294-245	294-225

TOOLS

BUNKER RAMO AMPHENOL

Poke-Home Contacts and Tool Applications (Continued)

213 Series

Contact	Crimp Tool	Positioner	Insertion	Removal
#20	294-1166	294-1169	294-279	294-280
#16	294-1166	294-1170	294-192 (MS90455-1)	294-219 (MS-90456-1)
#20†	294-1166	294-1762	294-279	294-296

† Contact Body smaller than regular #20 contact.

246 Series

Contact Size	AMPHENOL Part No. Pin	AMPHENOL Part No. Socket	Crimping Tool	Contact Locator	Crimp Jaw Setting	Insertion Tool	Removal Tool
#16	246-12600-16000-XX	246-12800-16000-XX	294-293	Included	See Data Plate	294-192 (MS90455-1)	294-219 (MS90456-1)
#12	246-12600-12000-XX	246-12800-12000-XX	294-293	Included	See Data Plate	294-229 (MS90455-2)	294-230 (MS90456-2)
#8	246-12600-08000-XX	246-12800-08000-XX	Pico #400B	Pico Die Assy. #414DA-8N	Pico Locator #4066-2	294-237 (MS90455-3)	294-240 (MS90456-3)
#4	246-12600-04000-XX	246-12800-04000-XX	Pico #400B	Pico Die Assy. #414DA-4N	Pico Locator #4066-1	294-236 (MS90455-4)	294-239 (MS90456-4)
#0	246-12600-01000-XX	246-12800-01000-XX	Pico #400B	Pico Die Assy. #414DA-"0"N	Pico Locator #4066	294-235 (MS90455-5)	294-241 (MS90456-5)

270 Series

#20	270-101-20000-XX	270-100-2000-XX	294-1166	294-1640	.037/.046	294-25	294-26
#16	270-101-16000-XX	270-100-1600-XX	294-1166	294-1641	.047/.055	294-63	294-105
#12	270-101-12000-XX	270-100-1200-XX	294-1166	294-1654	.060/.068	294-64	294-106
#8	270-101-08000-XX	270-100-0800-XX	294-519	294-1802 (Die Assembly) 294-1803 (Contact Locator)	Fixed	294-104	294-107

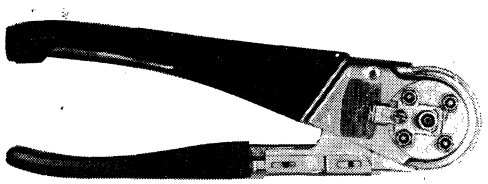
348 Series (Power Contacts)

12-12	348-100-1200P-XX	348-100-1200S-XX or 348-100-1203S-XX (Long)	294-1462 or 294-1718	294-1722-01 or 294-1722-02	See Data Plate Info. on Turret Head	294-33 (MS3323-12)	294-34 (Pin)* 294-35 (Skt.)*
16-16	348-100-1600P-XX	348-100-1600S-XX or 348-100-1603S-XX (Long)	294-1462 or 294-1718	294-1722-01 or 294-1722-02		294-30 (MS3323-16)	294-31 (Pin)* 294-32 (Skt.)*
20-20	348-100-2000P-XX	348-100-2000S-XX or 348-100-2003S-XX (Long)	294-1462 or 294-1718	294-1722-01 or 294-1722-02		294-27 (MS3323-20)	294-28 (Pin)* 294-29 (Skt.)*
23-22	348-100-2202P-XX	348-100-2201S-XX or 348-100-2203S-XX (Long)	294-268 or 294-297	294-1551-01 or 294-1551-02	See Data Plate Info. on Locator	294-278 (MS3323-22)	294-286 (Pin)* 294-287 (Skt.)*
23-28	348-100-5047P-XX	348-100-5047S-XX or 348-100-5048S-XX (Long)	294-268 or 294-297	294-1551-01 or 294-1551-02		294-278 (MS3323-22)	294-286 (Pin)* 294-287 (Skt.)*

* Note: 294-28 (MS3342-20) 294-29 (MS3344-20) 294-31 (MS3342-16) 294-32 (MS3344-16) 294-34 (MS3342-12) 294-35 (MS3344-12) 294-286 (MS3342-23) 294-287 (MS3344-23)

348 Series (Shielded Contacts)

Contact Size	AMPHENOL Part No. Pin	AMPHENOL Part No. Socket	Crimp Tool (Includes Hex Die Set)	Center Contact Tools Crimp Tool	Center Contact Tools Contact Locator	Insertion Tool	Removal Tool
All Size 12 Shielded Contact	348-100-60XXP-XX	348-100-60XXS-XX	294-525	294-297	294-1816-01	294-33 (MS3323-12)	294-34 (Pin) (MS3342-12) 294-35 (Skt.) MS3344-12)
All Size 16 Shielded Contact	348-100-6010P-XX	348-100-6010S-XX 348-100-6011S-XX	294-532	294-297	294-1816-01	294-30 (MS3323-16)	294-31 (Pin) (MS3342-16) 294-32 (Skt.) (MS3344-16)



294-126

294-279

294-287

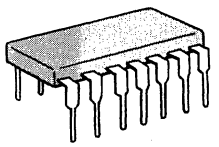
294-280

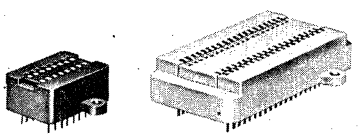
294-286

294-278

SOCKET SOLUTIONS ...PLUS!

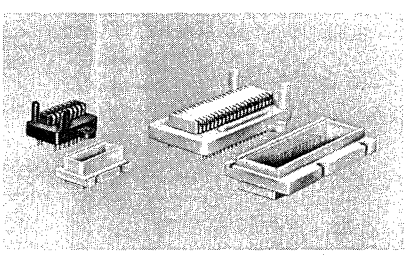
BARNES has the largest selection of sockets for I.C., MSI, LSI and Transistors in the industry... PLUS the world's most complete line of carriers / contactors and breadboards!





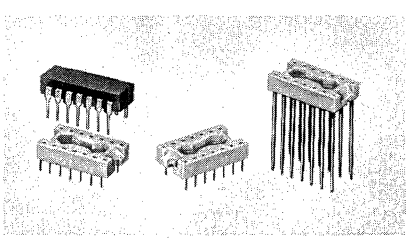
DIP SOCKETS...

For testing, aging, burn-in and breadboarding. Features easy loading, long, reliable life with no lead deformation.



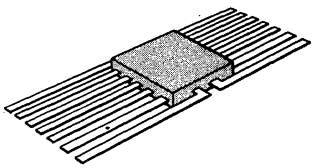
DIP CARRIERS/CONTACTORS...

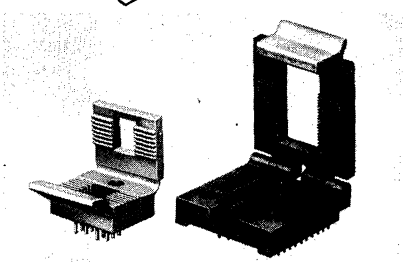
For device protection during shipment, testing and manual or automatic handling. Provides uniform geometry and polarization protection for all package sizes and types.



DIP PRODUCTION SOCKETS...

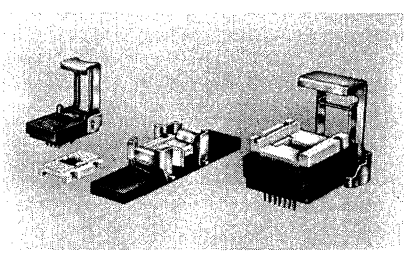
For high density production mounting of I.C.'s. Features low body profile, available in wire-wrap or solder tab terminals, temperatures to 150°C.





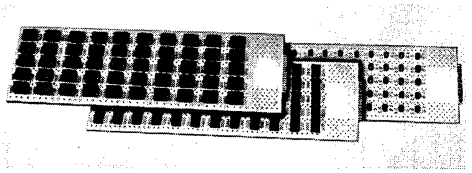
FLAT PACK SOCKETS...

For testing, aging, burn-in, breadboarding and production mounting. Features fast, one-hand loading and unloading, and positive lead separation with no deformation.



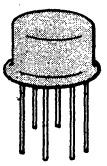
FLAT PACK CARRIERS/CONTACTORS...

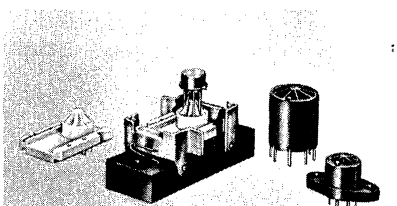
For device protection during shipment, testing and manual or automatic handling. Provides uniform geometry and polarization protection for all package sizes and types.



BREADBOARDS...

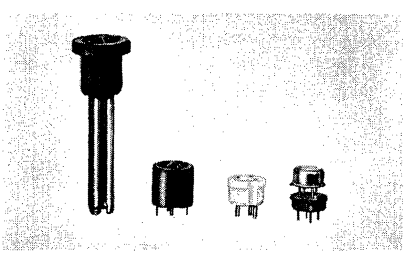
For high temperature circuit design, environmental testing, aging and burn-in for Dual-in-Line, Flat Pack and TO style I.C. packages. Available with 5 to 75 device positions per board with card receptacle edge connector.





TO SOCKETS, CARRIERS/CONTACTORS...

For testing, aging, burn-in and breadboarding ... and for device protection during shipment, testing and handling for all sizes and pin configurations.



TRANSISTOR SOCKETS...

For testing, aging, burn-in, breadboarding and production mounting. Features easy insertion, excellent electrical characteristics and low profile for high density production mounting, as well as wide temperature range capability.

For more information about socket solutions plus the world's most complete line of carriers, contactors and breadboards, write for a comprehensive BARNES catalog.

barnes CORPORATION

LANSDOWNE, PA. 19050 ■ 215/MA 2-1525
TWX: 510/669-9977

BARNES' complete line also includes Spring Sockets, Op-Amp Sockets, Modular Test Sockets, Relay Sockets, TH-037 Test Handler Series, Universal Mating Connector System

BERG ELECTRONICS, INC.

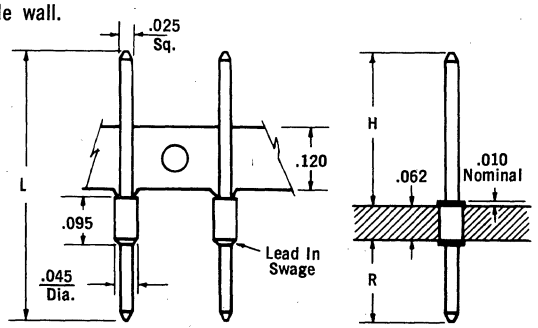
.025" SQUARE POSTS FOR DISCONNECT AND WIRE-WRAPPING APPLICATIONS

BergPost™ .025" SQ. PIN AND FERRULE ASSEMBLIES

The BergPost system provides a fast, reliable method for setting .025" square pins in circuitboards.

BergPost .025" square posts are designed for staking in .049" ± .002" holes spaced .100" by .100" minimum grid. The BergPost itself is a solder-bonded pin and ferrule assembly manufactured from rolled, square wire with four smooth, flat sides. They are ideal for wire-wrapping because perpendicularity, corner radii and post's end shape are within usually recommended specifications.

BergPost ferrules are designed for staking in 1/16" board. They are smoothly tapered to pass through pre-drilled circuit boards without damaging the board or its foil on either side. The ferrule expands into the hole wall when staked to securely retain post without damage to hole wall.



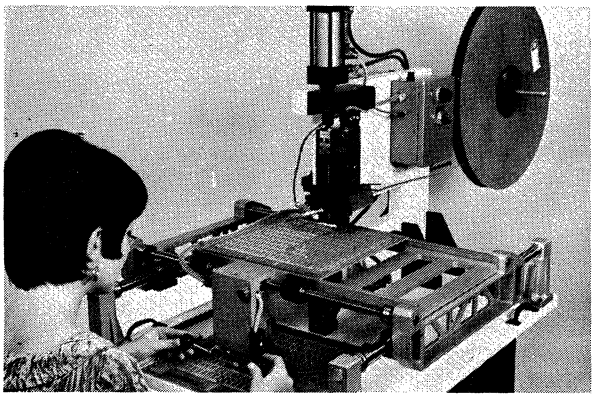
MATERIALS: Post: rolled phosphor bronze, ¾ hard. Ferrule and Carrying Strip: Pre-solder coated brass.

PART NUMBERS: for BergPost assemblies 12,500 per reel.

Nominal Staked Height Above Board, H	Post Length, L	Nominal Pin Extension Below Board, R	30 Microin. Gold Plating On Post	50 Microin. Gold Plating On Post	150 Microin. Tin Coat On Post
.248	.365	.055	47337	47357	47317
.248	.550	.240		47349	
.328	.445	.055	47330		47310
.343	.460	.055		47350	
.400	.502	.040	47762	47340	47344
.400	.782	.320		47342	47346
.468	.585	.055		47359	
.505	.960	.393			47600
.540	.642	.040		47341	47345
.540	.912	.320	47800	47343	47347
.578	.695	.055	47331		47311
.578	.880	.240	47338		47318
.578	1.210	.570	47334		47314
.578	1.400	.760	47335		47315
.593	.710	.055		47351	
.593	.895	.240		47358	
.593	1.240	.585		47354	
.593	1.430	.775		47355	
.603	1.000	.335	47799		47319

FLIP-DIP™ IC Mounting

BergPost assemblies can be used in a variety of specialized configurations for IC mounting. The FLIP-DIP™ method is a low-cost interconnection with free access to IC legs for soldering and wrapped-wire terminations. **For complete details and specifications contact your local Berg Sales Engineer or request catalog section #105.**



BergPost pantograph machine stakes up to 3,500 posts per hour. A numerically-controlled version inserts and stakes up to 10,000 per hour.

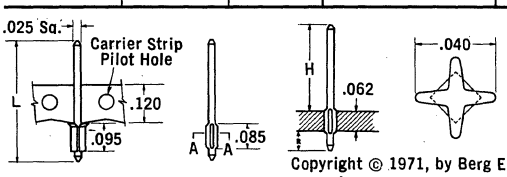
BergPin™ ALTERNATE DESIGN ALLOWS GREATER CIRCUIT PATH AREA BETWEEN HOLES....

The BergPin terminals require only .032" ± .003" holes on .100" centers for applications that preclude drilling the .049" hole needed for BergPost assemblies. The .025" square pins are held in plain brass ferrules on a reeled carrier strip.

The pins have a star-like deformation near the bottom. When the BergPin staker removes a pin from its ferrule and inserts it into a circuitboard, the rays of the star bite into the board and retain the pin. Subsequent flow soldering completes the electrical and mechanical bond. High-rate staking machines and tooling produce the same high quality of pin alignment and perpendicularity as with the BergPost design.

PART NUMBERS

Nominal Pin Height Above Board, H	Nominal Pin Extension Below Board, R	Post Length, L	Finish	Part Number
.305	.035	.400	50 u-in. Gold	47321
.335	.035	.430	50 u-in. Gold	47329
.270	.040	.370	30 u-in. Gold	47772
.375	.040	.475	30 u-in. Gold	47773
.470	.040	.570	30 u-in. Gold	47774
.620	.040	.720	30 u-in. Gold	47775
.295	.040	.400	30 u-in. Gold	47781
.375	.040	.475	50 u-in. Soft Gold	47882
.470	.040	.570	50 u-in. Soft Gold	47883
.270	.040	.370	50 u-in. Soft Gold	47881
.438	.412	.912	30 u-in. Gold	75059-001
.640	.308	1.010	50 u-in. Gold	75059-2
.320	.375	.758	30 u-in. Gold	75059-3
.320	.628	1.010	50 u-in. Gold	75059-4
.320	.628	1.010	30 u-in. Gold	75059-5
.535	.360	1.020	30 u-in. Gold	75059-7
.240	.608	.910	30 u-in. Gold	75059-9
.290	.190	.542	30 u-in. Gold	75059-10
.290	.420	.772	30 u-in. Gold	75059-11
.500	.302	.864	50 u-in. Gold	75059-12
.315	.400	.777	30 u-in. Gold	75059-13



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BERG ELECTRONICS, INC.

CRIMP-TO-WIRE RECEPTACLE TO MATE WITH .025" SQUARE POSTS

BERG Pv™ and Mini-Pv RECEPTACLES FEATURE DUAL-METAL DESIGN

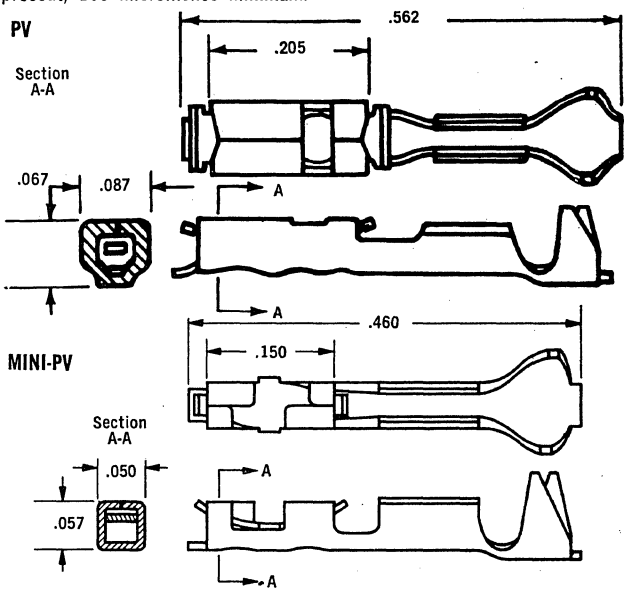
BERG PV RECEPTACLE

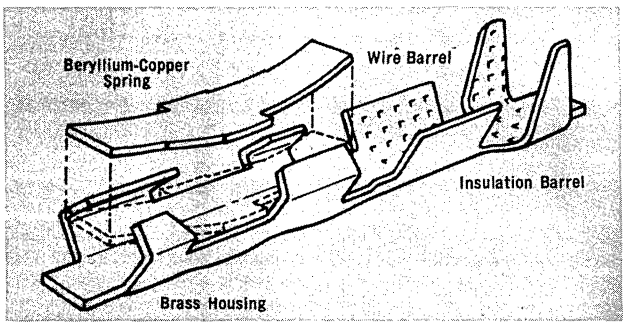
Two-part design of a disconnect for .025" sq. posts eliminates compromises in materials selection to provide optimum physical and electrical properties. Separate spring element applies a repeatable normal force to the male post for maximum multiple-cycle life. For .125" grid or greater.

MINI-PV RECEPTACLE

This smaller version of the PV is designed for interconnection with .025" sq. posts on .100" grid spacing. The Mini-PV receptacle is of similar two-piece design for lasting retention after repeated disconnects.

Choice of BERGgold gold plating, 40 or 75 microinches thick over 50 microinches nickel plating, or BERGflo 60-40 electro-deposited solder precoat, 100 microinches minimum.





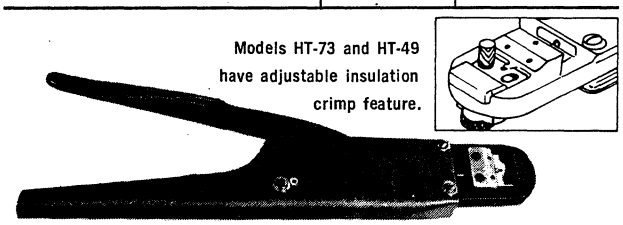
APPLICATION TOOLING

Sturdy hand tool duplicates the quality of crimp obtained with the bench machine. The tool features a positive ratchet that does not release until full crimping pressure is applied to a terminal.

Bench machine rate: 1500 terminations per hour.

HAND TOOL — PART NUMBERS

Wire Size, AWG	PV Model No.	Mini-PV Model No.
One #28, #30, #32	HT-47	HT-68
One #22, #24, #26 or two #26	HT-48	HT-66
One #18, #20 or two #22, two #24	HT-49	—
One #20	—	HT-73



PV RECEPTACLE PART NUMBERS

	Wire Gage, AWG	#18, #20, or two #22, two #24			#22, #24, #26 or two #26			#28, #30, #32		
	Insulation OD, range	.042" - .103"			.036" - .103"			.028" - .054"		
	Spring thickness	.005"	.006"	.008"	.005"	.006"	.008"	.005"	.006"	.008"
Loose Piece	Finish:									
	Gold, 40 u-in. over Ni	46227	46225	47387	46237	46235	47384	46247	46245	47403
	Gold, 75 u-in. over Ni	46229	46224	47418	46239	46234	47419	46249	46244	47420
	BERGflo solder precoat	46582	47391	46581	46592	47392	46591	46602	47393	46601
Strip	Finish:									
	Gold, 40 u-in. over Ni	46226	46221	46223	46236	46231	46233	46246	46241	46243
	Gold, 75 u-in. over Ni	46228	46220	46222	46238	46230	46232	46248	46240	46242
	BERGflo solder coat	47736	47388	46580	47737	47389	46590	47738	47390	46600

MINI-PV RECEPTACLE PART NUMBERS

	Wire Gage, AWG	#20 or two #22, two #24			#22, #24, #26 or two #26, two #28			#28, #30, #32, two #30, two #32		
	Insulation OD, range	.042" - .103"			.036" - .103"			.028" - .054"		
	Spring thickness	.0035"	.005"	.0065"	.0035"	.005"	.0065"	.0035"	.005"	.0065"
Loose Piece	Finish:									
	Gold, 40 u-in. over Ni	—	47713	47746	47743	47712	47745	47742	47711	47744
	Gold, 75 u-in. over Ni	48014	47707	—	48015	47706	—	48013	47705	—
	BERGflo solder coat	—	47716	47749	47747	47715	47750	47748	47714	47751
Strip	Finish:									
	Gold, 40 u-in. over Ni	—	47441	47566	47457	47439	47565	47456	47437	47564
	Gold, 75 u-in. over Ni	47785	47220	—	47784	47216	—	—	47212	47883
	BERGflo solder coat	—	47221	47648	47445	47217	47649	47446	47213	47650

Note: A stackable version of the Mini-Pv is available for terminating two connectors to a single post.

For complete details and specifications contact your local Berg Sales Engineer or request catalog sections #101 and #102.

BERG ELECTRONICS, INC.

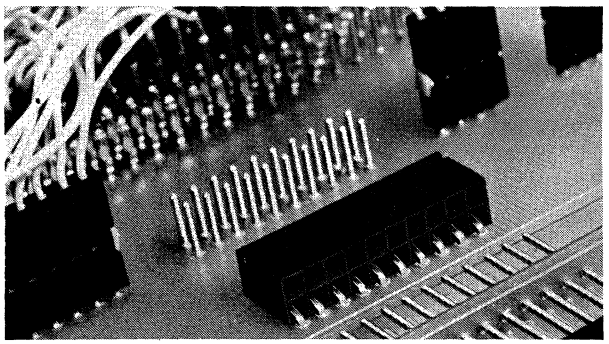
CARD CONNECTORS AND MULTIPLE CONTACT HOUSINGS FOR .025" SQUARE POSTS

BERG Pv™ Card Connectors

MATE WITH .025" SQ. POSTS ON .100" OR .150" GRID

The PV Card Connector features low contact resistance, high-retention qualities, and exceptional cycle life. Adaptable to both horizontal and vertical mounting, these connectors utilize the same dual-metal contact design used in Berg PV terminals.

Berg Card Connectors are available in single- or double-row configurations. For example, the Card Connector for .100" spacing accepts 8 through 55 terminations in a single-row mounting or up to 110 in double-row. Housings for .150" accept 8 through 40 terminations in a single row or 16 through 80 in double-row.



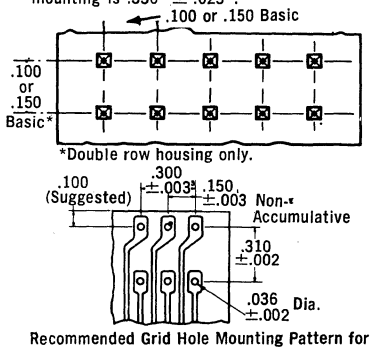
CONNECTOR ASSEMBLIES

All BergPost pins on true center of basic dimension within .012" dia.

1. Card connector to mate to .025" ± .001" square or round BergPost pins.
2. Suggested BergPost pin length for card connector mounting is .330" ± .025".

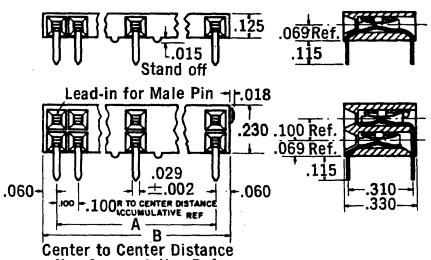
MATERIALS

Housing—Choice of Diallyl Phthalate (Green) or Phenolic (Black). Terminal body—¼-hard brass, plated 40 micro-inches gold over nickel. Terminal spring—Beryllium copper #25, heat-treated and gold-plated.



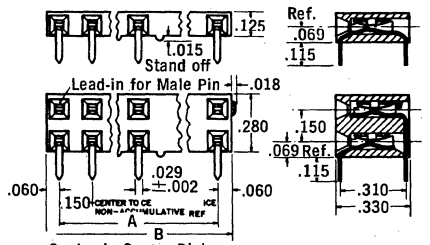
Recommended Grid Hole Mounting Pattern for PC Boards

CONNECTOR SPACING — .100" SPACING



Center to Center Distance Non-Accumulative Ref.

CONNECTOR ASSEMBLIES — .150" SPACING



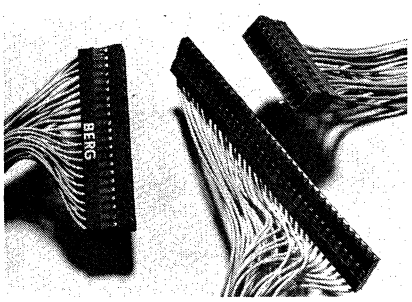
Center to Center Distance Non-Accumulative Ref.

For complete details and specifications contact your local Berg Sales Engineer or request catalog section #112.

BERG Latch Housings MATE WITH .025" SQUARE POSTS

For Mini-PV connections, Berg offers a specialized latch housing. This connector allows simultaneous termination of as many as 72 Mini-PV terminated conductors and is available in customized versions upon request. The latch housing features a lock-tab terminal-retaining device which permits easy loading and provides positive retention of terminal in housing. Available in single- or double-row configurations for .100" center-to-center spacing.

Additional designs are available for mating BergPost terminals on .125" and .150" grids with Mini-PV and PV receptacles.



For complete details and specifications contact your local Berg Sales Engineer or request catalog sections #101 and #102.

SPECIAL CONNECTORS FOR SHIELDED AND UNSHIELDED, ROUND CONDUCTOR CABLES

Berg supplies terminated flat cable assemblies using PV or Mini-PV receptacles and precision molded housings. Berg's automated stripping and crimping equipment is designed for shielded cable with conductor spacing of .050", .100" and .125". Unshielded, round-wire flat cables with conductor spacing of .050", .075", .100" and .125" are also being terminated.

Cable assemblies can be supplied to customer specifications, or where volume warrants, Berg can give OEM's their own in-house cable capability.

BERG ELECTRONICS, INC.

MODULAR INTERCONNECTION OF CIRCUIT BOARDS, LOGIC CARDS, SUBSTRATES, ETC.

BergLok™ MODULAR INTERCONNECTION BLOCKS

A simple, reliable way to mount replaceable daughter-board modules in electronic assemblies.

BergLok Connector Blocks provide a vertical mounting system for logic cards, ceramic substrates, printed circuit cards, and the like. They give you complete "pluggability" of modules using any conventional PC board, 1/16" thick.

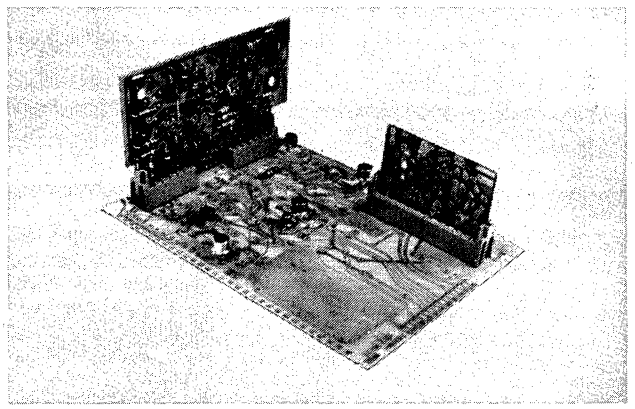
BergLok Connector Blocks can be mounted in any position on the mother board, permitting maximum flexibility in design and assembly. They resist impact, shock, vibration — without need for supplementary support devices.

A. Spring contacts with solder tab or wire-wrapping tails are supplied pre-assembled in blocks. Crimp-to-wire contacts and semi-automatic crimping machines can be supplied for customer assembly.

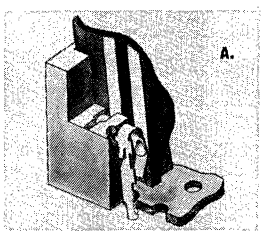
B. Blocks have snap-lock base to anchor connectors firmly in mother board prior to wave soldering. No tools or fixtures needed.

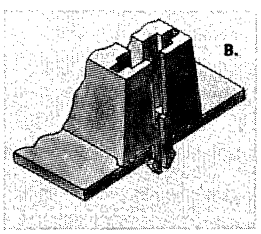
C. End-block latches lock daughter boards firmly in place during handling and shipping. Yet boards are readily removed for servicing or replacement.

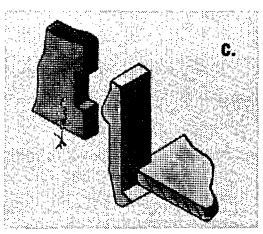
D. Each block position will accept contacts for mating with either single- or double-sided daughter boards. In double-sided blocks, daughter boards can be removed without opposing contacts touching.

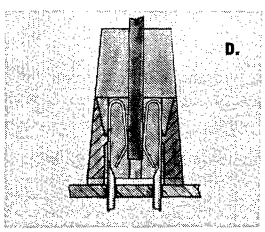


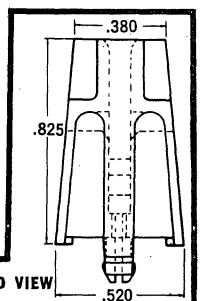
You can specify BergLok Connector Blocks, as 4-, 6-, or 8-position end blocks or as 6-position center blocks. Additional center blocks can be added to provide an unlimited number of contact positions. Standard center-to-center spacing .200".











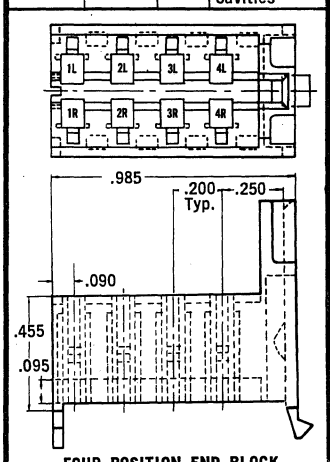
ORDERING DATA (All blocks utilize terminal No. 47787)

Ass'y Part No.	Qty. Req'd Housing Part No. 65011-1	Qty. Req'd No. of Term.	Standard Term. Location
65012-1	1	4	All R Cavities
65012-2	1	4	All L Cavities
65012-3	1	8	All L & R Cavities

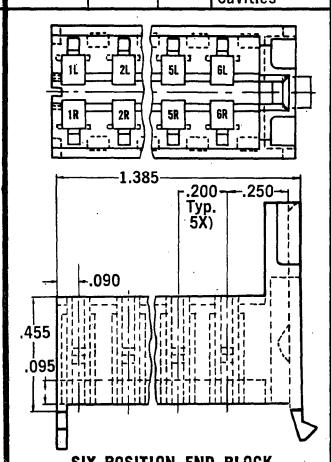
Ass'y Part No.	Qty. Req'd Housing Part No. 65013-1	Qty. Req'd No. of Term.	Standard Term. Location
65014-1	1	6	All R Cavities
65014-2	1	6	All L Cavities
65014-3	1	12	All L & R Cavities

Ass'y Part No.	Qty. Req'd Housing Part No. 65015-1	Qty. Req'd No. of Term.	Standard Term. Location
65016-1	1	8	All R Cavities
65016-2	1	8	All L Cavities
65016-3	1	16	All L & R Cavities

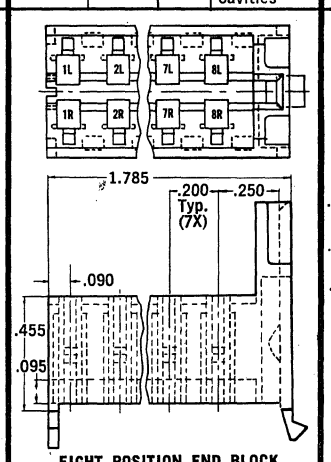
Ass'y Part No.	Qty. Req'd Housing Part No. 65019-1	Qty. Req'd No. of Term.	Standard Term. Location
65020-1	1	6	Cavities 1 Side
65020-3	1	12	All Cavities



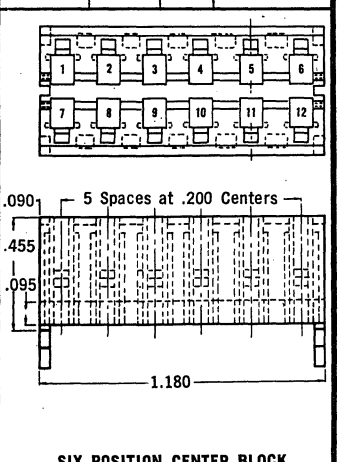
FOUR POSITION END BLOCK



SIX POSITION END BLOCK



EIGHT POSITION END BLOCK



SIX POSITION CENTER BLOCK

Note: Specify right-hand or left-hand end blocks if for single-sided daughter board (center blocks, when specified, will be furnished to match). Give type of contact tail desired: solder tab, wire-wrap, or crimped-to-wire.

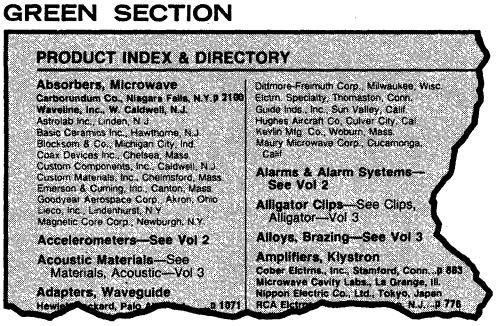
For complete details and specifications contact your local Berg Sales Engineer or request catalog section #116P.

NEW CUMBERLAND, PA. 17070 • PHONE (717) 938-6711 • TWX 510-650-3538 • IN EUROPE: 's-HERTOGENBOSCH, NETHERLANDS • PHONE 04100-23432 • TWX 50536

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo A... p 1971
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Elctm. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kiverin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn..p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J...p 776

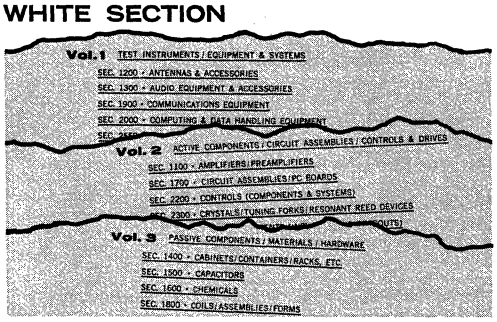
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 - ANTENNAS & ACCESSORIES
SEC. 1300 - AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 - COMMUNICATIONS EQUIPMENT
SEC. 2000 - COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 - AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 - CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 - CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 - CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 - CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 - CAPACITORS
SEC. 1600 - CHEMICALS
SEC. 1800 - COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

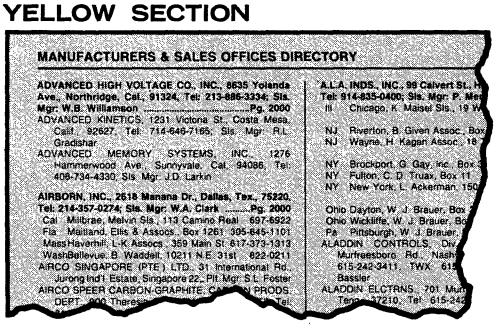
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8835 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradshar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330; Sls Mgr: J.D. Larkin

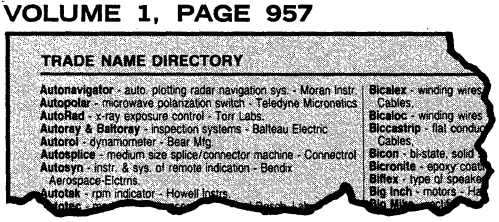
AIRBORN, INC., 2618 Mercana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261 305-645-1101
MassHaverhill, L-K Assocs., 359 Main St. 617-373-1313
WashBellevue: B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Indl. Estate, Singapore 22., Ph. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA... PRODS. DEPT., 900 Theres... Tel:

A.L.A. INDS., INC., 98 Calvert St., ... Tel: 914-835-0400; Sls. Mgr: P. Mc...
Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box ...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nashv... 615-242-9411, TWX: 61... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

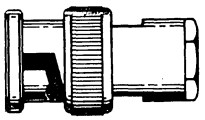
Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - X-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat conduc Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

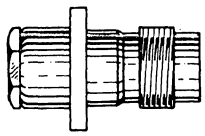
contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

Broadest line of RF CONNECTORS on the market



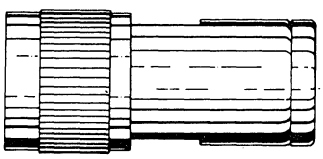
BNC Square Cut: 60 second cable assembly; weatherproof; small and lightweight with quick disconnect bayonet-lock coupling. BNC uses small cables, operates to peak load of 500 volts. Manufactured in accordance with MIL-C-3608A.

Cable	RG55B, 223	RG58	RG59, 62, 71	RG122	RG174
Plug	30220-9	30220-2	30220-4	30220-11	30220-13
Cable Jack	30516-5	30516-1	30516-3	30516-7	30516-9
S.H.Mt.Jack	30517-5	30517-1	30517-3	30517-7	30517-9



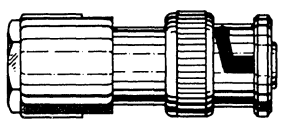
TNC Square Cut: A screw thread adaptation of BNC Square Cut. Assembly electrical and mechanical features are identical to the improved BNC Square Cut series and, except for threaded sleeve, are manufactured in accordance with MIL-C-3608A.

Cable	RG55B, 223	RG58	RG59, 62, 71	RG122	RG174
Plug	8280-5	8280-1	8280-3	8280-7	8280-9
Cable Jack	8281-5	8281-1	8281-3	8281-7	8281-9
S.H.Mt.Jack	8282-5	8282-1	8282-3	8282-7	8282-9



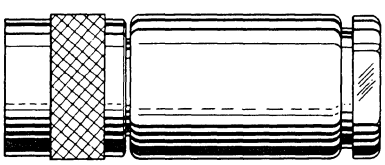
N Square Cut: A line of low voltage, constant impedence connectors (50 ohms) designed for quick cable assembly on small and medium size RF cable. They have a peak rating of 1,000 volts and are weatherproof.

Cable	RG55B, 233	RG58	RG59, 62, 71	RG8, 213	RG9, 214
Plug	33072-5	33072-1	33072-3	30533-1	30533-3
Cable Jack	33073-5	33073-1	33073-3	30534-1	30534-3
S.H.Mt.Jack	33086-5	33086-1	33086-3	30535-1	30535-3



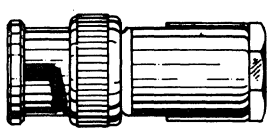
BNC High Voltage: A high voltage adaptation of the standard BNC. This series is of weatherproof construction rated at 4,000 V. at sea level.

Cable	RG55	RG58	RG59	RG195
Plug	2085-1	3621-2	UG932 A/U	3652-1
Cable Jack	3066-1	3066-1	UG1016 A/U	3954-1
S.H.Mt.Jack	3650-1	3650-1	3650-2	3655-1



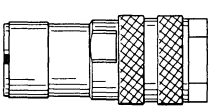
TRIAX Group A: Incorporates the normal coaxial design with center contact and outer contact, but with a third contact made through the body shell to accommodate the triaxial cable ground. Group A is of the same diameter as the Type C (UG-Series) connector line.

Cable	RG8	RG11	RG59	RG58
Plug	3875-1	3881-1	3880-1	—
Cable Jack	3874-1	3906-1	3902-1	—
S.H.Mt.Jack	3945-1	—	3974-1	3973-1



TRIAX Group B: Group B TRIAX is of the same diameter as the BNC series. It is available also in a polarized version.

Cable	21-738	50-3822	21-204	93-3930
Plug	2743-1	30088-1	4774-1	30061-1
Cable Jack	2741-1	30571-1	—	—
S.H.Mt.Jack	3107-1	—	30230-2	30062-1



ADM: Miniature coaxial cable connectors featuring small bayonet-locking, superior cable gripping mechanism; waterproof construction and easy assembly with only 3 basic parts. Intermateable with DM Series; multiple polarization available. Fully tested to MIL-C-25516—B and C. Floating ground, ungrounded and unshielded versions available.

	Cable	Pol. E	Pol. F	Pol. J	Pol. K
Plug	RG179	43016-3	43003-2	43016-1	43003-3
Cable Jack	RG179	43005-1	43004-1	43005-2	43004-2
S.H.Mt.Jack	RG179	43006-1	43007-1	43006-2	43007-2

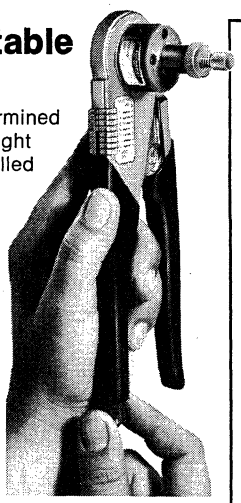
Part numbers shown above (partial listing only) are suitable for most connector applications. All are available for fast delivery from Bendix stock. Bendix provides *one source* for all your RF connector requirements, including custom engineering and special finishes. Call or write for complete Catalog: Microwave Devices Division, The Bendix Corporation, Hurricane Road, Franklin, Indiana 46131. Phone (317) 736-6136.

Bendix Electronics

BUCHANAN

Headquarters for universal crimping tools

Step-adjustable crimp tool

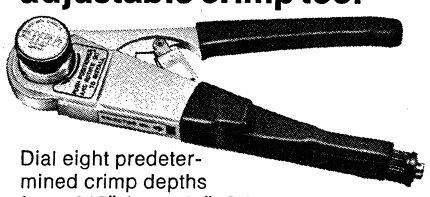


Dial seven pre-determined crimp depths with eight indent, cycle-controlled tool. Direct reading indicator.

Crimps MS pin and socket contacts sizes 12, 16, 20 and 22 to wire sizes #12 thru #26 AWG with or without turret head assemblies as shown on MS3191. **MS3191-4. LISTED UNDER QPL MIL-T-22520 CLASS I.**

Infinitely adjustable crimp tool also available. Eight indent, cycle-controlled tool crimps depths from .025" to .075". Direct reading indicator. Crimps contacts #12 and smaller. Meets performance requirements of MIL-T-22520.

Miniature Step-adjustable crimp tool

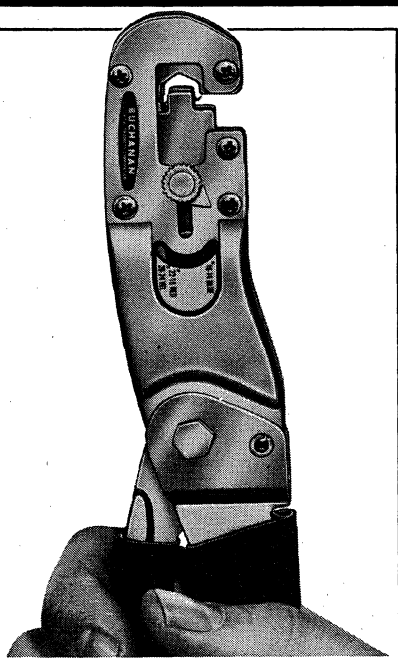


Dial eight predetermined crimp depths from .015" thru .043". Crimps micro-miniature contacts #20 and smaller to wire sizes #20 AWG and smaller with or without positioners. Selection of MS positioners available. Eight indent, cycle-controlled tool. **MS3198-1. LISTED UNDER QPL MIL-T-22520 CLASS I.**

Miniature infinitely adjustable tool also available for contacts #20 and smaller. Crimps depth values from .015" thru .043". Meets performance requirements of MIL-T-22520.

Manual Feed Tool

Pneumatic; cycle-controlled; portable or bench mounted with foot pedal. Crimps contacts #8 thru #22. Weighs less than 5 lbs. **LISTED UNDER QPL MIL-T-22520 CLASS II.**



C-Frame Tools

Lighter, easier to operate, compact yet strong. In-line die system; cycle controlled.

CT Tools. Crimp MS 25036 terminal lugs, MS 25181 splices and other fittings. Dial for size selector knob.

CTS Standard size, Cat. #11545, for fittings 12-10 thru 26-24. Meets performance requirements of MIL-T-22910.

CTM Miniature, Cat. #11707, for sizes 16-14 thru 26-24. **MS90413-1 (AS). LISTED UNDER QPL MIL-T-22910 CLASS I.**

•

CH Tools. Hex dies for use on RF connectors and shielded terminating ferrules.

CHS Standard Size. Pop-in die. **M22910/7-1. LISTED UNDER QPL MIL-T-22910 CLASS I.**

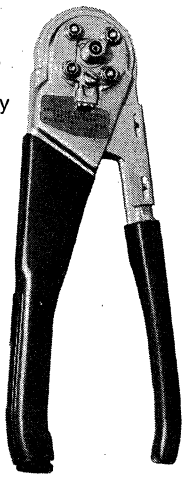
CHM Miniature. Fixed die. **MS 90487. LISTED UNDER QPL MIL-T-22910 CLASS I.**

CHM pop-in die also available. Meets performance requirements of MIL-T-22910.

•

CD Tools. Special dies for special custom applications. Standard size (CDS) and miniature size (CDM). C-frame or closed frame models.

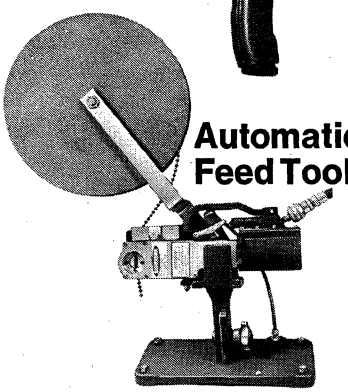
Positioner controlled crimp tool



MIL standard 4-indent, cycle-controlled tool crimps most proprietary and mil spec contacts #12 thru #22. **MS 3191-A. LISTED UNDER QPL MIL-T-22520 CLASS I.**

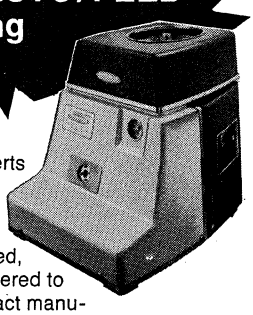
Miniature positioner controlled tool also available. Crimps most contacts #20 and smaller. Ideal for confined areas. 6¾" long; 10 ounces.

Automatic Feed Tool



Four-indent tool automatically feeds contacts from disposable carriers (protects contacts from damage). Crimps as fast as operator inserts wires. Bench unit holds 2,000 or more contacts. For portable application, carriers in self-positioning, "see-thru" magazines hold up to 102 contacts. Crimps contacts #12 thru #22. **LISTED UNDER QPL MIL-T-22520 CLASS II.**

NEW! AUTO/FEED Crimping System



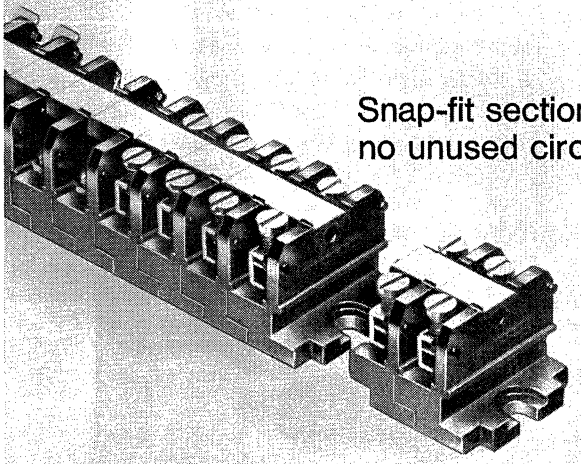
VIBRAPAK™ inserts hold up to 4000 pin and socket contacts. Can be loaded, labeled, sealed, and delivered to you by any contact manufacturer you choose. Provides you with a built-in positive lot control and contact identification system. BUCHANAN® AUTO/FEED system crimps contact sizes 16 thru 22. Accommodates most contacts covered by MIL-C39029, MIL-C23216, MIL-C26636. Meets performance requirements of MIL-T-22520.

BUCHANAN
ELECTRICAL PRODUCTS CORPORATION

A subsidiary of Amerace Esna Corporation
1065 Floral Avenue • Union, New Jersey 07083
(201) 289-8200 • Telex 13-8214

402A

4 most sought-after terminal block features:

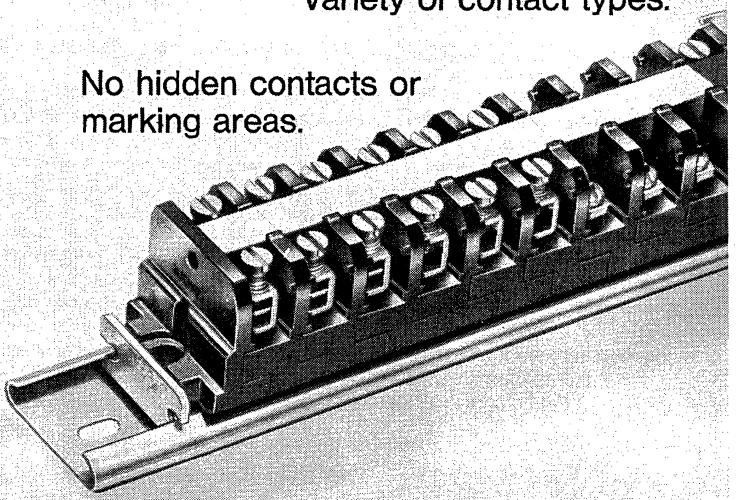


Snap-fit sections...
no unused circuits.

Variety of contact types.

No hidden contacts or
marking areas.

Direct or Channel
mounting.



Only **BUCHANAN** has them all!

Only Buchanan gives you the 4 most sought-after features in its terminal blocks—features that put more profit in your designs.

Assembly is fast because blocks are packaged in preassembled snap-fit sections. Clearly visible marking areas and contacts make wiring and marking fast and simple. Four different contact types meet the requirements of any application. You even have a choice of flat base or dovetail base. Bonus: New BUCHANAN® nylon and polypropylene blocks are designed to allow more circuits per foot than comparable competitive blocks.

To get all the profit-building facts, write today for new catalog. 1065 Floral Avenue, Union, New Jersey 07083 • (201) 289-8200 Telex 13-8214

BUCHANAN
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Write for UL, CSA listings and NEC tables.

Extra-Heavy Duty Phenolic— #4 thru 250 MCM, 600V NEMA, 10 circuits per foot.

Switch Fuse Blocks— for wire sizes #18 thru #8-15 amps. 16 circuits per foot.

NEW 1/0 Nylon— special base for direct or channel mounting, #10 thru #1/0 AWG, 600V, 16 circuits per foot.

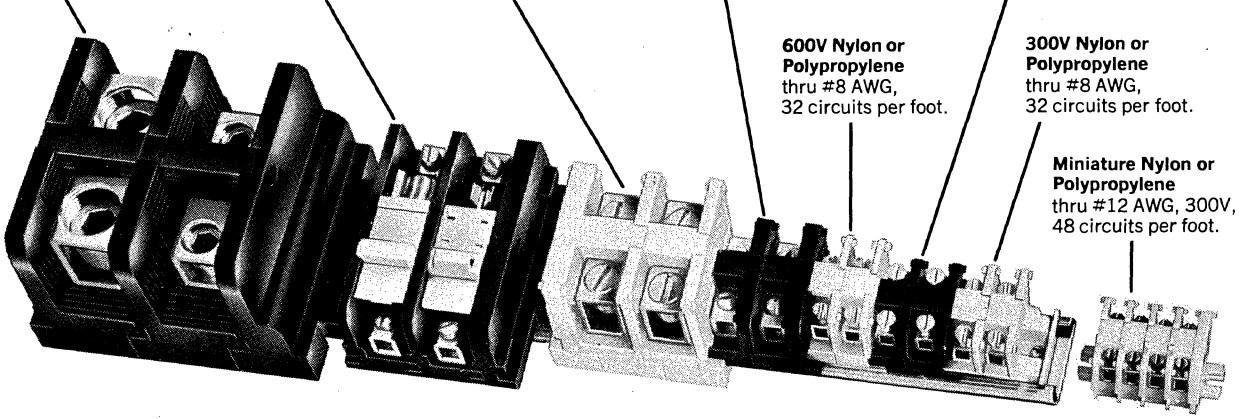
Heavy Duty Phenolic— #18 thru #4 600V NEMA, 750V IEEE, 21 circuits per foot.

Medium Duty Phenolic— #22 thru #8 AWG, 750V IEEE, 28 circuits per foot.

600V Nylon or Polypropylene thru #8 AWG, 32 circuits per foot.

300V Nylon or Polypropylene thru #8 AWG, 32 circuits per foot.

Miniature Nylon or Polypropylene thru #12 AWG, 300V, 48 circuits per foot.



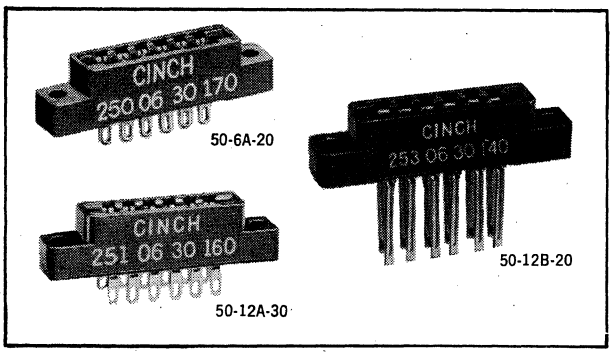
352B

CINCH

PRINTED CIRCUIT EDGE CONNECTORS

PRECISION MILITARY AND COMMERCIAL PRINTED CIRCUIT BOARD EDGE CONNECTORS

These Cinch printed circuit connectors are designed for minimum printed circuit card wear, low insertion force and positive contact with the printed circuit board. Insulation is glass-filled diallyl phthalate, type SDG-F per MIL-M-14. Contacts are of phosphor bronze with a minimum of 30 micro-inches thickness gold plate. Units with solder tab or dip solder terminations utilize bifurcated contacts permitting two flexing surfaces instead of one for positive contact. Bifurcated contacts are especially recommended for added conact reliability where vibration or printed circuit board irragularities would otherwise cause trouble. Types meeting Military Specification MIL-C-21097B are also available as indicated. These connectors have beryllium copper contacts with 50 micro-inches gold finish.



COMMERCIAL TYPES Without Bushings

SINGLE READOUT

CONTACT POSITIONS	CINCH PART NO.	FACTORY NO.
CONVENTIONAL SOLDER TAILS		
6	50-6A-20	250-06-30-170
10	50-10A-20	250-10-30-170
12	50-12A-20	250-12-30-170
15	50-15A-20	250-15-30-170
18	50-18A-20	250-18-30-170
22	50-22A-20	250-22-30-170
25	50-25A-20	250-25-30-170
DIP SOLDER TAILS (STANDARD LENGTH)		
6	50-6B-10	252-06-30-240
10	50-10B-10	252-10-30-240
15	50-15B-10	252-15-30-240
18	50-18B-10	252-18-30-240
22	50-22B-10	252-22-30-240
25	50-25B-10	252-25-30-240
DIP SOLDED TAILS (EXTENDED LENGTH)		
6	50- 6S-10	252-06-30-230
10	50-10S-10	252-10-30-230
12	50-12S-10	252-12-30-230
15	50-15S-10	252-15-30-230
18	50-18S-10	252-18-30-230
22	50-22S-10	252-22-30-230
25	50-25S-10	252-25-30-230

DOUBLE READOUT

CONTACT POSITIONS	CINCH PART NO.	FACTORY NO.
CONVENTIONAL SOLDER TAILS		
6	50-12A-30	251-06-30-160
10	50-20A-30	251-10-30-160
12	50-24A-30	251-12-30-160
15	50-30A-30	251-15-30-160
18	50-36A-30	251-18-30-160
22	50-44A-30	251-22-30-160
25	50-50A-30	251-25-30-160
DIP SOLDER TAILS		
6	50-12B-10	252-06-30-160
10	50-20B-10	252-10-30-160
12	50-24B-10	252-12-30-160
15	50-30B-10	252-15-30-160
18	50-36B-10	252-18-30-160
22	50-44B-10	252-22-30-160
DIP SOLDER TAILS (EXTENDED LENGTH)		
6	50-12S-20	252-06-30-260
10	50-20S-20	252-10-30-260
12	50-24S-20	252-12-30-260
15	50-30S-20	252-15-30-260
18	50-36S-20	252-18-30-260
22	50-44S-20	252-22-30-260
25	50-50S-20	252-25-30-260

CONTACT POSITIONS	CINCH PART NO.	FACTORY NO.
CARD EXTENDER TYPE (.050" TAIL SPACING) (Gold plated beryllium copper contacts)		
6	50-12S-30	251-06-30-390
10	50-20S-30	251-10-30-390
12	50-24S-30	251-12-30-390
15	50-30S-30	251-15-30-390
18	50-36S-30	251-18-30-390
22	50-44S-30	251-22-30-390
25	50-50S-30	251-25-30-390
WIRE WRAP POST		
6	50-12B-20	253-06-30-140
10	50-20B-20	253-10-30-140
12	50-24B-20	253-12-30-140
15	50-30B-20	253-15-30-140
18	50-36B-20	253-18-30-140
22	50-44B-20	253-22-30-140

POLARIZING KEYS		
PART NO.	DESCRIPTION	FACTORY NO.
50-PK-2	Between-Contact Type	456-07-35-003
50-PK-1	In-Contact Type	474-11-54-200

NOTE: Polarizing keys are not furnished with connectors and must be ordered as a separate item.

MILITARY PC CONNECTORS (Per MIL-C-21097B) With Conventional Wiring Tails

SINGLE READOUT

CONTACT POSITIONS	CINCH PART NO.	MIL PART NO.	FACTORY NO.
NO BUSHINGS			
6	50-6A-20M	M21097/1-001	250-06-30-220
10	50-10A-20M	M21097/1-037	250-10-30-220
15	50-15A-20M	M21097/1-073	250-15-30-220
18	50-18A-20M	M21097/1-109	250-18-30-220
22	50-22A-20M	M21097/1-145	250-22-30-220
MOLDED-IN BUSHINGS			
6	50-6A-20-MB	M21097/1-004	250-06-30-230
10	50-10A-20MB	M21097/1-040	250-10-30-230
15	50-15A-20MB	M21097/1-076	250-15-30-230
18	50-18A-20MB	M21097/1-112	250-18-30-230
22	50-22A-20MB	M21097/1-148	250-22-30-230
FLOATING BUSHINGS			
6	50-6A-20MFB	M21097/1-007	250-06-30-240
10	50-10A-20MFB	M21097/1-043	250-10-30-240
15	50-15A-20MFB	M21097/1-079	250-15-30-240
18	50-18A-20MFB	M21097/1-115	250-18-30-240
22	50-22A-20MFB	M21097/1-151	250-22-30-240

DOUBLE READOUT

CONTACT POSITIONS	CINCH PART NO.	MIL PART NO.	FACTORY NO.
NO BUSHINGS			
6	50-12A-30M	M21097/1-019	251-06-30-270
10	50-20A-30M	M21097/1-055	251-10-30-270
15	50-30A-30M	M21097/1-091	251-15-30-270
18	50-36A-30M	M21097/1-127	251-18-30-270
22	50-44A-30M	M21097/1-163	251-22-30-270
MOLDED-IN BUSHINGS			
6	50-12A-30MB	M21097/1-022	251-06-30-280
10	50-20A-30MB	M21097/1-058	251-10-30-280
15	50-30A-30MB	M21097/1-094	251-15-30-280
18	50-36A-30MB	M21097/1-130	251-18-30-280
22	50-44A-30MB	M21097/1-166	251-22-30-280
FLOATING BUSHINGS			
6	50-12A-30MFB	M21097/1-025	251-06-30-290
10	50-20A-30MFB	M21097/1-061	251-10-30-290
15	50-30A-30MFB	M21097/1-097	251-15-30-290
18	50-36A-30MFB	M21097/1-133	251-18-30-290
22	50-44A-30MFB	M21097/1-169	251-22-30-290

DOUBLE READOUT WITH DIP SOLDER TAILS — No Bushings

CONTACT POSITIONS	CINCH PART NO.	MIL PART NO.	FACTORY NO.
6	50-12B-10M	M21097/1-028	252-06-30-220
10	50-20B-10M	M21097/1-064	252-10-30-220
15	50-30B-10M	M21097/1-100	252-15-30-220
18	50-36B-10M	M21097/1-136	252-18-30-220
22	50-44B-10M	M21097/1-172	252-22-30-220

ELECTRICAL SPECIFICATIONS

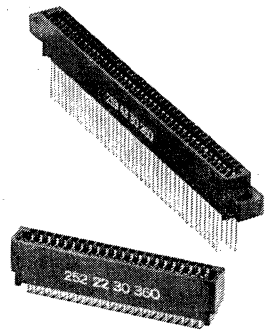
VOLTAGE RATING (AC RMS, adj. terminals): 830 (Sea Level); 300 (3.4 Hg, 50,000 Feet); 200 (1.3 Hg, 70,000 Feet); CURRENT: 5.0 Amps; CONTACT RESISTANCE: .005 Ohms at Rated Current; INSULATION RESISTANCE: 5000 Megohms.

ENVIRONMENTAL SPECIFICATIONS (Per MIL-C-21097 and MIL-STD-202, latest versions.)

SHOCK: 3 blows of 50G, Method 202B; TEMPERATURE CYCLING: 5 continuous cycles per Method 107B, Test Condition B; Beryllium copper, —65°C to 125°C; Phosphor bronze, —65°C to 105°C; SALT SPRAY: 48 hrs. per Method 101B, Condition B; VIBRATION: Per Method 204A, Condition B for bifurcated contacts; Method 201A for non-bifurcated contacts; HUMIDITY: Per Method 103B, Condition B.

CINCH

PRECISION DOUBLE READ-OUT PRINTED CIRCUIT BOARD EDGE CONNECTORS WITH 0.100 INCH CENTERS



This new connector series features a unique bifurcated cantilever contact construction that provides a simple, dependable design capable of handling 1/16" thick printed circuit boards. These contacts are pre-loaded against an insulator stop to provide gap uniformity and assure rapid build-up of force to the PC board. This design combines minimum insertion force with maximum contact pressure.

Contacts are fabricated from grade A phosphor bronze, selectively gold plated with 30 micro-inches of gold over 50 micro-inches of nickel in the contacting area and 10 micro-inches minimum gold on the remainder of the contact, per MIL-C-45204, Type II. Insulation is glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONVENTIONAL SOLDER TAILS

Contact Positions	Cinch Part No.	Factory No.
15	50-30C-10	251-15-30-410
22	50-44C-10	251-22-30-410
36	50-72C-10	251-36-30-410
40	50-80C-10	251-40-30-410
43	50-86C-10	251-43-30-410

DIP SOLDER TAILS

15	50-30C-20	252-15-30-360
22	50-44C-20	252-22-30-360
36	50-72C-20	252-36-30-360
40	50-80C-20	252-40-30-360
43	50-86C-20	252-43-30-360

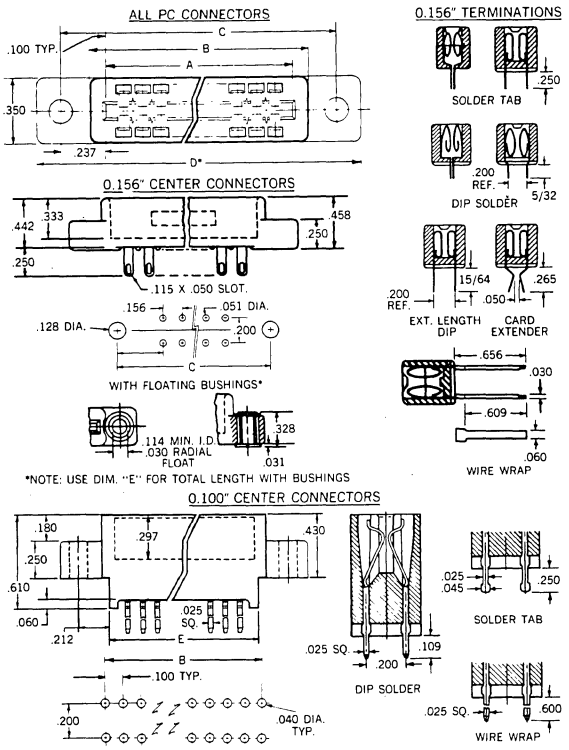
WIRE WRAP TAILS

15	50-30C-30	253-15-30-260
22	50-44C-30	253-22-30-260
36	50-72C-30	253-36-30-260
40	50-80C-30	253-40-30-260
43	50-86C-30	253-43-30-260

Note: Polarizing keys are not furnished with connectors and must be ordered separately.

Polarizing Key	Part No.	Factory No.
	50-PK-3	474-11-76-229

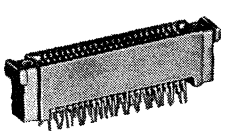
DIMENSIONS



DIMENSIONS

Contact Positions	A	Dimensions B	C	D	E
0.156" Center Connectors					
6	1.100	1.239	1.531	1.785	1.937
10	1.724	1.864	2.156	2.410	2.562
12	2.036	2.177	2.469	2.723	2.875
15	2.504	2.645	2.937	3.191	3.343
18	2.972	3.114	3.406	3.660	3.812
22	3.596	3.739	4.031	4.285	4.437
25	4.067	4.208	4.500	4.754	4.906
0.100" Center Connectors					
15	1.600	1.760	2.075	2.335	1.650
22	2.300	2.460	2.775	3.035	2.350
36	3.700	3.860	4.175	4.435	3.750
40	4.100	4.260	4.575	4.835	4.150
43	4.400	4.560	4.875	5.135	4.450

TYKON HIGH DENSITY EDGE CONNECTORS

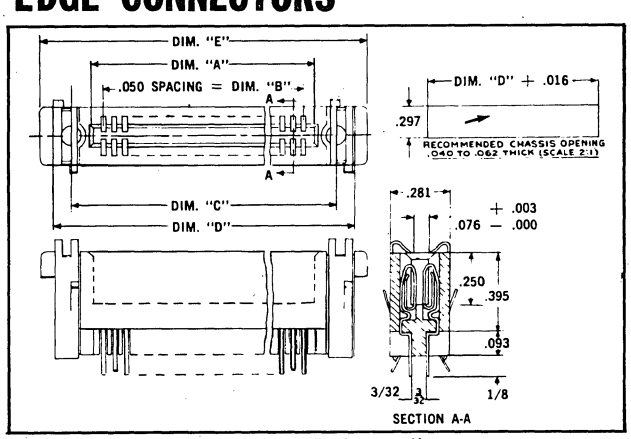


With .050" contact centers, for double readout boards. Conventional wiring tails suitable for welding or soldering. Insulator: glass filled diallyl phthalate per MIL-M-14F, Type SDG-F. Contacts: beryllium copper with copper flash plus .00003 gold plate per MIL-G-45204 Type II.

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS: a.) At sea level (adj. terminals) 500 VAC RMS, 730 VDC, b.) (to ground) 1160 VAC RMS, 1660 VDC, c.) At 60,000 ft. (adj. terminals) 165 VAC RMS, 230 VDC, (to ground) 300 VAC RMS, 400 VDC; CURRENT RATING: .050 amps; CONTACT RESISTANCE at 20 MV .040 ohms max. .020 ohms average; MILLIVOLT DROP at 0.50 amps: 20 MV max. INSULATION RESISTANCE: 5000 meg. min.

ITEM	PART NO.	CONTACT POSITIONS	DIMENSIONS A	B	C	D	E
6-position connector	50-12A-40	6	.350	.250	.550	.725	.850
10-position connector	50-20A-40	10	.550	.450	.750	.925	1.050
15-position connector	50-30A-40	15	.800	.700	1.000	1.175	1.300
20-position connector	50-40A-40	20	1.050	.950	1.250	1.425	1.550
25-position connector	50-50A-40	25	1.300	1.200	1.500	1.675	1.800



Mounting Clip 50-MC For semi-flush mounting
Polarizing Key 50-PK T-shaped cellulose acetate

CINCH

D-SUBMINIATURE CONNECTORS†

The Cinch D Subminiature Connectors are designed for applications where space and weight are prime considerations. These high contact density connectors are especially well-suited for aircraft, missile and ground support installations. Although designed essentially for rack-and-panel installations, D series connectors may be adapted for cable attachment by means of accessory junction shells with integral clamps.

In addition to the original D series with two-piece insulators, Cinch offers Golden D and MARK III ROYAL D connectors utilizing monobloc insulators. The Golden D connector is available with either crimp-type, snap-in, removable contacts or standard solder pot contacts. MARK III ROYAL D connectors have the "Little Caesar" rear release contact assembly. Contacts are inserted by hand and extracted at the rear of the connector with a simple plastic tool. The "Little Caesar" contact assembly was selected by the National Aerospace Standards Committee for vital programs demanding great operational reliability.

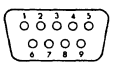
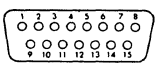
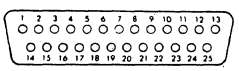
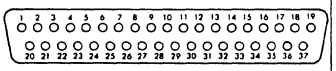
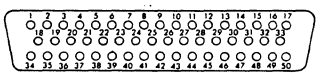
All D Subminiature connectors will inter-mate if insert arrangements correspond. These connectors are designed to meet or exceed most of the requirements of MIL-C-8384 Rev. B.

Combination layouts are supplied with unfilled coaxial and/or HV contact cavities. Coaxial and HV contacts must be ordered separately, and may be used interchangeably in any of the layouts listed. HV contacts accommodate wire sizes up to #20. Coaxial contacts (with crimp or solder type terminations) and HV contacts are snap-in and removable. Solder type coaxial and HV contacts have captivated center contacts.

Royal D, Mark III and Golden D, Mark II contacts use crimp tool MS-3191-1. Extraction tool 599-11-11-150 is used with each Royal D, Mark III commercial connectors; insertion-extraction tool 599-11-11-165 is used with each military connector.
For detailed test data and technical information see Cinch Catalog CM-46.

TYPE	DESCRIPTION	COMMON NAME	INSULATOR TYPE	CONTACT TERMINATION
D*MA	D connectors for the most critical applications. Monobloc insulators and "Little Caesar" contact assemblies Military version meets MIL-C-24308.	Mark III ROYAL D	Monobloc diallyl, thalate, GD-1-30F	Crimp insert by hand, remove with small tool.
D*M	D connectors with monobloc insulator for more critical application requirements.	Golden D, Mark I	Monobloc, diallyl phthalate, SDG	Solder pot Solder pot with coaxial
		Golden D, Mark I Combination	Monobloc, diallyl phthalate, SDG	and/or HV
D*SM	D connectors with crimp, snap-in contacts in monobloc insulators for quick assembly in more critical applications.	Golden D, Mark II	Monobloc, diallyl phthalate, MDG	Crimp, snap-in removable
D*	Original D connectors with two-piece insulators.	Original D	Two-piece, zytel	Solder pot
DATA-PHONE	Same as D*	—	Diallyl phthalate, GDI-30	Same as D*

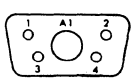
†Manufactured under license agreement with ITT Cannon Electric, Inc.

BASIC LAYOUT CONNECTORS (#20 contacts only)	LAYOUT	SHELL SIZE	PART NUMBER D*	D*M	D*SM	D*MA Commercial	D*MA Military	DATAPHONE**
	9 Contact Plug	E	DE-9P	DEM-9P	DESM-9P	DEMA-9P	M24308/4-1	—
	Socket	E	DE-9S	DEM-9S	DESM-9S	DEMA-9S	M24308/2-1	—
	15 Contact Plug	A	DA-15P	DASM-15P	DASM-15P	DEMA-15P	M24308/4-2	DA-19603-403
	Socket	A	DA-15S	DASM-15S	DASM-15S	DEMA-15S	M24308/2-2	DA-19603-404
	25 Contact Plug	B	DB-25P	DBM-25P	DBSM-25P	DEMA-25P	M24308/4-3	DB-19604-432
	Socket	B	DB-25S	DBM-25S	DBSM-25S	DEMA-25S	M24308/2-3	DB-19604-433
	37 Contact Plug	C	DC-37P	DCM-37P	DCSM-37P	DEMA-37P	M24308/4-4	—
	Socket	C	DC-37S	DCM-37S	DCSM-37S	DEMA-37S	M24308/2-4	—
	50 Contact Plug	D	DD-50P	DDM-50P	DDSM-50P	DEMA-50P	M24308/4-5	—
	Socket	D	DD-50S	DDM-50S	DDSM-50S	DEMA-50S	M24308/2-5	—

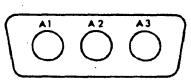
Add suffix "F" for shell with float mounts, as DEF, DEMF, etc. ** Require Dataphone Hoods.

COMBINATION LAYOUTS (#20 contacts with coaxial and/or HV cavities*)

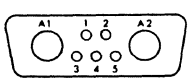
SHELL SIZE
PLUG PART NO.
SOCKET PART NO.



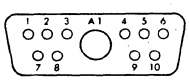
E
DEM-5W1P
DEM-5W1S



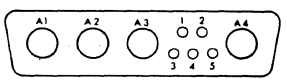
A
DAM-3W3P
DAM-3W3S



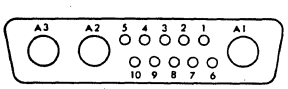
A
DAM-7W2P
DAM-7W2S



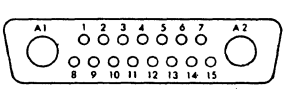
A
DAM-11W1P
DAM-11W1S



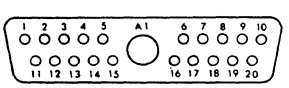
B
DBM-9W4P
DBM-9W4S



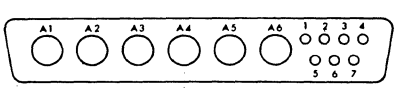
B
DBM-13W3P
DBM-13W3S



B
DBM-17W2P
DBM-17W2S



B
DBM-21W1P
DBM-21W1S



C
DCM-13W6P
DCM-13W6S

PERFORMANCE DATA

VOLTAGE RATING: 1250 VAC test, 1700 flashover; CURRENT RATING: 5 Amperes; INSULATION RESISTANCE: Greater than 5,000 megohms, determined in accordance with MIL-STD-202A, Method 302; CONTACT VOLTAGE DROP: (#20 contacts) 2.67 millivolts maximum per amp when tested in accordance with MIL-C-8384B, Paragraph 4.6.4; INDIVIDUAL CONTACT SEPARATION FORCE: 1 to 8 ounces; CONTACT RETENTION FORCE: 10 lbs. min. after 10 insertions; 5 lbs. min. after 100 insertions; MOISTURE RESISTANCE: Exceeds test requirements of MIL-STD-202A, Method 106†; VIBRATION: Exceeds test requirements of MIL-STD-202A, Method 204†; SHOCK: Exceeds test requirements of MIL-STD-202A, Method 202A†; CORROSION RESISTANCE: Exceeds requirements of 50 hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B†; HIGH POTENTIAL: MIL-STD-202A, Method 301†; TEMPERATURE CYCLING: MIL-STD-202A, Method 102A, Condition D.†

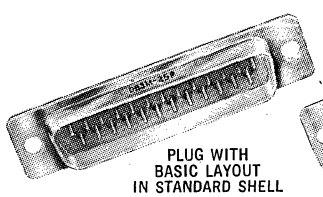
MATERIALS

SHELLS: Steel cadmium plated with yellow chromate coating, except Dataphone connectors have clear chromate coating; INSULATORS: D*-Zytel; D*M and Dataphone-Diallyl phthalate, glass filled per MIL-M-14F, Type SDG; D*SM-Diallyl phthalate asbestos filled per MIL-M-14F, Type MDG; D*MA-Diallyl phthalate, glass fibre filled per MIL-P-19833; PIN CONTACTS: D* and D*M-Brass, gold plated (.00003) over silver; D*SM and D*MA-Leaded copper, gold plated (.00003) over silver; Dataphone-Brass, gold plated (.00005) over copper; SOCKET CONTACTS: D*-Phosphor bronze, gold plated (.00003) over silver; D*M-Brass, gold plated (.00003) over silver; D*SM-Leaded copper, gold plated (.00003) over silver; Copper alloy, gold plate over silver plate with stainless steel sleeves. Dataphone-Phosphor bronze, gold plated (.00005) over copper.

† As referenced in MIL-C-24308.

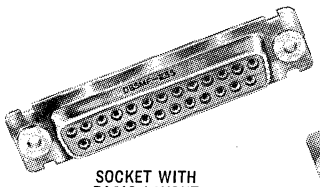
CINCH

D-SUBMINIATURE CONNECTORS (Cont'd.)

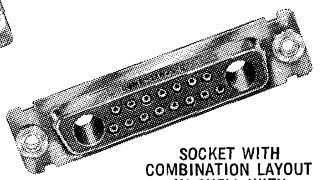


PLUG WITH BASIC LAYOUT IN STANDARD SHELL

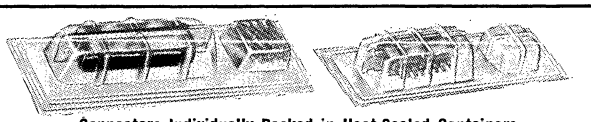
PLUG WITH COMBINATION LAYOUT IN STANDARD SHELL



SOCKET WITH BASIC LAYOUT IN SHELL WITH FLOAT MOUNTS



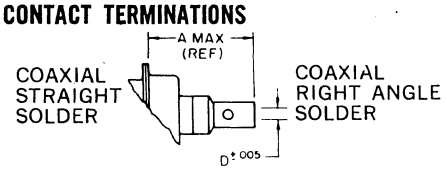
SOCKET WITH COMBINATION LAYOUT IN SHELL WITH FLOAT MOUNTSt



Connectors Individually Packed in Heat-Sealed Containers to Assure Extended Shelf Life

To protect D-Subminiature connectors from contamination and other corrosive elements in the air, Cinch individually packs each connector in heat-sealed polyvinyl-chloride containers (as shown) with an inert gas, oxygen-free atmosphere. This assures every customer of extended shelf life. A separate compartment is also provided in each container for the loose crimp-type contacts supplied with the Golden D, Mark II and Mark III connector.

CONTACT TERMINATIONS



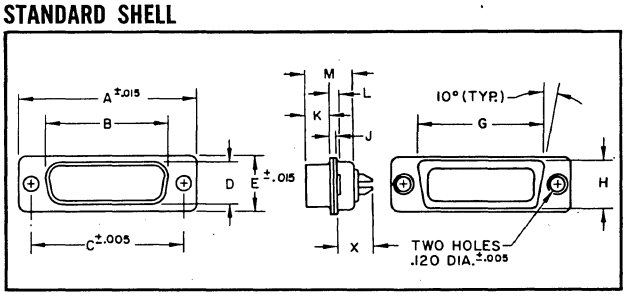
COAXIAL STRAIGHT SOLDER

	Order Number	Contact Ext. from Rear of Flange A	Dielectric Entry D	Overall Length	RG Cables
Plug	DM-53740-5008	.739	.040	.929	196/U
Plug	DM-53740-5001	.739	.067	.929	187/U 188/U
Plug	DM-53740-5002	.847	.110	1.037	195/U
Plug (Short Type)	DM-53740-5000	.670	.040	.860	196/U
Receptacle	DM-53742-5001	.739	.067	.929	187/U 188/U
Receptacle	DM-53742-5002	.847	.110	1.037	195/U
Receptacle	DM-53742-5004	.847	.125	1.037	58/U

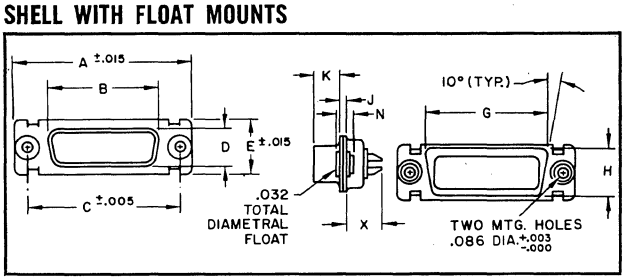
COAXIAL RIGHT ANGLE SOLDER

	Order Number	Contact Ext. from Rear of Flange A	B	Dielectric Entry D	Overall Length	RG Cables
Plug	DM-53741-5000	.530	.492	.040	.734	196/U
Plug	DM-53741-5001	.530	.492	.067	.734	187/U 188/U
Receptacle	DM-53743-5003	.530	.601	.110	.734	195/U
Receptacle	DM-53743-5004	.530	.601	.125	.734	58/U

STANDARD SHELL



SHELL WITH FLOAT MOUNTS

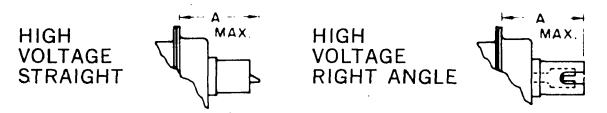


SHELL SIZE	A	B	C	D	E	G
E—Plug	1.213	.697	.984	.360	.494	.759
E—Socket	1.213	.640	.984	.308	.494	.759
A—Plug	1.541	1.025	1.312	.360	.494	1.083
A—Socket	1.541	.968	1.312	.308	.494	1.083
B—Plug	2.088	1.583	1.852	.378	.494	1.625
B—Socket	2.088	1.508	1.852	.308	.494	1.625
C—Plug	2.729	2.231	2.500	.378	.494	2.272
C—Socket	2.729	2.156	2.500	.308	.494	2.272
D—Plug	2.635	2.127	2.406	.484	.605	2.178
D—Socket	2.635	2.026	2.406	.420	.605	2.178

SHELL SIZE	H	J	K	L	M	N	X†
E—Plug	.422	.030	.236	.045	.422	.120	.422
E—Socket	.422	.030	.243	.045	.429	.120	.390
A—Plug	.422	.030	.236	.045	.422	.120	.422
A—Socket	.422	.030	.243	.045	.429	.120	.390
B—Plug	.422	.039	.231	.060	.426	.129	.422
B—Socket	.422	.030	.243	.045	.429	.120	.390
C—Plug	.422	.039	.231	.060	.426	.129	.422
C—Socket	.422	.030	.243	.045	.429	.120	.390
D—Plug	.534	.039	.231	.060	.426	.129	.422
D—Socket	.534	.030	.243	.045	.429	.120	.390

*Add F to Part Nos. in the above table for Float Mounts (Ex. DEMF-5WIP).
All tolerances are ± .010 unless noted otherwise.
Dimensions B and D are measured as outside dimensions at the bottom of the draw.
†D*SM only; D* dimension is .312, D*M dimension is .390 for all plugs and sockets.

HIGH VOLTAGE COMBINATIONS

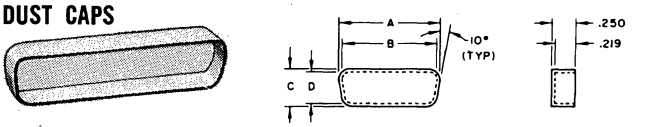


	Order Number	Contact Ext. from Rear of Flange A	Wire Size	Overall Length
Plug	DM-53745-0000	.539	#20	.734
Receptacle	DM-53744-0000	.539	#20	.734
Plug	DM-53745-5000	.491	#20	.697
Receptacle	DM-53744-5000	.491	#20	.697

STANDARD CRIMP CONTACTS (Style 1)

	Mark II D*SM	Mark III D*MA Commercial	Mark III D*MA Military
Pin	031-0932-004	330-5291-000	M24308/11-1
Socket	031-0931-006	031-1007-000	M24308/10-1

DUST CAPS

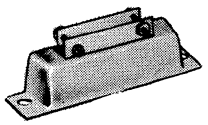


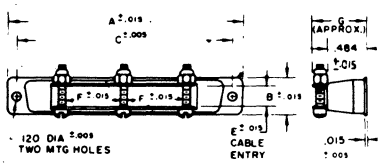
Order Number by Shell Size	For Use with	A	B	C	D
DE-59-20	DE-9S	.694	.627	.362	.295
DE-60-20	DE-9P	.749	.682	.412	.345
DA-59-20	DA-15S	1.022	.955	.362	.295
DA-60-20	DA-15P	1.077	1.010	.412	.345
DB-59-20	DB-25S	1.562	1.495	.362	.295
DB-60-20	DB-25P	1.635	1.568	.430	.363
DC-59-20	DC-37S	2.210	2.143	.362	.295
DC-60-20	DC-37P	2.283	2.216	.430	.363
DD-59-20	DD-50S	2.116	2.049	.474	.407
DD-60-20	DD50P	2.179	2.112	.536	.469

MATERIAL: Polypropylene (clear)

D-SUBMINIATURE CONNECTORS (Cont'd.)

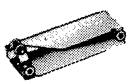
JUNCTION SHELLS



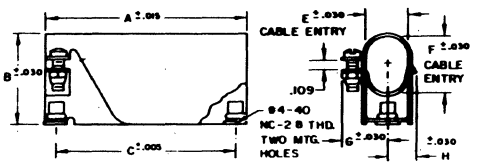


STRAIGHT CLAMP

Order Number by Shell Size	No. of Cable Locking Screws Required	A	B	C	E	F	G
DA-19678-1	2	1.531	.500	1.312	.296	.312	.640
DB-19678-2	2	2.078	.500	1.852	.296	.796	.640
DC-19678-3	3	2.718	.500	2.500	.296	.687	.640
DD-19678-4	3	2.625	.609	2.406	.390	.687	.703

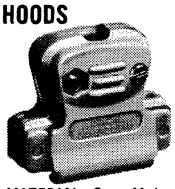


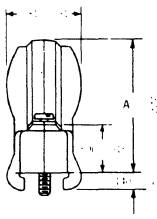
RIGHT ANGLE

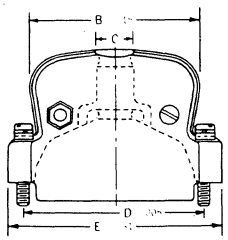


Order Number by Shell Size	A	B	C	E	F	G	H
DE-19977-5	1.203	.718	.984	.437	.437	.468	.281
DA-19977-1	1.531	.718	1.312	.437	.437	.468	.281
DB-19977-2	2.078	.968	1.852	.437	.625	.468	.281
DC-19977-3	2.718	1.187	2.500	.437	.812	.468	.281
DD-19977-4	2.625	1.250	2.406	.562	.906	.531	.343

DATAPHONE HOODS



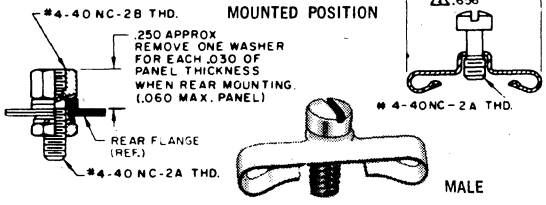




MATERIAL: Gray Melamine

Part No.	Contacts	A	B	C	D	E
DA-51225-1	15	1.297	1.219	.266	1.312	1.641
DB-51226-1	25	1.406	1.797	.328	1.852	2.203

SCREW LOCK ASSEMBLIES

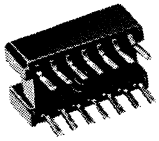


FEMALE MALE

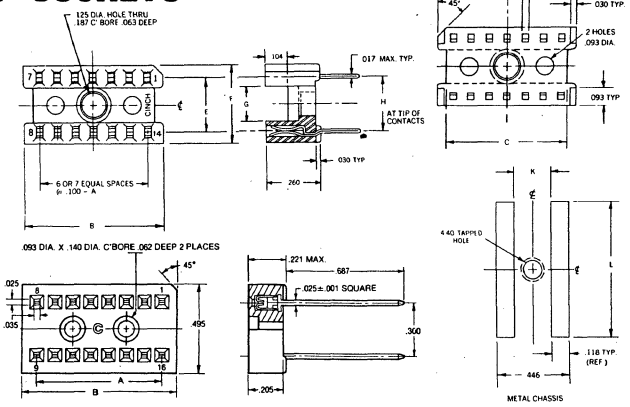
Order Number	Type	Usage
D-20418-2	Female	DE, DA, DB, DC, DD PIN OR SOCKET WITH OR WITHOUT JUNCTION SHELL
D20419	Male	DA, DE PIN OR SOCKET; DB, DC SOCKET
D20420	Male	DD SOCKET

PRECISION DIP SOCKETS

PRECISION DIP SOCKETS



Cinch IC sockets are ideal for testing and prototype purposes as well as production applications. Convenient and dependable, these sockets prevent the possibility of damage to leads and hermetic seals. These sockets combine high contact retention with low contact resistance and high environmental stability.



DIP SOLDER TAILS

MATERIALS: INSULATORS: GP Black Phenolic per MIL-M-14, type CFG; Diallyl Phthalate per MIL-M-14, type SDG; CONTACTS: Beryllium copper, gold or electro-tin plating.

ELECTRICAL SPECIFICATIONS

CURRENT RATING: 1.0 amp; CONTACT RESISTANCE: 6 milliohms (at 1 amp); CAPACITANCE PER MIL-STD-202: Method 305 at 100 KHz bet. contacts: 0.33 pfd avg. (phenolic), 0.28 pfd avg. (diallyl phthalate), bet. opposing contacts: 0.12 pfd avg. (phenolic), 0.10 pfd. avg. (diallyl phthalate); WITHSTANDING VOLTAGE BET. ADJ. CONTACTS: 1800 VRMS; INSULATION RESISTANCE: 1.0×10^4 meg. min. (phenolic), 2.0×10^6 meg. min. (diallyl phthalate).

MECHANICAL SPECIFICATIONS

VIBRATION: Per MIL-STD-202C, Condition D. Method 204A, 10-2000 C.P.S. at 20 G's or .060" double amplitude. No continuity interruptions of 1 micro-second or longer. No damage to contact or insulator. No disengagement of DIP module from the socket; SHOCK: Per MIL-STD-202C, Method 2028/3 blows in each of 3 mutually perpendicular planes. Shock level of 150 G's. No continuity interruptions of 1 microsecond or longer. No damage to contact or insulator. No disengagement of DIP module from the socket; Temperature Range: Phenolic: −65° to 150°C.

WIRE WRAP TAILS

MATERIALS: INSULATORS: Glass Nylon −65° to 125°C; CONTACTS: Solid .025 phosphor bronze wire wrap post with sharp (.003 max. radius) corners. (Gold or electro-tin plated).

ELECTRICAL SPECIFICATIONS: CURRENT RATING: 1 amp; CONTACT RESISTANCE: 6 milliohms; INSULATION RESISTANCE: 1×10^6 Meg.; WITHSTANDING VOLTAGE: 1000 volts A.C. rms; INTERLEAD CAPACITANCE: 0.40 pf at 1 mhz.

MECHANICAL SPECIFICATIONS: CONTACT SEPARATION FORCE: Min. 4 oz., Max. 1 oz.; Min. CONTACT SEPARATION FORCE AFTER 100 CYCLES: 1 oz.

DIMENSIONS

Contacts	A	B	C	D	E, H	F	G	J	K	L
14	.600	.770	.690	.796	.300	.424	.187	.043	.210	.446
16	.700	.870	.790	.896	.300	.424	.187	.093	.600	.770
24	1.100	1.270	1.190	1.296	.600	.724	.486	.125	.700	.870

SOLDER TYPE

Distributor Part No.	Factory Part No.	Contacts	*Insulation & Lead Plating
Standard Throat, Dim. "T" = .104"			
14-DIP	133-51-02-003	14	(1), (5)
14-DIP-1	133-51-92-005	14	(2), (6)
16-DIP	133-51-02-006	16	(1), (5)
16-DIP-1	133-51-92-008	16	(2), (6)
24-DIP	133-59-02-011	24	(1), (5)
24-DIP-1	133-59-92-010	24	(2), (6)
Shallow Throat, Dim. "T" = .072"			
14-N-DIP	133-59-02-059	14	(1), (5)
14-N-DIP-1	133-59-92-060	14	(2), (6)
16-N-DIP	133-59-02-062	16	(1), (5)
16-N-DIP-1	133-59-92-061	16	(2), (6)
24-N-DIP	133-59-02-063	24	(1), (5)
24-N-DIP-1	133-59-92-064	24	(2), (6)

WIRE WRAP TYPE

Distributor Part No.	Factory Part No.	Contacts	*Insulation & Lead Plating
14-W-DIP	133-59-91-055	14	(3), (5)
14-W-DIP-1	133-59-91-055	14	(3), (5)
14-W-DIP-2	133-59-91-051	14	(3), (6)
14-W-DIP-3	133-59-91-052	14	(4), (6)
16-W-DIP	133-59-91-058	16	(3), (5)
16-W-DIP-1	133-59-91-057	16	(4), (5)
16-W-DIP-2	133-59-91-054	16	(3), (6)
16-W-DIP-3	133-59-91-053	16	(4), (6)

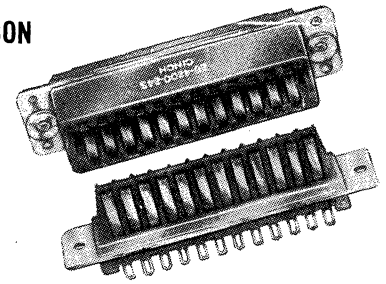
* **INSULATIONS:** (1) G.P. Black Phenolic; (2) Diallyl Phthalate; (3) Black Glass Nylon; (4) White Glass Nylon: **LEAD PLATING:** (5) Electro-tin; (6) Gold.

Note: Shallow Throat Socket Terminals are .017"x.017"x.110" long
Standard Throat Socket Terminals are .017"x.033"x.170 long

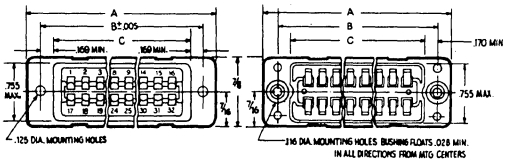
CINCH

BLUE RIBBON* and MICRO RIBBON* RACK and PANEL CONNECTORS

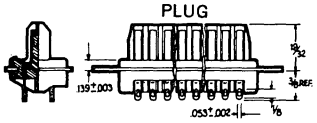
BLUE RIBBON



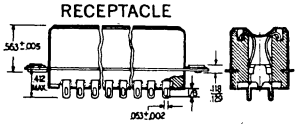
DIMENSIONAL DATA



PLUG



RECEPTACLE



ELECTRICAL SPECIFICATIONS

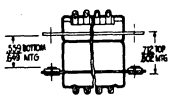
VOLTAGE RATINGS: (a) At Sea Level 800 VDC, (b) At 70,000 Feet 300 VDC; CONTACT CURRENT RATING: 5 Amperes; CONTACT RESISTANCE: .003 Ohms Maximum; INSULATION RESISTANCE (As Received): 100,000 Megohms Minimum.

MECHANICAL SPECIFICATIONS

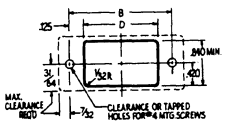
CONTACTS: Plug, Copper, ASTM-B-152, Type ETP, Socket, Phosphor bronze, ASTM-B-103, MIL-B-892, Grade A; FINISH: .00002 Gold per MIL-G-45204, Type II over copper flash; MOUNTING PLATE: Passivated stainless steel.

No. of Contacts	Part Numbers Plug	Part Numbers Socket	A	Dimensions B	Dimensions C	D (Min.)
8	26-4100-8P	26-4200-8S	1 23/32	1.375	1 1/32	1.120
16	26-4100-16P	26-4200-16S	2 15/32	2.125	1 25/32	1.868
24	26-4100-24P	26-4200-24S	3 1/32	2.875	2 17/32	2.620
32	26-4100-32P	26-4200-32S	3 31/32	3.625	3 9/32	3.370

*Tolerances: Fractions ± 1/64
Decimals ± .005



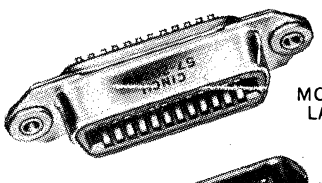
MATING PLUG & RECEPTACLE



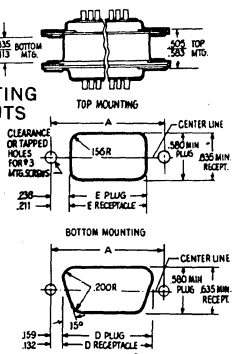
MOUNTING LAYOUT

MICRO-RIBBON

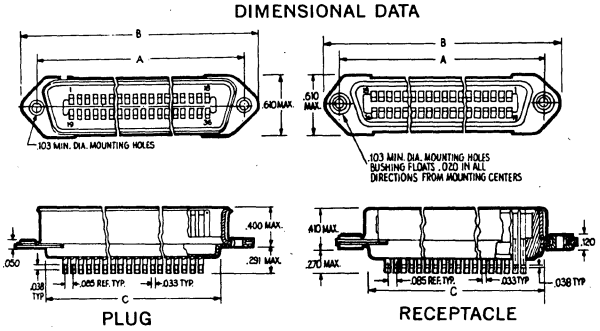
MATING PLUG & RECEPTACLE



MOUNTING LAYOUTS

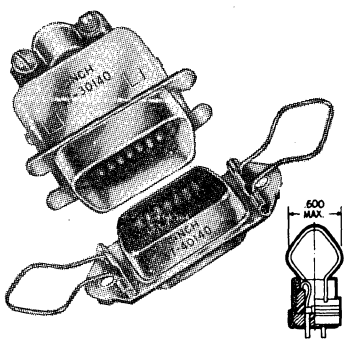


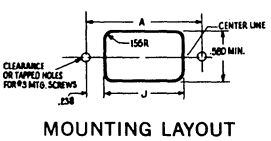
DIMENSIONAL DATA



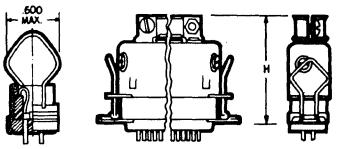
PLUG RECEPTACLE

MICRO-RIBBON CABLE-TO-CHASSIS



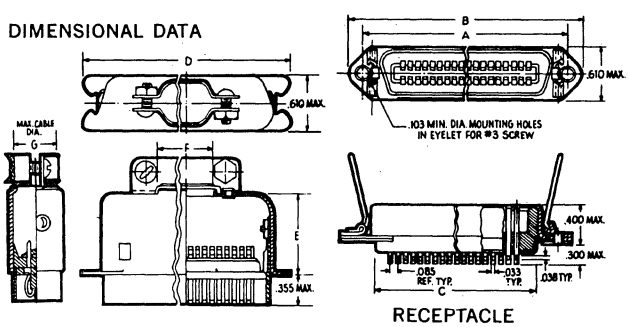


MOUNTING LAYOUT



MATING PLUG AND RECEPTACLE

DIMENSIONAL DATA



RECEPTACLE

No. of Contacts	Socket No.	Plug No.	Socket No.	Plug No.	A	B	C	D	D min.	E	E min.	F	G	H	J min.
14	57-20140	57-10140	57-40140	57-30140	1.417	1.750	.910	1.495	1.098	.843	.940	.306	.422	1.668	.940
24	57-20240	57-10240	57-40240	57-30240	1.842	2.175	1.335	1.920	1.523	.825	1.365	.473	.473	1.668	1.365
36	57-20360	57-10360	57-40360	57-30360	2.352	2.685	1.845	2.431	2.033	.905	1.875	.640	.473	1.730	1.875
50	57-20500	57-10500	57-40500	57-30500	2.947	3.270	2.440	3.025	2.628	.995	2.472	.766	.473	1.825	2.472

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS: (a) At Sea Level 500 VRMS, 700 VDC, (b) At 70,000 Feet 125 VRMS, 200 VDC; CONTACT CURRENT RATING: 5 Amperes; CONTACT RESISTANCE: .003 Ohms Average; INSULATION RESISTANCE (As Received): 5000 Megohms Minimum.

MECHANICAL SPECIFICATIONS

CONTACTS: Cadmium bronze, ASTM-B-105; FINISH: .00002 Gold per MIL-G-45204, Type II, over copper flash; HOUSINGS: Brass alloy with .0002 to .0004 zinc. Plus clear chromate.

*Manufactured under license from Bunker-Ramo, Inc.

CINCH

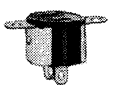
"JONES" PLUGS and SOCKETS — 300 SERIES

In addition to the 300 series listed here, Jones Connectors are available in higher ratings.

400 Series: 1200V, 15 amps
2400 Series: 1700V, 15 amps
500 Series: 3KV, 25 amps

For information on these connectors and additional data on the units listed here, contact any Cinch Electronics District Office, or your Cinch Distributor, who has these items in stock for immediate delivery.

P-302-CCT



S-302-AB

ELECTRICAL SPECIFICATIONS

All connector ratings are based on a continuously mated condition. "Rated Voltage" is ⅓ of Voltage Breakdown.

Rated Voltage ..... 730 Volts rms. Contact Resistance .... .016 Ohms max.

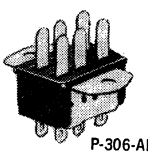
Under most normal operating conditions where not all contacts are carrying substantially full rated current, maximum current per contact is rated at 10 amperes. The Jones 300 series plugs and sockets are recognized under the Component Program of Underwriters' Laboratories, Inc. In accordance with UL Standard #498, the Underwriters' Laboratories ratings are derived from the condition whereby all contacts are carrying "rated" current simultaneously. The resultant ratings are as follows:

Rated Current	Rated Wattage
(2-12 contacts) ..... 7.5 amperes	(2-12 contacts) .....1875 watts
(15-33 contacts) ..... 4.5 amperes	(15-33 contacts) .....1125 watts

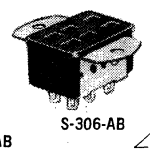
MECHANICAL SPECIFICATIONS

INSULATOR: Molded phenolic;; CONTACTS: Phosphor bronze, cadmium plated; HOUSING: Formed metal, black wrinkle finish.

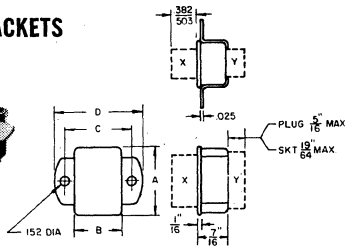
TYPE AB WITH ANGLE BRACKETS



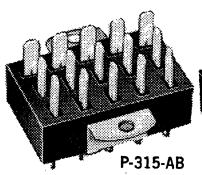
P-306-AB



S-306-AB

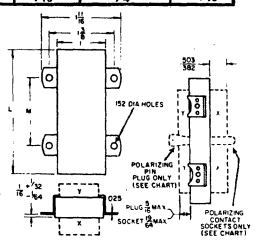


No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches A	B	C	D
2	P-302-AB	S-302-AB	21/32 Dia.	—	31/32	1 17/32
3	P-303-AB	S-303-AB	1	7/16	3/4	1 1/16
4	P-304-AB	S-304-AB	3/4	1 1/16	1	1 5/16
6	P-306-AB	S-306-AB	1	1 1/16	1	1 5/16
8	P-308-AB	S-308-AB	1 1/4	1 1/16	1	1 5/16
10	P-310-AB	S-310-AB	1 5/16	1 1/16	1	1 5/16
12	P-312-AB	S-312-AB	1 1/4	1 5/16	1 1/4	1 5/16



P-315-AB

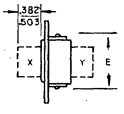
S-315-AB

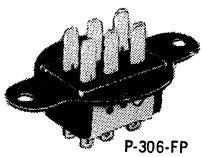


No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches L	M	Polarizing Pin†
15	P-315-AB	S-315-AB	1 5/8	See Note	NO
18	P-318-AB	S-318-AB	1 15/16	1 1/4	NO
21	P-321-AB	S-321-AB	2 1/4	1 5/16	NO
24	P-324-AB	S-324-AB	2 5/16	1 1/4	14
27	P-327-AB	S-327-AB	2 7/8	1 5/16	14
30	P-330-AB	S-330-AB	3 3/16	1 7/8	14
33	P-333-AB	S-333-AB	3 1/2	2 5/16	17

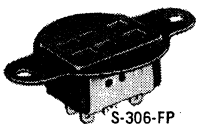
Note: P-315-AB and S-315-AB require only two mounting brackets, mounted on center of connector.

TYPE FP WITH FLUSH PLATE

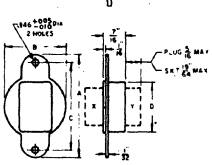




P-306-FP



S-306-FP

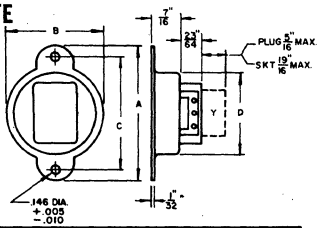


No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches A	B	C	D	E (Max.)
2	P-302-FP	S-302-FP	2 1/16	1 1/4	1 3/4	—	23/32
3	P-303-FP	S-303-FP	2 1/16	1 1/4	1 3/4	1 5/16	1/2
4	P-304-FP	S-304-FP	2 1/16	1 1/4	1 3/4	1 1/16	3/4
6	P-306-FP	S-306-FP	2 1/16	1 1/4	1 3/4	1 5/16	3/4
8	P-308-FP	S-308-FP	2 5/16	1 3/4	2 1/4	1 13/16	3/4
10	P-310-FP	S-310-FP	2 5/16	1 3/4	2 1/4	1 31/64	3/4
12	P-312-FP	S-312-FP	2 5/16	1 3/4	2 1/4	1 13/16	1

TYPE RP WITH RECESSED PLATE

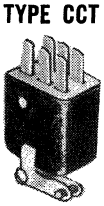
P-306-RP

S-306-RP

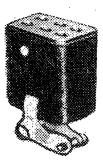


No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches A	B	C	D (Max.)
2	P-302-RP	S-302-RP	2 1/16	1 1/2	1 3/4	1.350
3	P-303-RP	S-303-RP	2 1/16	1 1/2	1 3/4	1.350
4	P-304-RP	S-304-RP	2 1/16	1 1/2	1 3/4	1.350
6	P-306-RP	S-306-RP	2 1/16	1 1/2	1 3/4	1.350
8	P-308-RP	S-308-RP	2 5/16	2	2 1/4	1.850
10	P-310-RP	S-310-RP	2 5/16	2	2 1/4	1.850
12	P-312-RP	S-312-RP	2 5/16	2	2 1/4	1.850

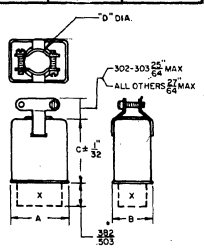
TYPE CCT WITH CABLE CLAMP IN TOP



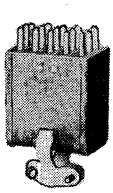
P-306-CCT



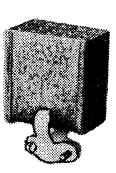
S-306-CCT



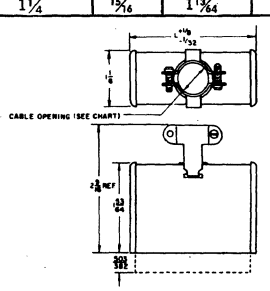
No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches A	B	C	D
2	P-302-CCT	S-302-CCT	21/32 Dia.	—	61/64	3/8
3	P-303-CCT	S-303-CCT	1	7/16	61/64	5/16
4	P-304-CCT	S-304-CCT	3/4	1 1/16	61/64	3/8
6	P-306-CCT	S-306-CCT	1	1 1/16	1 5/64	7/16
8	P-308-CCT	S-308-CCT	1 1/4	1 1/16	1 5/64	1/2
10	P-310-CCT	S-310-CCT	1 5/16	1 1/16	1 13/64	1/2
12	P-312-CCT	S-312-CCT	1 1/4	1 5/16	1 13/64	9/16



P-315-CCT



S-315-CCT

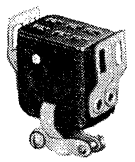


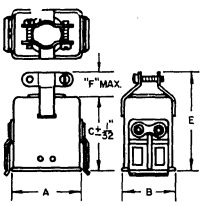
No. of Contacts	Plug Part Nos.	Socket Part Nos.	L +1/8 -1/32	Cable Opening Standard	Max.	Polarizing Pin
15	P-315-CCT	S-315-CCT	1 11/16	9/16	7/8	NO
18	P-318-CCT	S-318-CCT	2	9/16	7/8	NO
21	P-321-CCT	S-321-CCT	2 5/16	5/8	7/8	NO
24	P-324-CCT	S-324-CCT	2 5/8	5/8	7/8	14
27	P-327-CCT	S-327-CCT	2 15/16	5/8	7/8	14
30	P-330-CCT	S-330-CCT	3 1/4	3/4	7/8	14
33	P-333-CCT	S-333-CCT	3 5/16	3/4	7/8	17

CINCH

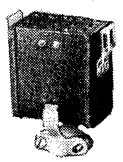
"JONES" PLUGS AND SOCKETS — 300 SERIES (Cont'd.)

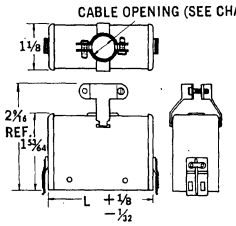
TYPE CCT-K WITH CABLE CLAMP IN TOP OF CAP AND WITH KEEPERS


S-306-CCT-K



No. of Contacts	Socket Part Nos.	Dimensions in Inches A	B	C	E	F	Cable Opening
2	S-302-CCT-K	21/32 Dia.	—	61/64	1 3/8	25/64	3/8
3	S-303-CCT-K	1	7/16	61/64	1 3/8	25/64	5/16
4	S-304-CCT-K	3/4	11/16	61/64	1 13/32	27/64	3/8
6	S-306-CCT-K	1	11/16	1 5/64	1 1/2	27/64	7/16
8	S-308-CCT-K	1 1/4	11/16	1 5/64	1 5/8	27/64	1/2
10	S-310-CCT-K	1 9/16	11/16	1 13/64	1 21/32	27/64	1/2
12	S-312-CCT-K	1 1/4	15/16	1 13/64	1 5/8	27/64	9/16

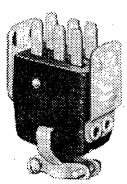

S-315-CCT-K

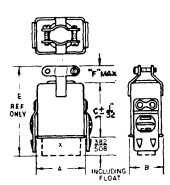


No. of Contacts	Socket Part Nos.	L +1/8 −1/32	Cable Opening	Polarizing Pin
15	S-315-CCT-K	1 11/16	9/16	NO
18	S-318-CCT-K	2	9/16	NO
21	S-321-CCT-K	2 5/16	5/8	NO
24	S-324-CCT-K	2 5/8	5/8	14
27	S-327-CCT-K‡	2 15/16	5/8	14
30	S-330-CCT-K‡	3 1/4	3/4	14
33	S-333-CCT-K‡	3 5/16	3/4	17

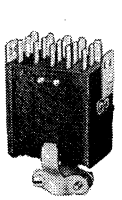
‡Keepers are centered on each side, not on each end as shown.

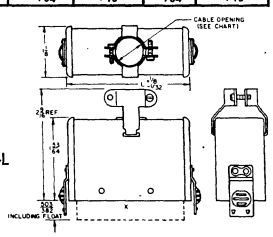
TYPE CCT-L WITH CABLE CLAMP IN TOP OF CAP AND WITH LOCKS


P-306-CCT-L



No. of Contacts	Plug Part Nos.	Dimensions in Inches A	B	C	E	F	Cable Opening
2	P-302-CCT-L	21/32 Dia.	—	61/64	1 13/16	25/64	3/8
3	P-303-CCT-L	1	7/16	61/64	1 13/16	25/64	5/16
4	P-304-CCT-L	3/4	11/16	61/64	1 27/32	27/64	3/8
6	P-306-CCT-L	1	11/16	1 5/64	1 15/16	27/64	7/16
8	P-308-CCT-L	1 1/4	11/16	1 5/64	2 1/16	27/64	1/2
10	P-310-CCT-L	1 9/16	11/16	1 13/64	2 3/32	27/64	1/2
12	P-312-CCT-L	1 1/4	15/16	1 13/64	2 1/16	27/64	9/16

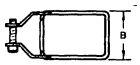

P-315-CCT-L

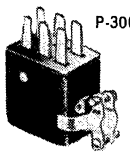


No. of Contacts	Plug Part Nos.	L +1/8 −1/32	Cable Opening Standard	Max.	Polarizing Pin
15	P-315-CCT-L	1 11/16	9/16	7/8	NO
18	P-318-CCT-L	2	9/16	7/8	NO
21	P-321-CCT-L	2 5/16	5/8	7/8	NO
24	P-324-CCT-L	2 5/8	5/8	7/8	14
27	P-327-CCT-L‡	2 15/16	5/8	7/8	14
30	P-330-CCT-L‡	3 1/4	3/4	7/8	14
33	P-333-CCT-L‡	3 5/16	3/4	7/8	17

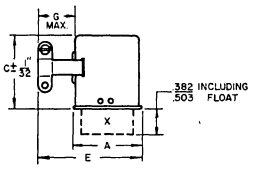
‡Locks are centered on each side, not on each end as shown.

TYPE CCE WITH CABLE CLAMP IN END

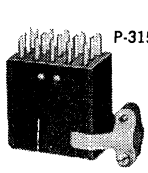



P-306-CCE

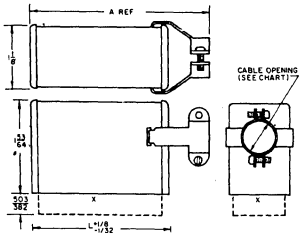
S-306-CCE



No. of Contacts	Plug Part Nos.	Socket Part Nos.	Dimensions in Inches A	B	C	E	G	Cable Opening
6	P-306-CCE	S-306-CCE	1	11/16	1 1/16	1 3/16	27/64	7/16
8	P-308-CCE	S-308-CCE	1 1/4	11/16	1 1/16	1 13/16	27/64	1/2
10	P-310-CCE	S-310-CCE	1 9/16	11/16	1 3/16	2 3/32	27/64	1/2
12	P-312-CCE	S-312-CCE	1 1/4	15/16	1 1/16	1 3/4	27/64	9/16

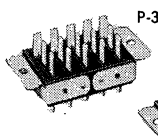

P-315-CCE

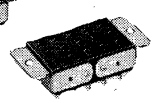
S-315-CCE

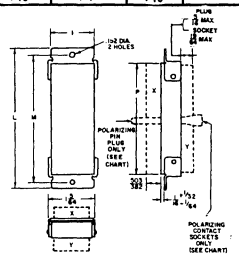


No. of Contacts	Plug Part Nos.	Socket Part Nos.	A (Ref.)	L +1/8 −1/32	Cable Opening Standard	Max.	Polarizing Pin
15	P-315-CCE	S-315-CCE	2 7/16	1 11/16	9/16	13/16	NO
18	P-318-CCE	S-318-CCE	2 3/4	2	9/16	13/16	NO
21	P-321-CCE	S-321-CCE	3 1/16	2 5/16	5/8	13/16	NO
24	P-324-CCE	S-324-CCE	3 3/8	2 5/8	5/8	13/16	14
27	P-327-CCE	S-327-CCE	3 11/16	2 15/16	5/8	13/16	14
30	P-330-CCE	S-330-CCE	4	3 1/4	3/4	13/16	14
33	P-333-CCE	S-333-CCE	4 5/16	3 5/16	3/4	13/16	17

TYPE EB WITH END BRACKETS

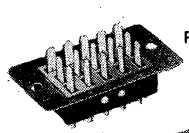

P-315-EB

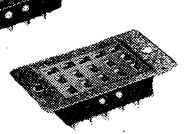

S-315-EB

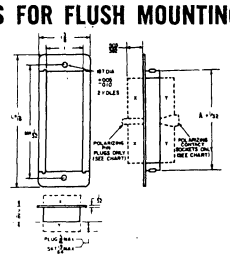


No. of Contacts	Plug Part Nos.	Socket Part Nos.	L ± 1/32"	M ± 1/32"	P ± 1/16"	Polarizing Pin
15	P-315-EB	S-315-EB	2 5/16	2	1 5/8	NO
18	P-318-EB	S-318-EB	2 5/8	2 5/16	1 13/16	NO
21	P-321-EB	S-321-EB	2 15/16	2 5/8	2 1/4	NO
24	P-324-EB	S-324-EB	3 1/4	2 15/16	2 5/16	14
27	P-327-EB	S-327-EB	3 9/16	3 1/4	2 7/8	14
30	P-330-EB	S-330-EB	3 7/8	3 5/16	3 5/16	14
33	P-333-EB	S-333-EB	4 5/16	3 7/8	3 1/2	17

TYPE SB WITH SHALLOW BRACKETS FOR FLUSH MOUNTING


P-315-SB


S-315-SB



No. of Contacts	Plug Part Nos.	Socket Part Nos.	A ± 1/32"	M ± 1/32"	L ± 1/16"	Polarizing Pin
15	P-315-SB	S-315-SB	1 11/16	2 1/8	2 35/64	NO
18	P-318-SB	S-318-SB	2	2 7/16	2 35/64	NO
21	P-321-SB	S-321-SB	2 5/16	2 3/4	3 11/64	NO
24	P-324-SB	S-324-SB	2 5/8	3 1/16	3 33/64	14
27	P-327-SB	S-327-SB	2 15/16	3 3/8	3 51/64	14
30	P-330-SB	S-330-SB	3 1/4	3 11/16	4 5/64	14
33	P-333-SB	S-333-SB	3 5/16	4	4 27/64	17

TERMINAL BLOCKS and ACCESSORIES

The Jones barrier terminal blocks are made of molded phenolic. Eyelets and screws are nickel-plated brass and terminals are hot solder dipped brass. Fibre or phenolic marker strips are available for all barrier blocks. Barrier blocks are available in standard terminal configurations as shown. Optional terminals are available as indicated by the Y, W, or ¾ W suffix on the part numbers in the charts.

2-140

2-172-W

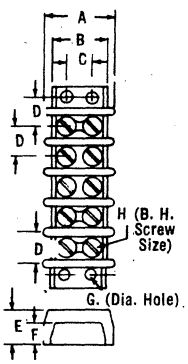
2-164¾-W

2-164-Y

The standard terminal block with binder head screws can be used for wire or special terminal attachment.
¾ W terminals are available for solder attachment of wires on one side of the terminal block. W terminals are available for solder connection of wires to both sides of the terminal block. (Available as standard on 172 series; special order on others.) Y terminals are available for solder connection of wires underneath the terminal block.

BARRIER TERMINAL BLOCKS

SERIES 140/141/142/164



DIMENSIONS

	140	141	142	164
A	7/8"	1 1/16"	1 3/16"	7/8"
B	1 1/16"	7/8"	1 1/16"	1 1/16"
C	5/16"	27/64"	1/2"	5/16"
D	3/8"	7/16"	9/16"	3/8"
E	13/32"	1/2"	5/8"	13/32"
F	1/4"	5/16"	3/8"	1/4"
G	.160"	.175/ .185"	.209"	.171/ .175"
H	5/40 x 3/16	6/32 x 1/4	8/32 x 5/16	6/32 x 1/4

140 SERIES

No. of Terminals	Std.*	¾W	Y
1	1-140	1-140-¾W	1-140-Y
2	2-140	2-140-¾W	2-140-Y
3	3-140	3-140-¾W	3-140-Y
4	4-140	4-140-¾W	4-140-Y
5	5-140	5-140-¾W	5-140-Y
6	6-140	6-140-¾W	6-140-Y
7	7-140	7-140-¾W	7-140-Y
8	8-140	8-140-¾W	8-140-Y
9	9-140	9-140-¾W	9-140-Y
10	10-140	10-140-¾W	10-140-Y
11	11-140	11-140-¾W	11-140-Y
12	12-140	12-140-¾W	12-140-Y
13	13-140	13-140-¾W	13-140-Y
14	14-140	14-140-¾W	14-140-Y
15	15-140	15-140-¾W	15-140-Y
16	16-140	16-140-¾W	16-140-Y
17	17-140	17-140-¾W	17-140-Y
18	18-140	18-140-¾W	18-140-Y
19	19-140	19-140-¾W	19-140-Y
20	20-140	20-140-¾W	20-140-Y
21	21-140	21-140-¾W	21-140-Y
22	22-140	22-140-¾W	22-140-Y
23	23-140	23-140-¾W	23-140-Y
24	24-140	24-140-¾W	24-140-Y
25	25-140	25-140-¾W	25-140-Y

*140 series barrier blocks are available with up to 25 terminal positions on special order. Part Nos. follow the conventional numbering system.

141 SERIES

No. of Terminals	Std.	¾W	Y
1	1-141	1-141-¾W	1-141-Y
2	2-141	2-141-¾W	2-141-Y
3	3-141	3-141-¾W	3-141-Y
4	4-141	4-141-¾W	4-141-Y
5	5-141	5-141-¾W	5-141-Y
6	6-141	6-141-¾W	6-141-Y
7	7-141	7-141-¾W	7-141-Y
8	8-141	8-141-¾W	8-141-Y
9	9-141	9-141-¾W	9-141-Y
10	10-141	10-141-¾W	10-141-Y
11	11-141	11-141-¾W	11-141-Y
12	12-141	12-141-¾W	12-141-Y
13	13-141	13-141-¾W	13-141-Y
14	14-141	14-141-¾W	14-141-Y
15	15-141	15-141-¾W	15-141-Y
16	16-141	16-141-¾W	16-141-Y
17	17-141	17-141-¾W	17-141-Y
18	18-141	18-141-¾W	18-141-Y
19	19-141	19-141-¾W	19-141-Y
20	20-141	20-141-¾W	20-141-Y

ELECTRICAL SPECIFICATIONS

Series	Max. Volts r.m.s. Without Marker Strip	Max. Volts r.m.s. With Marker Strip	Max. Current In Amps.	Max. Watts per Terminal
140	1100	1200	15	3,750
141	1100	1600	20	5,000
142	1600	2500	30	7,500
150	1700	2600	50	12,500
151	1800	3400	70	17,500
152	2100	3800	90	54,000
164	1100	1200	15	3,750
171	1000	—*	5	625
172	1000	2000	5	625
173	1000	2000	5	625
174	1000	2000	5	625

*No marker strip available.

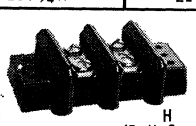
142 SERIES

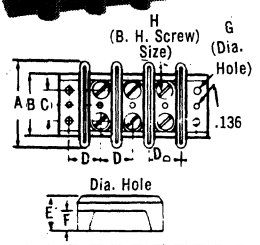
No. of Terminals	Std.	¾W	Y
1	1-142	1-142-¾W	1-142-Y
2	2-142	2-142-¾W	2-142-Y
3	3-142	3-142-¾W	3-142-Y
4	4-142	4-142-¾W	4-142-Y
5	5-142	5-142-¾W	5-142-Y
6	6-142	6-142-¾W	6-142-Y
7	7-142	7-142-¾W	7-142-Y
8	8-142	8-142-¾W	8-142-Y
9	9-142	9-142-¾W	9-142-Y
10	10-142	10-142-¾W	10-142-Y
11	11-142	11-142-¾W	11-142-Y
12	12-142	12-142-¾W	12-142-Y
13	13-142	13-142-¾W	13-142-Y
14	14-142	14-142-¾W	14-142-Y
15	15-142	15-142-¾W	15-142-Y
16	16-142	16-142-¾W	16-142-Y
17	17-142	17-142-¾W	17-142-Y

164 SERIES

No. of Terminals	Std.	¾W	Y
1	1-164	1-164-¾W	1-164-Y
2	2-164	2-164-¾W	2-164-Y
3	3-164	3-164-¾W	3-164-Y
4	4-164	4-164-¾W	4-164-Y
5	5-164	5-164-¾W	5-164-Y
6	6-164	6-164-¾W	6-164-Y
7	7-164	7-164-¾W	7-164-Y
8	8-164	8-164-¾W	8-164-Y
9	9-164	9-164-¾W	9-164-Y
10	10-164	10-164-¾W	10-164-Y
11	11-164	11-164-¾W	11-164-Y
12	12-164	12-164-¾W	12-164-Y
13	13-164	13-164-¾W	13-164-Y
14	14-164	14-164-¾W	14-164-Y
15	15-164	15-164-¾W	15-164-Y
16	16-164	16-164-¾W	16-164-Y
17	17-164	17-164-¾W	17-164-Y
18	18-164	18-164-¾W	18-164-Y
19	19-164	19-164-¾W	19-164-Y
20	20-164	20-164-¾W	20-164-Y
21	21-164	21-164-¾W	21-164-Y

SERIES 150/151/152





DIMENSIONS

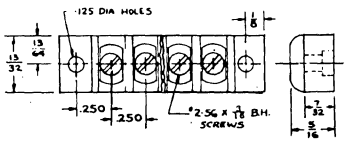
	150	151	152
A	1 13/16"	2"	2 1/2"
B	1 3/16"	1 1/2"	1 13/16"
C	5/8"	3/4"	7/8"
D	1 1/16"	7/8"	1 1/8"
E	3/4"	15/16"	1 1/8"
F	3/16"	1/2"	5/8"
G	.160"	.180"	.209"
H	10/32 x 5/16	12/32 x 3/8	1/4/28 x 1/2

No. of Terminals	150 SERIES Std.	150 SERIES Y	151 SERIES Std.	152 SERIES Std.
1	1-150	1-150-Y	1-151	1-152
2	2-150	2-150-Y	2-151	2-152
3	3-150	3-150-Y	3-151	3-152
4	4-150	4-150-Y	4-151	4-152
5	5-150	5-150-Y	5-151	5-152
6	6-150	6-150-Y	6-151	6-152
7	7-150	7-150-Y	7-151	
8	8-150	8-150-Y	8-151	
9	9-150	9-150-Y		
10	10-150	10-150-Y		

CINCH

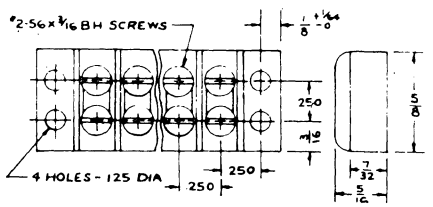
BARRIER TERMINAL BLOCKS (Cont'd.)

SERIES 171



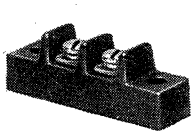
No. of Terminals	Std.
2	2-171
3	3-171
4	4-171
5	5-171
6	6-171
7	7-171
8	8-171

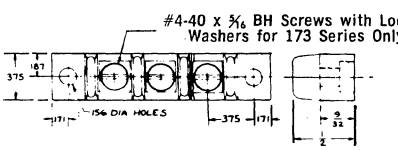
SERIES 172



No. of Terminals	Std.	W	¾W	Y
2	2-172	2-172-W	2-172-¾W	2-172-Y
3	3-172	3-172-W	3-172-¾W	3-172-Y
4	4-172	4-172-W	4-172-¾W	4-172-Y
5	5-172	5-172-W	5-172-¾W	5-172-Y
6	6-172	6-172-W	6-172-¾W	6-172-Y
7	7-172	7-172-W	7-172-¾W	7-172-Y
8	8-172	8-172-W	8-172-¾W	8-172-Y
9	9-172	9-172-W	9-172-¾W	9-172-Y
10	10-172	10-172-W	10-172-¾W	10-172-Y
11	11-172	11-172-W	11-172-¾W	11-172-Y
12	12-172	12-172-W	12-172-¾W	12-172-Y
13	13-172	13-172-W	13-172-¾W	13-172-Y
14	14-172	14-172-W	14-172-¾W	14-172-Y

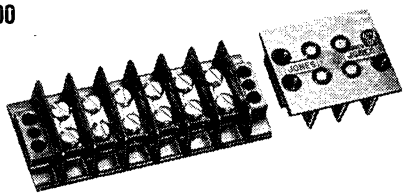
SERIES 173-174





No. of Terminals	173 SERIES w. Lock Washer	174 SERIES w.o. Lock Washer
2	2-173	2-174
3	3-173	3-174
4	4-173	4-174
5	5-173	5-174
6	6-173	6-174
7	7-173	7-174
8	8-173	8-174
9	9-173	9-174
10	10-173	10-174

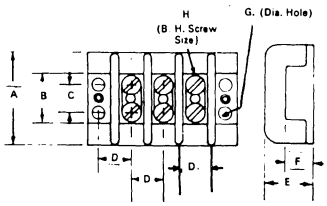
SERIES 500



The new 500 series Jones Barrier Terminal Blocks are designed for applications where electrical and mechanical performance requirements are especially critical. Bottoms are closed so that insulating strips are not required. Knockouts are molded into the base so that Y terminals can be accommodated if desired. A top-mounted marker strip can be furnished as described on page 16.

SERIES DIMENSIONS

	540	541	542
A	1⅛"	1⅜"	1⅝"
B	19/32"	¾"	7/8"
C	5/16"	27/64"	½"
D	⅜"	7/16"	9/16"
E	39/64"	11/16"	7/8"
F	21/64"	⅜"	½"
G	.160"	.175/.185"	.209"
H	5/40 x 3/16	6/32 x ¼	8/32 x 5/16



SERIES 540

Creepage Distance: ½ inch. **Max. Voltage:** 2300 volts r.m.s. **Max. Current:** 15 amps.

No. of Terminals	Part No.	No. of Terminals	Part No.	No. of Terminals	Part No.
2	2-540	12	12-540	22	22-540
3	3-540	13	13-540	23	23-540
4	4-540	14	14-540	24	24-540
5	5-540	15	15-540	25	25-540
6	6-540	16	16-540	26	26-540
7	7-540	17	17-540	27	27-540
8	8-540	18	18-540	28	28-540
9	9-540	19	19-540	29	29-540
10	10-540	20	20-540	30	30-540
11	11-540	21	21-540	31	31-540

SERIES 541

Creepage Distance: ⅝ inch. **Max. Voltage:** 2800 volts r.m.s. **Max. Current:** 20 amps.

No. of Terminals	Part No.	No. of Terminals	Part No.	No. of Terminals	Part No.
2	2-541	12	12-541	22	22-541
3	3-541	13	13-541	23	23-541
4	4-541	14	14-541	24	24-541
5	5-541	15	15-541	25	25-541
6	6-541	16	16-541	26	26-541
7	7-541	17	17-541	27	27-541
8	8-541	18	18-541	28	28-541
9	9-541	19	19-541	29	29-541
10	10-541	20	20-541	30	30-541
11	11-541	21	21-541		

SERIES 542

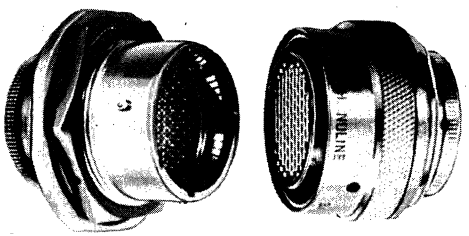
Creepage Distance: ¾ inch. **Max. Voltage:** 4000 volts r.m.s. **Max. Current:** 30 amps.

No. of Terminals	Part No.	No. of Terminals	Part No.	No. of Terminals	Part No.
2	2-542	11	11-542	20	20-542
3	3-542	12	12-542	21	21-542
4	4-542	13	13-542	22	22-542
5	5-542	14	14-542	23	23-542
6	6-542	15	15-542	24	24-542
7	7-542	16	16-542	25	25-542
8	8-542	17	17-542	26	26-542
9	9-542	18	18-542		
10	10-542	19	19-542		

CINCH-NULINE

THE SINGLE SOURCE FOR ALL ROUND CONNECTOR NEEDS

MIL-C-81511 SUBMINIATURE CYLINDRICAL CONNECTORS



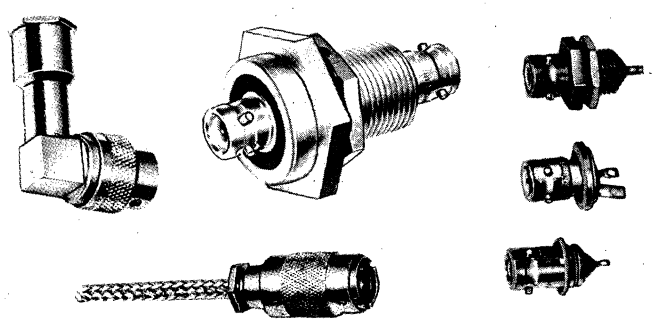
Cinch-Nuline "Astro/348®" connectors represent the highest state-of-the-art in round connectors. They have 0.085" contact centers with dielectric separation of 0.021", and the dielectric has a one-piece retention system that eliminates metal construction. Other important features include scoop-proof mating, grounding prior to electrical contact, removable crimp contacts, and extreme environment stability. Available are shell sizes for contact configurations of 4, 12, 37, 55, and 85 contacts, five receptacle styles, and standardized accessories including uniquely designed, strain relieving "J" Adapters. Request Catalog Number CN-5.

MIL-C-26500 & MIL-C-38300 CYLINDRICAL CONNECTORS

Cinch-Nuline "Omega®" and "Golden Omega®", the connectors with more hours in the air than any other cylindrical, are available in shell sizes 10 through 22, with any contact style and insert configuration. Available, too, with G-Type conductive shells and lanyard release assemblies. These Cinch-Nuline round connectors operate continuously at 200°C, and withstand violent thermal shock and high G vibration. They resist corrosion, ozone, sand, and dust. Request Catalog Number CN-3.

® Registered TM, Bunker-Ramo Corporation

MIL-C-25516 MINIATURE ENVIRONMENTAL-RESISTANT COAXIAL CONNECTORS



Cinch-Nuline 1200 Series Connectors are environmentally and hermetically sealed connectors for single conductor coaxial and unshielded cables. The 1200 Series is specifically designed for critical liquid quantity measurement systems and other high impedance and RF applications requiring high vibration resistance and maximum reliability. 1200 Series connectors are available in a wide range of configurations in both solder and crimp type terminal designs. Request Catalog Number CN-7.

Contact your local Cinch-Sales Office, or write...

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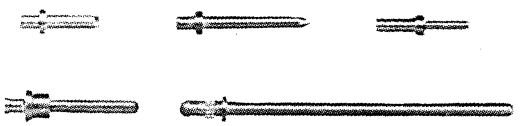
Standardized

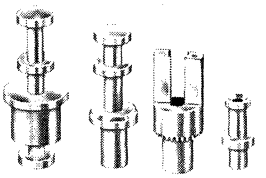


Hundreds of configurations in stock

SPACERS

TERMINALS

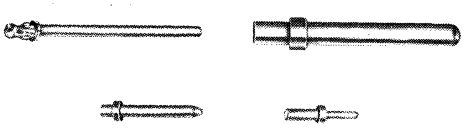
INSULATED/MICRO MINI/SUB MINI
STANDARD/PRINTED CIRCUIT
BRASS SOLDER



Hundreds of configurations in stock

WE PRECISION-MANUFACTURE AND PLATE TO MIL SPEC IN GOLD, SILVER, TIN, SOLDER, AND OTHERS TO ORDER.

SWISS AUTOMATIC SCREW MACHINE PRODUCTS



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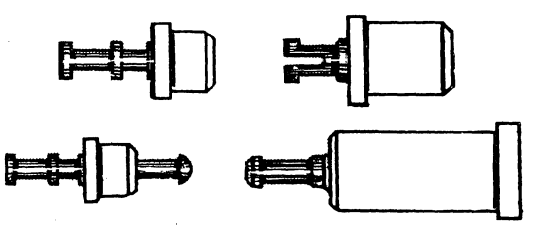
TEFLON INSULATED TERMINALS

MODULE AND CONNECTOR PINS



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CONNECTOR CORPORATION

6025 N. KEYSTONE AVENUE • CHICAGO, ILLINOIS 60646 • TELEPHONE: 312, 539-3108

For many years the electronic industry has relied on the wide range of products, engineering services and consistent production quality of Connector Corporation.

A limited cross section of Connector Corporation's line is illustrated. Your specific requirement can be exactly met and mass produced with good delivery. Many items can be supplied with leads attached and color coded, offering production savings for your assembly. Special items can be designed or developed at relatively low cost. Just let us know what you need.

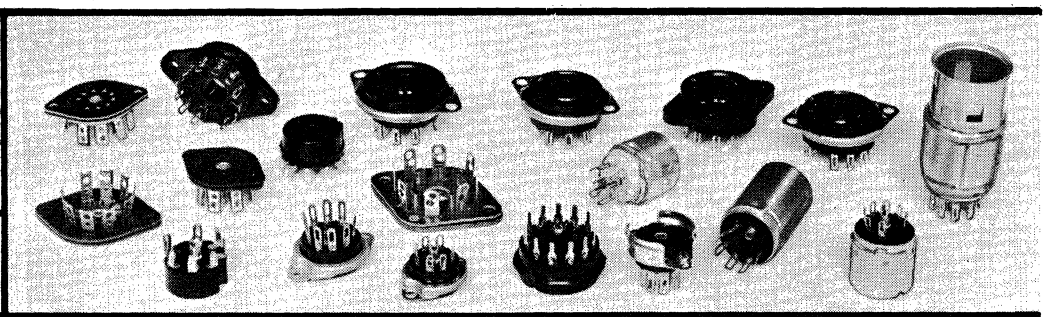
Products are available in a wide range of insulations and contact materials:

Insulations include: general purpose or mica-filled low loss Phenolic, glass filled alkyd, polypropolene, ceramic,etc., in molded versions. Laminated types include XP, XXP, XXXP Phenolics, X2B Hard Rubber, Glass Epoxy, Glass alkyd.

Contacts and Platings include: High tensile brass, phosphor bronze or beryllium copper with cadmium, electro tin, silver, hot tin dipped, silver-gold flash, gold plating, etc.

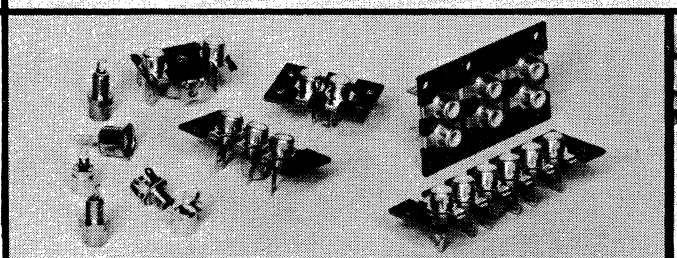
TUBE SOCKETS

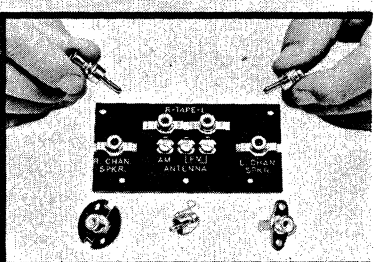
Most standard and many special molded & ceramic configurations available as well as laminated socket types. Fixed or collapsible types of shielding are available.



MULTI PURPOSE PHONO CONNECTORS

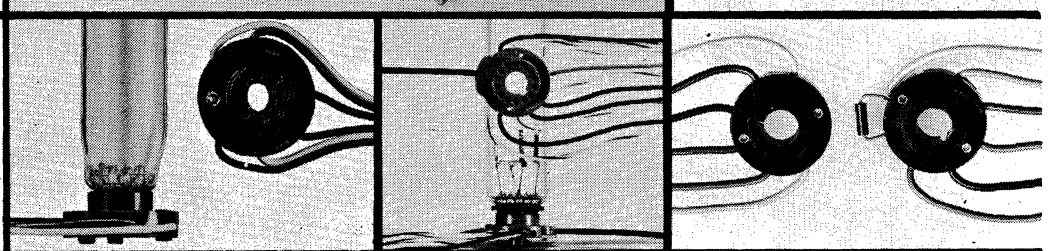
Sockets available in multiples up to 12 per section. Broad line of individual male and female types in a variety of mountings. Highly reliable for dependable repeated use.





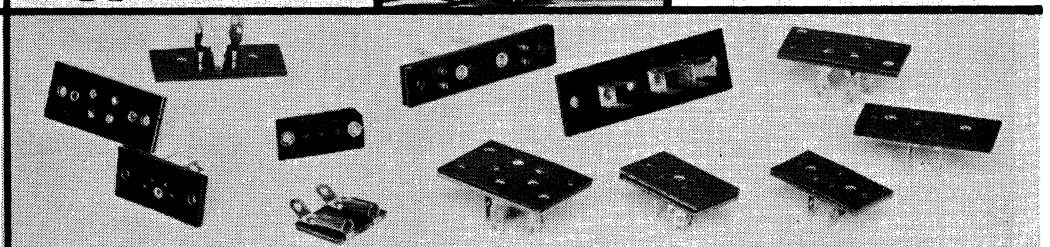
KINESCOPE SOCKET ASSEMBLIES

Include: Miniature Di Heptal Socket for 90° color tubes, 110° Eightar CRT sockets, miniature types for JEDEC E7-91, B7-247 basing (HEPTAL). Many special configurations and types may be furnished in quantity lots.



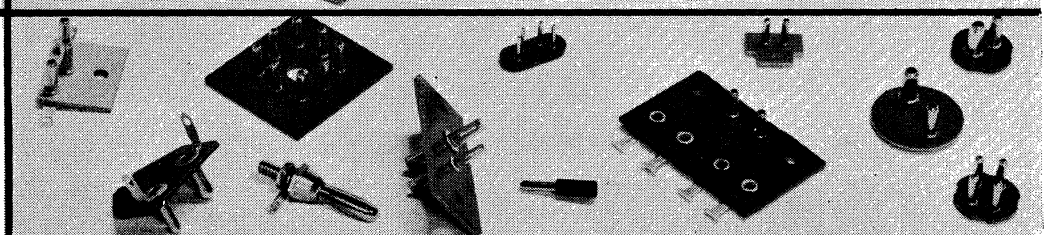
RECEPTACLES

Numerous varieties. Available in molded or laminated construction. Reliable contacts offer positive electrical and mechanical mating.



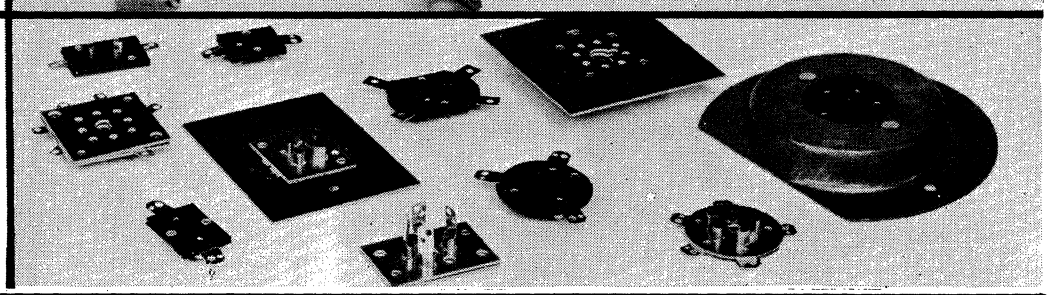
PLUGS

Numerous types available, with molded or laminated phenolic insulations. Leads may be supplied to specification.



BATTERY SOCKETS

Complete line for commercial & military batteries. Custom designed to your requirements.



CONNECTOR CORPORATION

6025 N. KEYSTONE AVENUE • CHICAGO, ILLINOIS 60646 • TELEPHONE: 312, 539-3108

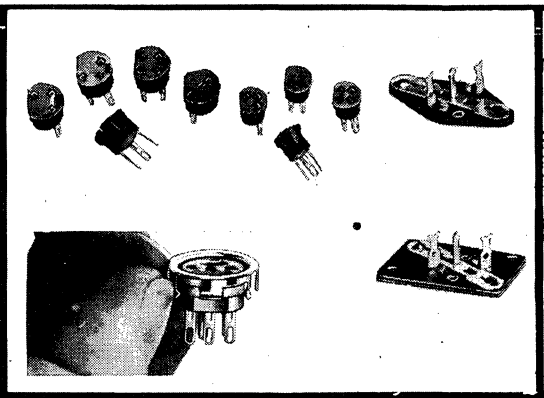
TRANSISTOR AND NUVISTOR SOCKETS

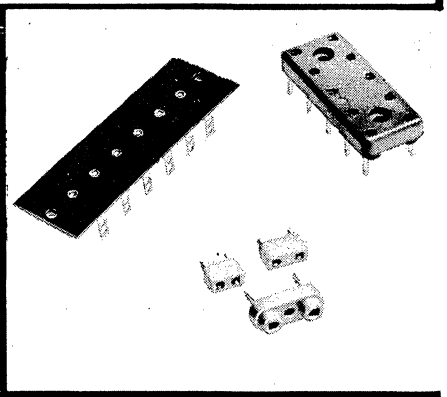
Available to mate with 3-pin, in-line transistors, and also with 3 and 4-pin transistors of any configuration on .200 or .100 dia. pin circle.

Miniature positive contact MIL quality nuvistor sockets for high quality military and commercial equipment.

CRYSTAL SOCKETS

Accommodate single & multiple crystals. Include both p.c. and conventional solder lug versions for crystals with .486, .273 and .192 pin centers and with .050 or .040 pin diameters. Also available to MIL Specs.



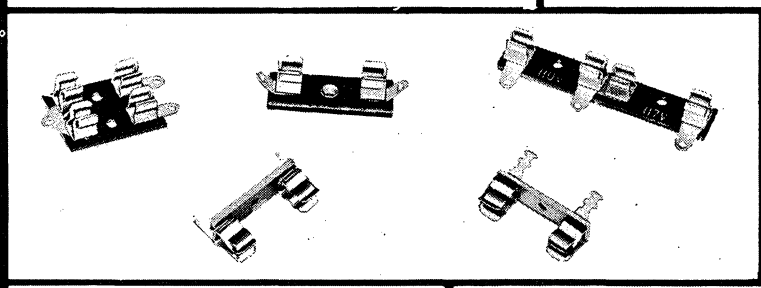


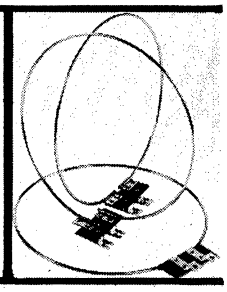
FUSE HOLDERS

Positive grip open type. Features: easy solderability, and versatility of construction which permit multiples or variations to your spec at reasonable cost.

UHF TV ANTENNAE

Attaches easily. Can be rotated in many different planes for optimum performance. Long life, trouble-free operation.



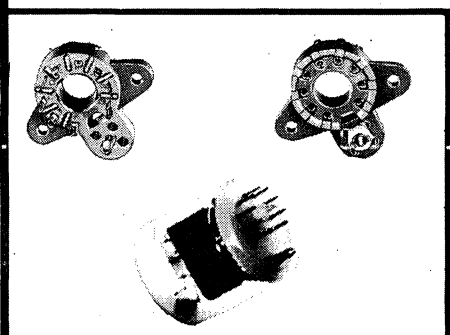


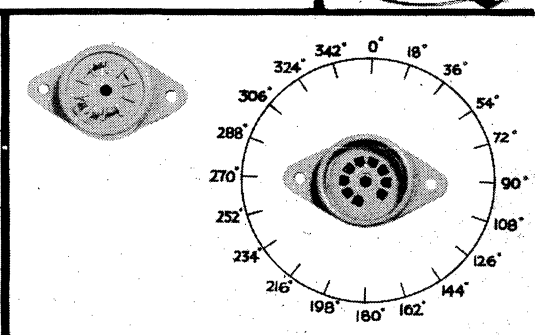
TRANSMITTER TUBE SOCKETS

Low loss at very high frequencies available. Vented to provide maximum cooling of tube base and anode contact area by convection. Voltage breakdown characteristics are enhanced by appropriate barriers between contact positions where indicated.

HIGH VOLTAGE TUBE SOCKETS

Designed for application with use of appropriate insulating materials and spacings.



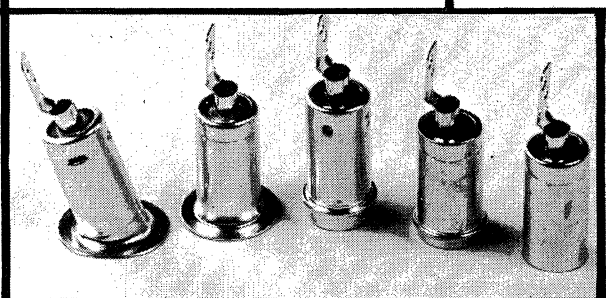


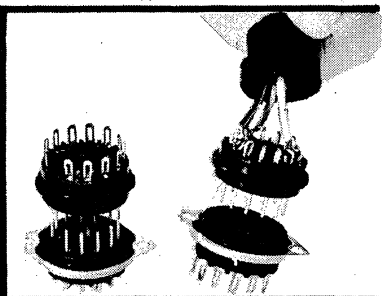
RF COAXIAL ANTENNA CONNECTORS

For auto receivers & similar applications. Rugged construction. Excellent contact resistance and retention.

MULTI-PIN MALE/FEMALE CONNECTORS

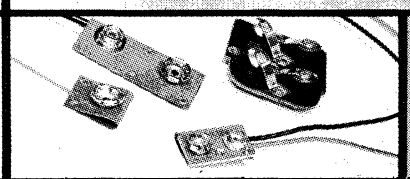
Provide quick reliable connect and disconnect for cable assemblies. Insert and extract easily, yet have reliable contact retention and resistance.

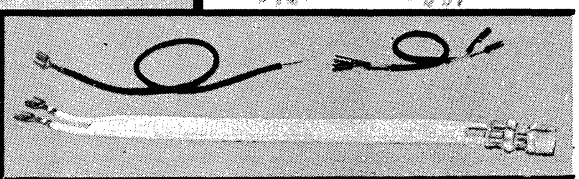




BATTERY CONNECTORS AND WIRE ASSEMBLIES

Snap-on and positive contact types available with wired leads if desired. Wire assemblies furnished to your specifications as to type of wire, length and termination attachments.

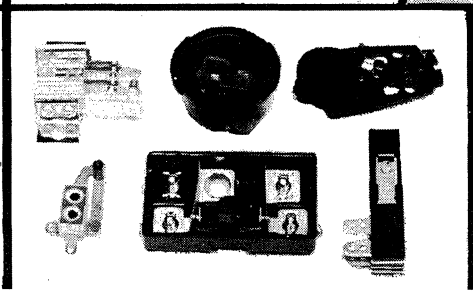


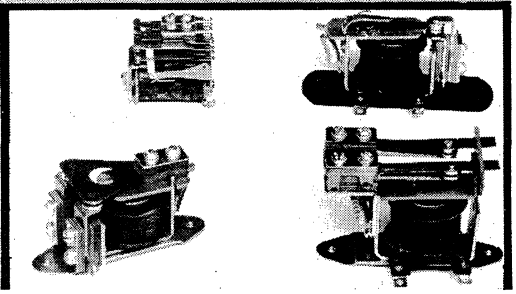


SEALECTRIC

SEALECTRIC SWITCHES AND RELAYS

For standard & special applications, send us your requirements.



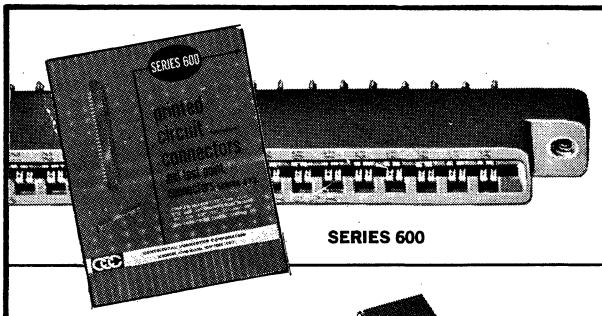


Precision Electronic Connectors

PRINTED CIRCUIT CONNECTORS*

Provide positive, space-saving connections between printed circuitry and conventional wiring through PC boards, tape cables or "plug" mounted subassemblies. Feature Continental's patented "Bellowform" contacts; glass-filled Diallyl Phthalate, Plaskon Alkyd, mineral filled Melamine moldings. Receptacles accommodate 1/32", 3/64", 1/16", 3/32" or 1/8" board thickness, single and dual readouts on .050", .075" .100", .125", .150", .156" and .200" centers.

*Patent No. 2,875,425

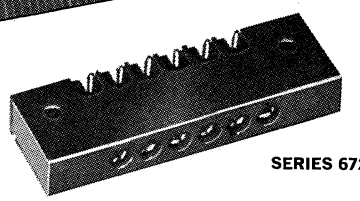


SERIES 600

PC BOARD RECEPTACLE

Card edge printed circuit connectors 1/32", 3/64", 1/16", 3/32" and 1/8" printed circuit boards. Available in wide range of sizes, single and dual readout contact construction...up to 210 terminals.

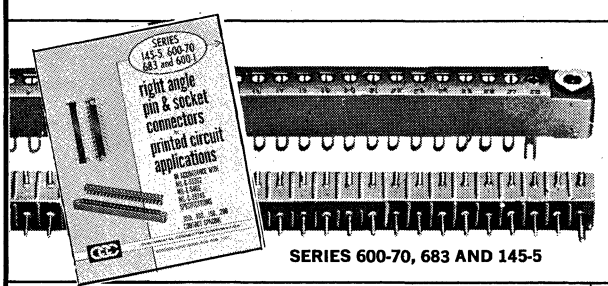
Also available with .025" and .045" square solderless-wrap terminations.



SERIES 672

PC TEST POINT

Provide conveniently located test points to check printed circuitry. Available with 4, 5, 6, 8, 10, 11, 20, 21, 28, 30, 42 and 63 contacts which grip and hold securely a standard .080" test probe. Connectors have recessed and floating pin terminals mounted at right angle to the test socket. Pins dip solder to printed circuit board.



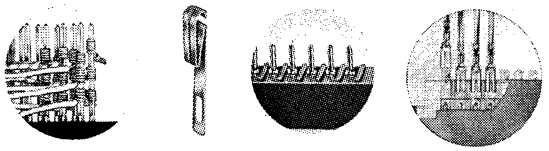
SERIES 600-70, 683 AND 145-5

PC RIGHT ANGLE PIN AND SOCKET

MEET MIL-E-5400, MIL-C-55302, MIL-C-28748 SPECIFICATIONS

Provide additional flexibility in printed circuit system design. Mating parts have set of solder cups on socket and set of right angle pins on plug which mounts and dip solders to the printed circuit board. Wide variety of configurations, contact sizes, moldings and mounting styles are available.

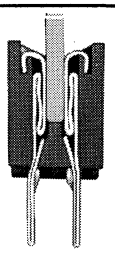
MOST PC CONNECTORS AVAILABLE IN THESE WIRING STYLES

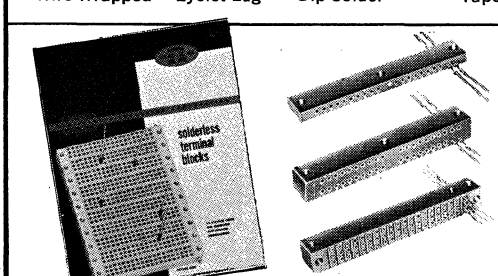


Wire-Wrapped | Eyelet Lug | Dip Solder | Taper Tab

EXCLUSIVE PATENTED "BELLOWFORM" CONTACT

Coil spring action grip clasps printed circuit board firmly over 100% of the contact area. Contact permits use of undersized or oversized board tolerances while maintaining low contact resistance. It "rides" with the printed circuit board under extreme vibration conditions or misalignment.





TERMINAL BLOCKS

SERIES 145-58, 145-50 AND 145-48. Precision reamed, solderless taper pin receptacles in single, dual and triple row construction, molded-in for highest durability. Available in any combination of feedthru individual or shorting terminals. Internal bus between any combination of terminals eliminates external wiring. Mounting holes for stacking, right angle and perpendicular mounting. Molding is glass filled Dially Phthalate (MIL-P-19833, Type GDI-30).

complete catalog data on request

CONTINENTAL

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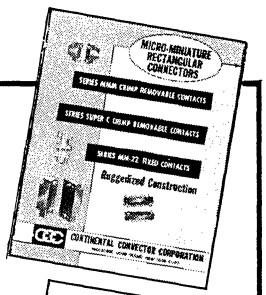
for Commercial & Military Applications

PLUG & SOCKET CONNECTORS for every requirement.

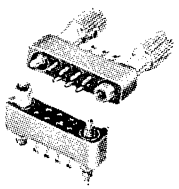
A complete line of high-reliability connectors for computer, missile, aircraft, communications and other critical applications. In addition to standard specifications, these connectors can be supplied with such optional accessories as aluminum hoods, protective shells, polarizing screwlocks*, and solder filled contacts. Various molding compounds are also available. *Patent No. 2,746,022



MICRO-MINIATURE

5 TO 104 CONTACTS. Ruggedized to withstand shock and vibration extremes. Meet MIL-C-8384 specs. Available with guide pins and sockets, polarizing screwlocks, cable brackets, hoods and glass filled Diallyl Phthalate molding.

Breakdown Voltage (sea level), 2000V. RMS • Current Rating, 3A • Min. Creepage Bet. Contacts, .070″ • Min. Air Space Bet. Contacts, .040″ • Contacts, center-to-center 3/32″ • Pin Diameter, .030″ • Solder Cup, #22 AWG wire.

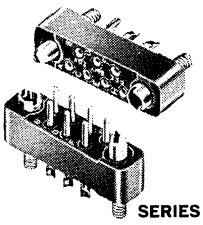


SERIES MM22 FIXED CONTACTS AND SERIES MMM CRIMP REMOVABLE CONTACTS

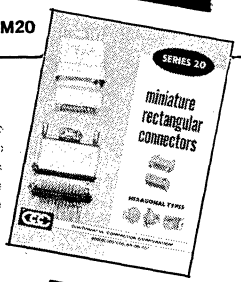
SUBMINIATURE

5 TO 104 CONTACTS. Meet or exceed applicable paragraphs of MIL-C-5015 and MIL-C-8384. Optional features include guide pins and sockets, polarizing screwlocks, protective shells and aluminum hoods. Glass-filled Diallyl Phthalate molding.

Breakdown Voltage (sea level), 2000V. RMS • Current, 5A. Cont., 7.5A max. • Min. Creepage Bet. Contacts, .078″ • Min. Air Space Bet. Contacts, .045″ • Contacts, center-to-center, 1/8″ • Pin Diameter, .040″ • Solder Cup, #20 AWG wire.



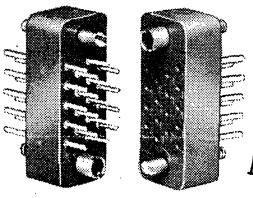
SERIES SM20



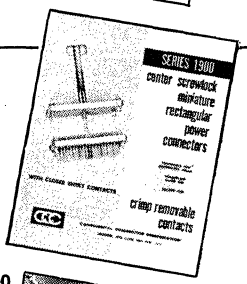
MINIATURE

4 TO 104 CONTACTS. A larger size, also available with guide pins and sockets, polarizing screwlocks, aluminum hoods, protective shells, and various molding compounds. Can be supplied with similar specifications in hexagonal types with 1, 4, 5, 7, 9 and 10 contacts.

Breakdown Voltage (sea level), 3000V. RMS • Current Rating, 5A. cont., 7.5A. max. • Min. Creepage Bet. Contacts, 1/8″ • Min. Air Space Bet. Contacts, .070″ • Contacts, center-to-center, .150″ • Pin Diameter, .040″ • Solder Cup, #20 AWG wire.



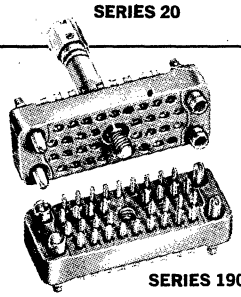
SERIES 20



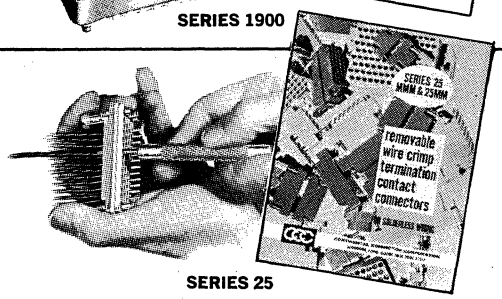
CENTER SCREWLOCK

34, 50, 78, 104, 152 CONTACTS. Double lead thread action screwlock, stainless steel side channels and closed entry contacts for maximum reliability. 152 removable contacts Series 2500152 and 10-contact and 22-contact types, for #20 AWG wire also available.

Breakdown Voltage (sea level), 3000V. RMS • Current Rating, 10A. cont., 13A. max. • Pin Diameter, .062″ • Min. Creepage Bet. Contacts, .110″ • Min. Air Space Bet. Contacts, .050″ • Contacts, center-to-center, .150″ • Solder Cup (also solderless-wrap and taper pin), #16 AWG wire.



SERIES 1900



MINIATURE AND MICROMINIATURE WITH CRIMP REMOVABLE CONTACTS

Miniature rectangular rack and panel connectors with removable crimp termination contacts. Available with 7, 9, 14, 18, 20, 26, 34, 50, 66, 75, and 104 contacts. For solderless wiring. Insertion, removal and crimping tools available. Conform to MIL-C-22857 specifications. Also in Microminiature Sizes: 50, 100, 200 Contacts. Series 25MM.

SERIES 25

complete catalog data on request

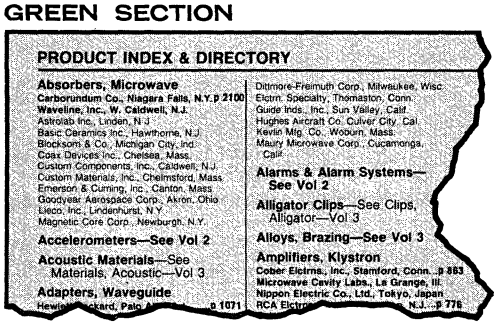
CONNECTORS

WOODSIDE, NEW YORK 11377 • PHONE SALES: (212) 899-4422

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo [illegible] p 1071
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Electm. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co., Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electron[illegible] N.J. p 776

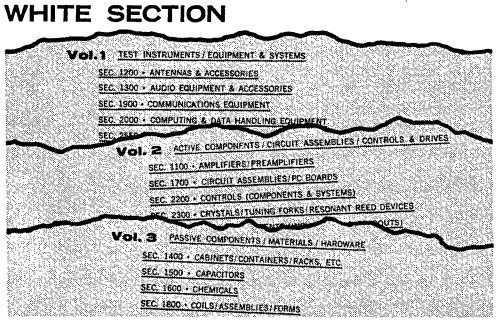
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
[illegible] OUTS)

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

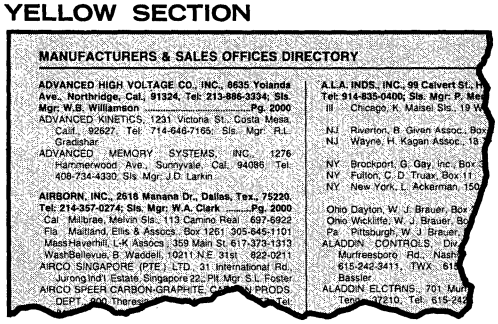
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

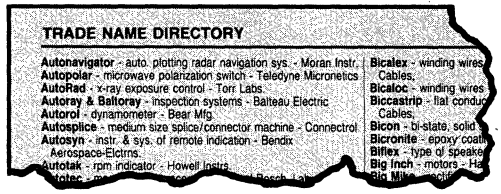
ADVANCED HIGH VOLTAGE CO., INC., 6635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.S. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradshar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086 Tel: 408-734-4330, Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2616 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash Bellevue, B. Waddell, 10211 N.E. 21st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22, Plt. Mgr S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CARBON PRODS. DEPT., 900 Theres[illegible] Tel:

A.L.A. INDS., INC., 99 Calvert St., H[illegible] Tel: 914-835-0400; Sls. Mgr: P. Mey[illegible]
Ill Chicago, K. Maisel Sls., 19 W[illegible]
NJ Riverton, B. Given Assoc., Box[illegible]
NJ Wayne, H. Kagan Assoc., 19[illegible]
NY Brockport, G. Gay, Inc., Box[illegible]
NY Fulton, C. D. Truax, Box 11[illegible]
NY New York, L. Ackerman, 150[illegible]
Ohio Dayton, W. J. Brauer, Box[illegible]
Ohio Wickliffe, W. J. Brauer, Bo[illegible]
Pa Pittsburgh, W. J. Brauer,
ALADDIN CONTROLS, Div. Murfreesboro Rd., Nash[illegible] 615-242-3411, TWX 61[illegible] Bassler
ALADDIN ELCTRNS., 701 Mur[illegible] Tenn. 37210, Tel. 615-242[illegible]

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - X-ray exposure control - Torr Labs
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible] - [illegible] - Bosch [illegible]
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat conduc Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha
Big Mike - [illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

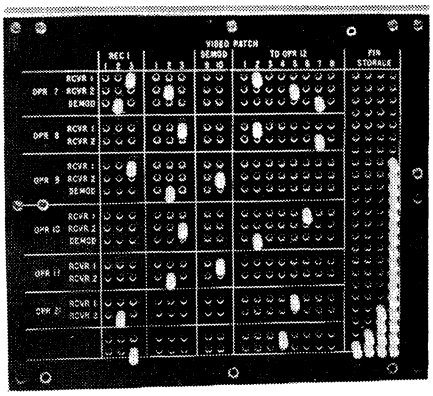
contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

CO-ORD SWITCH

A DIVISION OF LVC INDUSTRIES INC.

102-48 43rd AVE., CORONA, N. Y. 11368 • TEL: 212-899-5588

MATRIX PROGRAM BOARDS



CO-ORD Matrix Program Boards are composed of 2 to 8 decks of contacts that are bussed on .250 centers. The contact rows of one deck are usually oriented perpendicular to the rows of adjacent deck(s) so as to obtain switching crosspoints. Electrical connections of the bussed contact rows are effected by inserting shorting pins at the desired crosspoints; "CO-AX", phone plug type pins are available for networks which require component insertion (Diodes, resistors, etc.). Single board matrices of up to 11,000 crosspoints are available in standard or special arrangements. Bussed and isolated contacts can be had alone or in combination. Panels may be screened, engraved, or fitted with pre-punched templates for rapid program changing.

U. S. Patent No. 3,349,361

APPLICATIONS

- Computer memories
- Cordless patch panels
- Function generators (Analog/Digital)
- Power distributors
- Thermocouple signal selectors
- Circuit/Component test programmers
- Lighting systems (Special effects)
- Variable sequence selectors
- Variable diode matrices
- Code generators
- Traffic control panels
- Decade switches
- Vending machine control
- Numeric controlled machinery
- Data channeling and logging
- Communications distributors

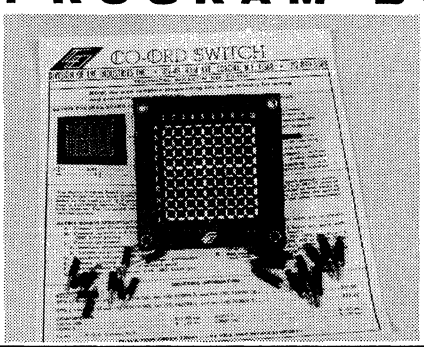
FEATURES

- Closed entry contacts
- High mechanical environment capacity
- Low interlead capacitance
- Attractive and uncluttered
- Compact package
- Standard sizes available
- Permits insertion of components into network without soldering
- Wide variety of switching combinations

SPECIFICATIONS

- Contact Resistance
  - a Total Pin Resistance: .004 OHM MAX.
  - b Volume Resistivity of Strip: .003 OHM/IN
- Breakdown Voltage: 1000 VRMS MIN.
- Current Capacity: 5 AMPS Continuous
- Materials:
  - a Plastic Parts: Black Phenolic XXX
  - b Flexible Contacts: Heat Treated Beryllium Copper
  - c Terminals: Brass
  - d Finishes: Gold, Silver or Nickel

PROGRAM BOARD KITS



KIT BPS-1 consists of a 10 x 10 matrix board similar to #63014-1, below. 10 shorting pins and 10 "CO-AX" diode pins with 1N270's installed $27.00

KIT BPS-2 is the same as BPS-1 but without diodes $22.25

10 x 10 matrix board	$17.00 ea.
Shorting pin	.12 ea.
Diode pin w/1N270	.99 ea.
Diode pin w/o diode	.51 ea.

AVAILABLE FROM STOCK

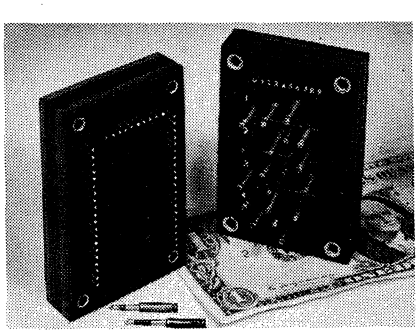
STANDARD MATRIX BOARDS — SERIES 63014

DASH	-1	-2	-3	-4	-5	-6	-7	-8	-9
MATRIX	10 x 10	10 x 15	10 x 20	10 x 25	15 x 20	15 x 25	20 x 20	10 x 50	25 x 25

AVAILABLE FROM STOCK. ADD DASH NO. (1 Thru 9) MATRIX SIZE.

MINIATURE PROGRAM BOARD

.100 and .125 inch Center Line

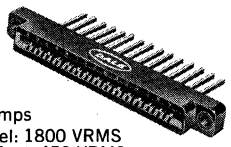


These Matrix Program Boards are designed to meet the increased technological requirements for miniaturization in electronic systems and equipment. They have all the same features of the larger matrices and can be supplied in from 2 to 4 decks of bussed contacts. Single matrix boards of up to 2500 crosspoints can be furnished in one solid unit, with rugged Shorting and CO-AX (diode) pins available for programming functions. A standard 2 deck matrix measures .315 inches thick from the front to rear panel; program pins are .280 inches long by .063 inches in diameter. Termination of the bussed contacts are to .040 diameter pin terminals, which allow the matrix to be plugged into mating female receptacles or connected to directly by wave, dip, or hard soldering. Contact resistance is only .005 ohms per crosspoint; breakdown voltage 600 VRMS; current capacity 3 amps continuous.

See Our BLOC-LITE Lighting Devices • Section 2400

DALE® for Optimum Value in Connectors

SERIES EBT 156

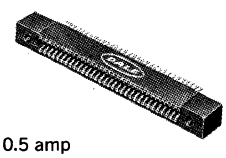


PHYSICAL and ELECTRICAL
Number of Contacts: 8, 10, 12, 15, 18 or 22
Contact Spacing: .156"
Board Thickness: .054" to .070"
Board Slot Depth: .330" **Current Rating:** 5 amps
Test Voltage between Contacts: At Sea Level: 1800 VRMS
At 70,000 feet: 450 VRMS
Insulation Resistance: 5000 meg. min.
Contact Resistance: 30 millivolts max. at rated current

COMPONENT MATERIAL
Body: Glass-filled phenolic per MIL-M-14, Type MFH, black
Contacts: Nickel silver per QQ-C-585, alloy 770, spring temper. Gold flash optional.
Polarizing Key: Glass-filled nylon
Optional Threaded Mounting Insert: Nickel plated brass. (Type Y)
Optional Floating Mounting Bushing: Cadmium plated brass. (Type Z)

APPLICATION For use with 1/16" printed circuit boards requiring an edgeboard type connector on .156" centers.

SERIES EBTL 050



PHYSICAL and ELECTRICAL
Number of Contacts: 8, 16, 20, 25, 32, 50 or 64 per side
Contact Spacing: .050"
Board Thickness: Size 1 = .027"-.035"
Size 2 = .056"-.068"
Board Slot Depth: .200" **Current Rating:** 0.5 amp
Test Voltage between Contacts: At Sea Level: 1200 VRMS
At 50,000 feet: 675 VRMS
Insulation Resistance: 5000 meg. min.
Contact Resistance: 10 millivolts max. at rated current

COMPONENT MATERIAL
Body: Glass-filled phenolic per MIL-M-14, Type MFH, black
Contact Backer Strips: Epoxy glass laminate per MIL-P-18177, Type GEE, black
Contacts: Beryllium copper per QQ-C-533, alloy 172. Gold plate per MIL-G-45204.
Polarizing Key: Polycarbonate

APPLICATION For use with 1/32" and 1/16" printed circuit boards in integrated thin film, and semiconductor circuitry with .050" contact spacing.

SERIES EB 7

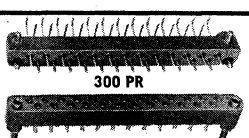
PHYSICAL and ELECTRICAL (Featuring Bifurcated Bellow Contacts)
Number of Contacts:
Single Row (Single Readout)—6, 10, 15, 18 and 22
Double Row (Double Readout)—12, 20, 30, 36 and 44
Contact Spacing: .156" **Board Thickness:** .054" to .070"
Board Insertion Depth:
Single Readout Contact—.300"
Double Readout Contact—.260"

Current Rating: 5 amps
Test Voltage between Contacts: At Sea Level: 1800 VRMS
At 70,000 feet: 450 VRMS
Insulation Resistance: 5000 meg. min.
Contact Resistance: 30 millivolts max. at rated current

COMPONENT MATERIAL
Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green
Contacts: Phosphor Bronze per QQ-B-750 with .000030 min. gold plated
Polarizing Key: Nylon
Optional Threaded Mounting Insert: Brass, nickel plated
Optional Floating Mounting Bushing: Brass, cadmium plated

APPLICATION For use with 1/16" printed circuit boards requiring an edgeboard type connector on .156" centers.

SERIES 300

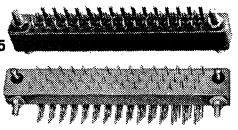


PHYSICAL and ELECTRICAL
Number of Contacts: 7, 15, 19 and 25
Contact Spacing: 0.250", staggered rows provide a .125" grid.
Contact Gauge: #20 AWG
Minimum Creepage Path between Contacts: 5/32"
Minimum Air Space between Contacts: 7/64" **Current Rating:** 7.5 amps
Breakdown Voltage: At Sea Level: 3600 VRMS
At 70,000 feet: 975 VRMS

COMPONENT MATERIAL
Contact Pin: Phosphor Bronze
Contact Socket: Phosphor Bronze
Contact Plating: Gold Plated
Guide Pins: Stainless steel, passivated
Standard Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green. Other body material supplied upon request.

APPLICATION Where permanent mounting of male connector to printed circuit board is required with mating female connector available.

SERIES 303

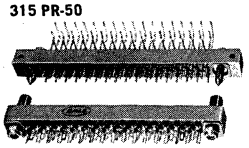


PHYSICAL and ELECTRICAL
Number of Contacts: 45
Contact Gauge: #22 AWG
Minimum Creepage between Contacts: 1/16"
Minimum Air Space between Contacts: 1/64"
Contacts, Center to Center: .050"
Voltage Breakdown, Contact to Contact and Contact to Ground:
At Sea Level: 1200 VRMS • At 70,000 feet: 325 VRMS
Current Rating: 3 amps

COMPONENT MATERIAL
Contact: Phosphor Bronze, Gold Plated
Contact Plating: Gold Plated
Studs, Pilot Pins, Washers, Nuts: Corrosion-resistant steel, passivated
Standard Body: Glass-filled diallyl phthalate per MIL-M-19833, Type GDI-30F, green

APPLICATION For use in equipment requiring printed circuit connectors of the dip solder type with mating female connector.

SERIES 315

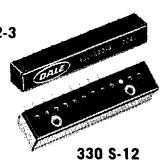


PHYSICAL and ELECTRICAL
Number of Contacts: 50
Contact Termination: Male contacts available in right angle dip solder, or solder cup termination
Contact Spacing: 0.200", staggered rows provide a 0.100" grid
Contact Gauge: #20 AWG
Minimum Creepage Path between Contacts: 7/64"
Minimum Air Space between Contacts: 1/16"
Current Rating: 7.5 amps
Breakdown Voltage, Contact to Contact: At Sea Level: 2500 VRMS
At 70,000 feet: 600 VRMS

COMPONENT MATERIAL
Contact Pin: Phosphor Bronze, Gold Plated
Contact (closed entry) Socket: Phosphor Bronze, Gold Plated
Guides and Hardware: Stainless steel, passivated
Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green

APPLICATION Designed for dip solder printed circuit applications requiring 50 contacts. Also available with solder cup termination for rack and panel applications.

SERIES 330

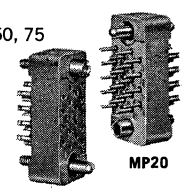


PHYSICAL and ELECTRICAL
Number of Contacts: 12
Contact Spring: .150"
Contact Size: .040" dia.
Minimum Creepage Path between Contacts: 7/64"
Minimum Air Space between Contacts: 7/64"
Current Rating: 7.5 amps
Breakdown Voltage: At Sea Level: 2500 VRMS
At 70,000 feet: 600 VRMS

COMPONENT MATERIAL
Contact Pin: Phosphor Bronze, Gold Plated
Contact Socket: Phosphor Bronze, Gold Plated
Eyelets: Brass, Cadmium Plated
Body: Phenolic, CFG (black)

APPLICATION Where permanent mounting of male connector to a printed circuit board is required with mating female connector available. Polarization available.

SERIES M20



PHYSICAL and ELECTRICAL
Number of Contacts: 7, 9, 14, 18, 20, 26, 34, 41, 50, 75
Contact Spacing: 0.150"
Contact Gauge: #20 AWG
Minimum Creepage Path between Contacts: 1/8"
Minimum Air Space between Contacts: 3/32"
Current Rating: 7.5 amps
Breakdown Voltage: At Sea Level: 3000 VRMS
At 70,000 feet: 675 VRMS

COMPONENT MATERIAL
Contact Pin: Brass
Contact Socket: Phosphor Bronze (beryllium copper also available).
Contact Plating: Gold Plated
Screwlocks: Stainless steel
Standard Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green. Other materials available on request.
Guides: Stainless steel

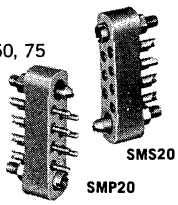
APPLICATIONS For use in instrumentation, avionics, communications, missiles, guidance systems, computers, portable equipment and test equipment.

DALE® for Optimum Value in Connectors

SERIES SM20

PHYSICAL and ELECTRICAL

Number of Contacts: 5, 7, 11, 14, 20, 26, 34, 42, 50, 75
Contact Spacing: 0.125"
Contact Gauge: #20 AWG
Minimum Creepage Path between Contacts: 5/64"
Minimum Air Space between Contacts: 3/64"
Current Rating: 7.5 amps
Breakdown Voltage: At Sea Level: 2000 VRMS
At 70,000 feet: 500 VRMS


SMS20

SMP20

COMPONENT MATERIAL

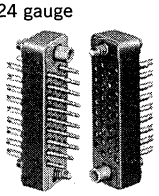
Contact Pin: Brass
Contact Socket: Phosphor Bronze. Beryllium copper also available.
Contact Plating: Gold Plated
Guides: Stainless steel, passivated
Screwlocks: Stainless steel, passivated
Standard Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green. Other body material supplied upon request.

APPLICATIONS For use wherever space is at a premium and a high quality connector is required in avionics, automation, communications, controls, instrumentation, missiles, computers and guidance systems.

SERIES MM22 and MM24

PHYSICAL and ELECTRICAL

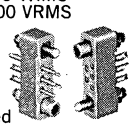
Number of Contacts: 5, 7, 9, 11, 14, 20, 26, 29, 34 and 44
Contact Spacing: 3/32"
Contact Gauge: MM22 Series = 22 gauge. • MM24 = 24 gauge
Minimum Creepage Path between contacts: 5/64"
Minimum Air Space between contacts: 3/64"
Current Rating: MM22 Series = 5 amps
MM24 Series = 3 amps
Breakdown Voltage: At Sea Level: 2000 VRMS
At 70,000 feet: 500 VRMS


MMP22-34SL

MMS22-34SL

COMPONENT MATERIAL

Contact Pin: Phosphor Bronze
Contact Socket: Phosphor Bronze
Contact Plating: Gold Plated
Screwlocks: Stainless steel, passivated
Guides: Brass, gold plated
Standard Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green. Other body material supplied upon request.


MMP22-5 MMS22-5

APPLICATIONS Especially suited for use in airborne, instrumentation and portable equipment applications or wherever the following requirements must be met: Minimum space and weight without sacrifice of performance, high quality materials, long service life, high vibration and shock resistance, and positive locking.

SERIES PJ

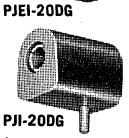
PHYSICAL and ELECTRICAL

Current Rating: 7.5 amps
Socket Contact Engages: 0.080" dia. probe

PJEI-20DG

COMPONENT MATERIAL

Standard Body: Glass-filled diallyl phthalate per MIL-M-19833, Type GDI-30F, green.
Pin Contacts: Brass
Socket Contacts: Phosphor Bronze
Contact Plating: Gold Plated

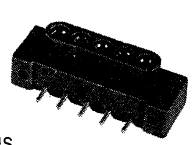

PJI-20DG

APPLICATION Printed circuit checkout and testing.

MODEL 500 SR5

PHYSICAL and ELECTRICAL

Number of Contacts: 5
Contact Spacing: 0.150"
Contact: Accepts .080" dia. probe
Current Rating: 5 amps
Breakdown Voltage: At Sea Level: 3000 VRMS
At 70,000 feet: 676 VRMS



COMPONENT MATERIAL

Contact Socket: Phosphor Bronze
Contact Plating: Gold Plated
Standard Body: Glass-filled diallyl phthalate per MIL-P-19833, Type GDI-30F, green. Other materials available upon request.

APPLICATION Permanent or semi-permanent test points for checkout and testing of printed circuits.

For complete information, write or phone:
DALE ELECTRONICS, INC.
P. O. Box 180 • YANKTON, SOUTH DAKOTA 57078
PHONE: 605-665-9301

SERIES QX32

PHYSICAL and ELECTRICAL

Minimum Creepage between Contacts: 9/64"
Minimum Air Space between Contacts: 7/64"
All male contacts are .093" in diameter. Current ratings vary only because some solder cups are made for #12 AWG and others for #16 AWG.

QX32S-1

QX32P

Voltage Breakdown Contact to Contact (#12 AWG solder cup): At Sea Level: 3300 VRMS
At 70,000 feet: 712 VRMS
Current Rating: 23 amps #12 AWG • 13 amps #16 AWG
Voltage Breakdown Contact to Contact (#16 AWG solder cup): At Sea Level: 3600 VRMS • At 70,000 feet: 750 VRMS

QX32S

COMPONENT MATERIAL

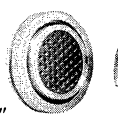
Closed Entry Socket Contacts: Phosphor Bronze*, Gold Plated
Inserts and Hardware: Stainless steel, passivated*
"O" Ring: Synthetic rubber **Boot:** Neoprene
Body Material: Glass-filled diallyl phthalate per MIL-M-19833, Type GDI-30F, green. Consult factory for other materials.
For use with QX32S, a shorting plug to ground static electricity is available. Contact factory for details.
*Contact factory. Beryllium copper can be specified to ordinance drawing 10182288.

APPLICATION Used in the firing system of missiles.

SERIES 400 and 401

PHYSICAL and ELECTRICAL

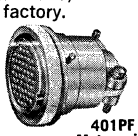
Voltage Breakdown, contact to contact:
At Sea Level: 2000 VRMS
At 70,000 feet: 500 VRMS
Minimum Creepage Path between Contacts: 5/64"
Minimum Air Space between Contacts: 3/32"
Contacts, center to center: .150"


400PF

400RM

COMPONENT MATERIAL

Molded Body: Glass-filled diallyl phthalate per MIL-M-19833, Type GDI-30F, green. For other materials, contact factory.
Hood: Aluminum, anodized (on 401PF)
Shells, Mounting Nut and Coupling Nut: Aluminum, clear anodized.
Contact Pins: Brass, Gold Plated
Contact Socket: Phosphor Bronze, Gold Plated
Lock Ring: Brass, cadmium plated
Retaining Ring: Stainless steel **Protective Cap:** Polyvinyl


401PF
Mates with Series 400RM

APPLICATION Series 400: For use in equipment requiring a 41, 51 or 55 pin sealed connector, with a mating non-sealed female connector. **Series 401:** For identical applications where hood is required. Mates with Series 400RM connectors.

SERIES S20

COMPONENT MATERIAL

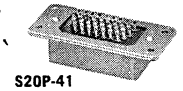
Molded Body: Orlon-filled diallyl phthalate per MIL-M-14F, Type SDI-5 (blue), furnished as standard.
Contact Pin: Brass, Gold Plated
Contact Socket: 4 tine beryllium copper, gold plated
Coaxial Insulator: Teflon
Coaxial Socket Body: Brass, silver plating standard. Gold also available.
Coaxial Socket Contact: Beryllium copper, gold plated
Shell and Retaining Plate: Aluminum, cadmium plated and gold iridited

Coaxial Contacts are for use with Adapter No. 2710-10 by Cannon or No. 5988 by Greymar and fit RG 188/U cable.

S20P-41 and S20S-41

PHYSICAL and ELECTRICAL

Minimum Creepage Path between Contacts: 1/8"
Minimum Air Space between Contacts: 1/16"
Contacts, center to center: 3/32"
Ambient Temperature Range: −67° F to +250° F
Approximate Weight: S20S-41 = 1.5 oz.
S20P-41 = 1.0 oz.


S20P-41

S20S-41

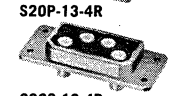
Voltage Breakdown, contact to contact: At Sea Level: 2500 VRMS
At 70,000 feet: 600 VRMS
Current Rating: 10 amps

S20P-13-4R and S20S-13-4R

PHYSICAL CHARACTERISTICS

Minimum Creepage Path between Contacts: 7/64"
Minimum Air Space between Contacts: 1/16"
Contacts, center to center: .150"
Ambient Temperature Range: −67° F to +250° F
Approximate Weight: S20P-13-4R = 1.8 oz.
S20S-13-4R = 1.3 oz.

S20P-13-4R

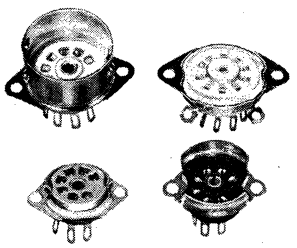

S20S-13-4R

Eby™

BINDING POSTS, CONNECTORS, SOCKETS

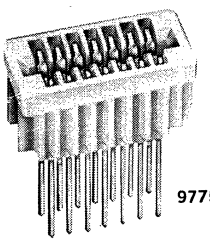
custom connecting devices...

SOCKETS



7, 8 and 9-Pin Miniature Sockets. To MIL-S-12883A or commercial requirements. Contacts: brass, phosphor-bronze or beryllium-copper, with various finishes. Mica-filled, general purpose phenolic or ceramic. Top mount, bottom mount, split-saddle or shield base versions. 4 ground lugs available in bottom mount version. Various mounting centers.

P.C. CARD EDGE CONNECTOR



9775-89

Miniature Card-Edge Connector designed for automatic solderless wrap connections.

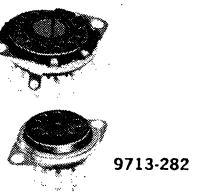
Specifications:

Housing: Glass filled nylon.

Contacts: Beryllium-copper, gold over nickel-plated, on 0.100 centers, 0.025 square tails.

Accepts a 0.062 thick P.C. board.

SOCKETS



9878-1

9713-282

Compactron Socket, #9878-1. Accommodates any Compactron tube. Top or bottom mount saddle. 4 ground lugs on bottom mount optional. 1 5/16" centers. Mica-filled or general purpose phenolic.

10-Pin Socket, #9713-282. Accepts new 10-Pin tube. Top or bottom mount. 4 ground lugs on bottom mount optional. Mica-filled or general purpose phenolic.

SOCKETS

119 Series

9718 Series

119 Connector. 1 to 5 contacts. 7/8" mounting centers.

9718 Series. Up to 12 contacts. 1 5/16" mounting centers. Many combinations available without tooling.

(Mating plugs available for all models)

UNIVERSAL BINDING POSTS

9738-19 9766-150-1 7186

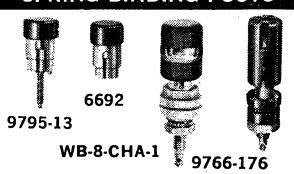
Multi-type. Accepts banana plug. "D" insulators for keyed mounting. Non-removable tops. Red or black phenolic.

#9738-19 — Rated 30 amps at 1000V. Nickel-plated brass.

#9766-150-1 — Miniature. Extends only 51/64" from panel when closed. Max. dia., 17/32". Gold flash on nickel-plated brass.

Twin Assemblies, #7186. Boss insulates posts from panel. 7/8" mounting centers. 6-32 molded-in stud. 1/2" dia. non-removable tops. Brass and phenolic.

SPRING BINDING POSTS



6692

9795-13

WB-8-CHA-1

9766-176

Quick connections. D-shaped hole for uniform tension across wire. Accepts phono-tip. Threaded stem and dowel optional. Nickel-plated brass. Red or black phenolic caps.

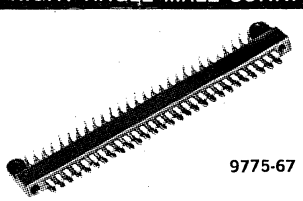
#9795-13 — with stem and dowel.

#6692 — without stem or dowel.

#WB-8-CHA-1 — To Signal Corps spec. U 106/U. Watertight. Can also be produced to MIL-P55149/8.

#9766-176 — Miniature, watertight. Meets MIL-P-55149/7 Max. dia. 0.40". High impact strength nylon plastic body.

RIGHT ANGLE MALE CONN.



9775-67

Designed primarily for terminating printed circuit boards into wire-wrap plates on military air-borne and ship board electronic equipment, this header also has numerous commercial applications.

Specifications:

Insulator: Diallyl phthalate.

Contacts: Brass, gold over nickel-plated, on 0.100 square grid.

Available in 34, 40 and 50 contact configurations.

TRANSISTOR SOCKETS

9866-13-6 9866-13-4

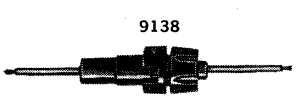
Designed for JEDEC series transistors. One-piece integral saddle design. Speedy assembly with rivets or #2 screws. Contacts are silver-plated beryllium copper with gold flash. Mica-filled phenolic sockets meet MIL-M-14 MFE specs.

POWER TRANSISTOR SOCKET

9866-15-1

For to -3 power transistors. Special design permits **complete** electrical isolation of base connection. 1-piece molded construction of high impact Bakelite.

FUSE HOLDER

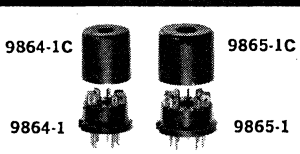


9138

Heavy-duty Holder. Housing, #9138. Cap, #9137. Solder or crimp-type contacts. General purpose phenolic.

Springs according to type of fuse. Assembled or unassembled. Can also be supplied in thermoplastic nylon.

ADAPTORS



9864-1C 9865-1C

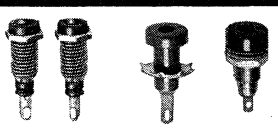
9864-1 9865-1

Converts any 7 or 9-Pin miniature socket into a connector. Brass cadmium contacts, mica-filled or general purpose phenolic.

7-Pin Socket, #9864-1
Cap, #9864-1C

9-Pin-Socket, #9865-1
Cap, #9865-1C

TIP JACKS



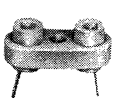
9768-17 7115 9768-13

Metal Jack, #9768-17. Beryllium-copper contacts. Nylon insulator in wide range of colors.

Molded Jack, #7115. Red or black general purpose.

Metal Jack, #9768-13. Brass body. Phosphor-bronze contacts. Cap in red or black phenolic. Locking nut and insulation washer available.

SOCKETS



9748-1

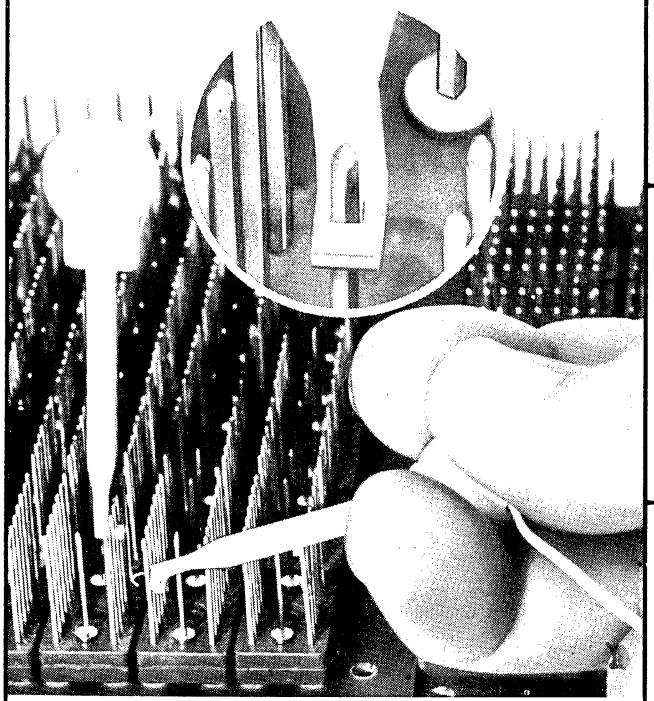
Crystal Socket (TS0205C01), #9748-1. Glazed Steatite per JAN-1-10. Meets MIL-S-12883A. Contacts: phosphor-bronze or beryllium copper, silver-plated. Also available in black general purpose and mica-filled low loss.

Eby **HUGH H. EBY CO.** *REQUEST TECHNICAL BULLETIN*

4701 GERMANTOWN AVENUE • PHILADELPHIA, PA. 19144 • PHONE: (215) DA 4-7000 *A DIVISION OF REDM CORP.*

EARNED LEADERSHIP IN THE ELECTRONICS INDUSTRY THROUGH RELIABLE, QUALITY PRODUCTS

E-Z-HOOK® THE IMPOSSIBLE HOOKER

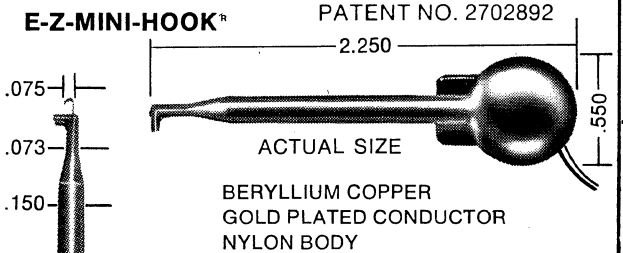


Now, jumper or test your Wire-Wrap* circuits easily and instantly with E-Z-HOOK connectors. Miniature reliable clip with spring action insures secure connection, making miniature hook-ups short-free and efficient. Saves time, cuts cost.

E-Z-HOOK "Hypo-Action" slides vertically onto Wire Wrap pins or hooks on laterally. Features beryllium copper, gold plated conductor with insulated durable Nylon body to point of contact.

E-Z-MINI-HOOK®

PATENT NO. 2702892

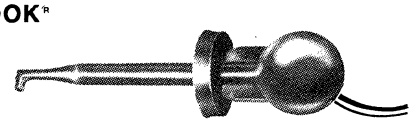


BERYLLIUM COPPER
GOLD PLATED CONDUCTOR
NYLON BODY

RED, BLACK, BLUE, GREEN, ORANGE, YELLOW WHITE, BROWN, VIOLET, AND GRAY

*Register Trade Mark Gardner-Denver Co.

E-Z-MINI-HOOK®



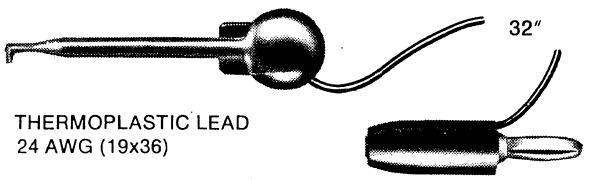
AVAILABLE WITHOUT LEAD

COLORS: All (Specify)

No. X-100 **$ .59** ea **No. X-100W** (illustrated) **$ .64** ea

Finger-ease washers available separately.
Part No. 200 Packed 100 per bag $5.00 ea. bag

E-Z-MINI HOOK® TO STACKING BANANA PLUG

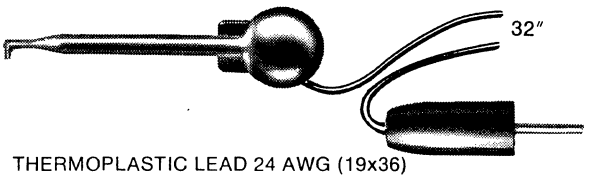


THERMOPLASTIC LEAD
24 AWG (19x36)

COLORS: All (Specify)

No. 201 **$1.09** ea **No. 201W** (with washer) **$1.14** ea

E-Z-MINI-HOOK® TO TIP PLUG (.080)

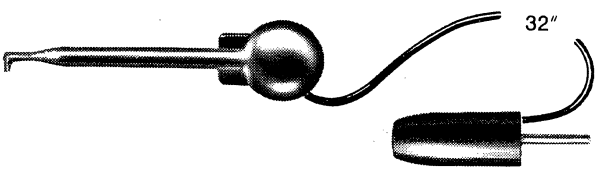


THERMOPLASTIC LEAD 24 AWG (19x36)

COLORS: All (Specify)

No. AX-1 **$ .99** ea **No. AX-1W** (with washer) **$1.04** ea

E-Z-MINI HOOK® TO STACKING TIP PLUG (.080)

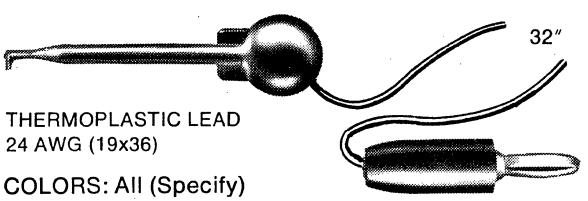


THERMOPLASTIC LEAD 24 AWG (19x36)

COLORS: All (Specify)

No. 202 **$1.09** ea **No. 202W** (with washer) **$1.14** ea

E-Z-MINI-HOOK® TO BANANA PLUG

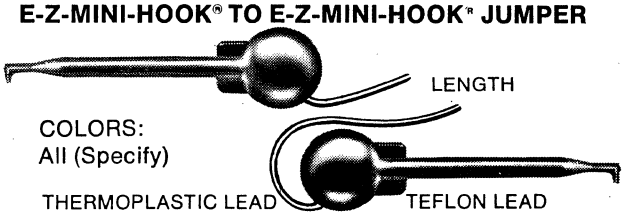


THERMOPLASTIC LEAD
24 AWG (19x36)

COLORS: All (Specify)

No. BX-1 **$ .99** ea **No. BX-1W** (with washer) **$1.04** ea

E-Z-MINI-HOOK® TO E-Z-MINI-HOOK® JUMPER



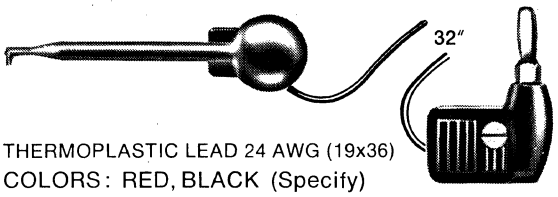
COLORS:
All (Specify)

THERMOPLASTIC LEAD		TEFLON LEAD	
No. / Length	Net ea.	No. / Length	Net ea.
204 — 6	**$1.35**	**304 — 6**	**$1.45**
204 — 12	**1.35**	**304 — 12**	**1.45**
204 — 18	**1.35**	**304 — 18**	**1.45**
204 — 24	**1.35**	**304 — 24**	**1.45**
204 — 36	**1.35**	**304 — 36**	**1.55**
204 — 48	**1.35**	**304 — 48**	**1.65**
204 — 60	**1.35**	**304 — 60**	**1.75**

No. 204 and No. 304 series available with finger-ease washers @ .10 extra. Add W after length (204-6W) when ordering.

E-Z-HOOK TEST PRODUCTS

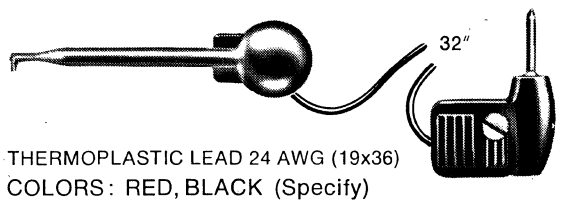
E-Z-MINI-HOOK® TO METER BANANA PLUG



THERMOPLASTIC LEAD 24 AWG (19x36)
COLORS: RED, BLACK (Specify)

No. 205 **$1.19** ea **No. 205W** (with washer) **$1.24** ea

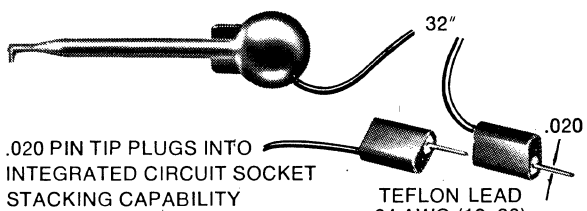
E-Z-MINI-HOOK® TO METER PIN PLUG (.080)



THERMOPLASTIC LEAD 24 AWG (19x36)
COLORS: RED, BLACK (Specify)

No. 206 **$1.19** ea **No. 206W** (with washer) **$1.24** ea

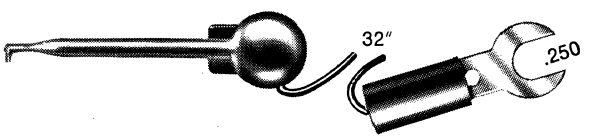
E-Z-MINI-HOOK® TO .020 STACKING PIN



.020 PIN TIP PLUGS INTO INTEGRATED CIRCUIT SOCKET STACKING CAPABILITY
TEFLON LEAD 24 AWG (19x36)
COLORS: All (Specify)

No. 307 **$1.65** ea **No. 307W** (with washer) **$1.70** ea

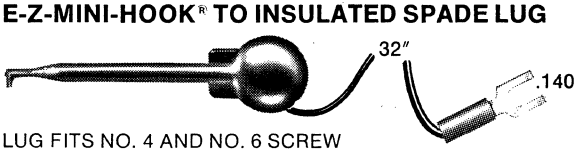
E-Z-MINI-HOOK® TO INSULATED SPADE LUG



LUG FITS STANDARD BINDING POST
COLORS: RED, BLACK (Specify)

No. 208 **$ .89** ea **No. 208W** (with washer) **$ .94** ea

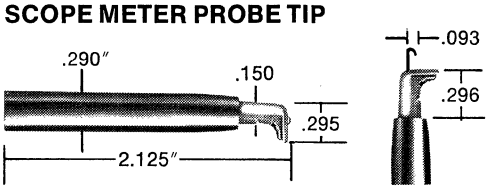
E-Z-MINI-HOOK® TO INSULATED SPADE LUG



LUG FITS NO. 4 AND NO. 6 SCREW
COLORS: RED, BLACK (Specify)

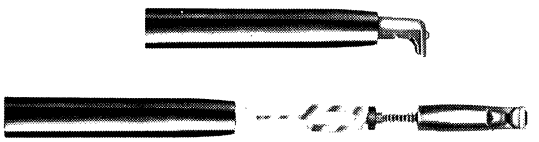
No. 209 **$ .89** ea **No. 209W** (with washer) **$ .94** ea

TIP DIMENSIONS
JUMPER METER CLIP, TEST PROD TIPS AND SCOPE METER PROBE TIP



RED, BLACK, BLUE, GREEN, ORANGE, YELLOW

JUMPER METER CLIPS



Easy slip-on design saves in assembly—safe solder connection with strain relief assures trouble free lead life.
Durable Nylon in colors for identification
Tough stainless conductor

COLORS: Red, Black, Blue, Green, Orange, Yellow

No. 61-1 E-Z-HOOK® CLIP (STANDARD) $ .49 ea.
No. 61-2 E-Z-HOOK® CLIP (GOLD PLATED) .69 ea.

TEST PROD TIP ADAPTERS

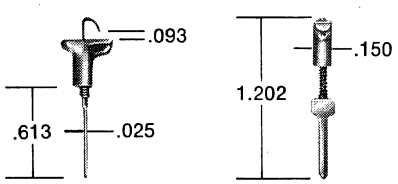
TOUGH STAINLESS CONDUCTOR, DURABLE NYLON INSULATION

Wobble free fit on prod doubles test prod utility
Remote connections made easily—safe from shock

COLORS: Red, Black, Blue, Green, Orange, Yellow

No. 55-0 E-Z-HOOK® TIP (NEEDLE .060) $ .79 ea.
No. 56-1 E-Z-HOOK® TIP (STANDARD .080) .79 ea.
No. 59-4 E-Z-HOOK® TIP (BANANA-STANDARD) .79 ea.

HARNESS BOARD CLIPS

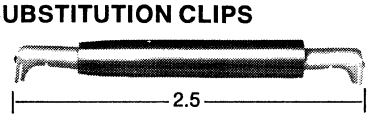


Save up to 30% in board construction time
E-Z-HOOK® "NAIL" CLIP® drives into wood like a nail and pulls out as easily. Smooth, tough stainless E-Z-HOOK® holds firmly against durable nylon—Won't cut, nick or damage wire ends.
Easy finger tip operation speeds wire placing.

COLOR: RED

No. 81-1 E-Z-HOOK® "NAIL" CLIP® $ .25 ea.
No. 81-4 For #14 Wire .25 ea.
No. K8150T (50 Clips, Tool & Instr.) 9.95 ea.
No. T-20 Nail Driving Tool .35 ea.

PART SUBSTITUTION CLIPS



Eliminate guessing—quick, easy temporary connections in seconds—No lead twisting or solder tacking to damage parts or wiring.

SPEEDS TROUBLE SHOOTING—
SAVES TIME AND MONEY

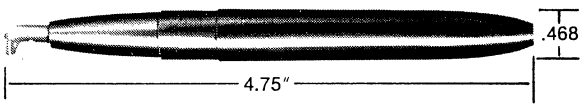
COLORS: Red, Black, Blue, Green, Orange, Yellow

No. 71-1 **$ .69** ea.

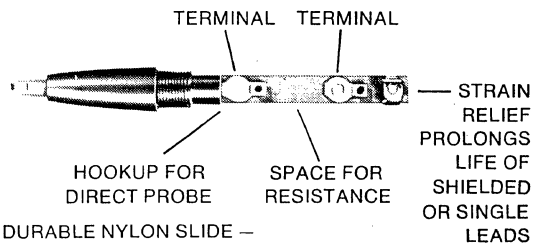
E-Z-HOOK TEST PRODUCTS

SCOPE METER PROBE

CUSTOM Probes assembled in minutes
Featherweight construction ⅓ oz.



Screw on cover for ready access and repair
Special terminals speed assembly

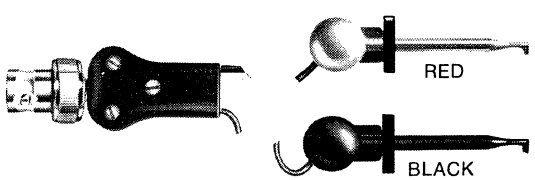


DURABLE NYLON SLIDE —
TENITE BODY —
TOUGH STAINLESS HOOK

RED, BLACK, BLUE, GREEN, ORANGE AND SILVER

No. 54-1 E-Z-HOOK™ CUSTOM PROBE $ .99 ea.
No. 54-2 E-Z-HOOK™ CUSTOM PROBE (GOLD PLATED) 1.19 ea.

BNC FEMALE TO E-Z-MINI-HOOKS®

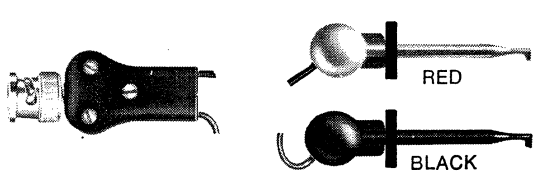


Connector: BNC Female, Bright Finish
Wire: 20 AWG (105 x 40) Thermoplastic—Flexible
Clips: E-Z-MINI-HOOK®, Gold plated, Beryllium Copper Conductor, Nylon Body

Overall Length: 7"

No. 1001 $3.95 ea. *

BNC MALE TO E-Z-MINI-HOOKS®

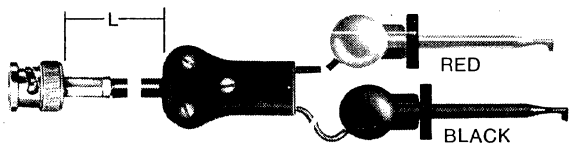


Connector: BNC Plug, Bright Finish
Wire: 20 AWG (105 x 40) Thermoplastic—Flexible
Clips: E-Z-MINI-HOOK®, Gold plated, Beryllium Copper Conductor, Nylon Body

Overall Length: 7"

No. 1010 $4.95 ea.*

BNC MALE TO E-Z-MINI-HOOK®

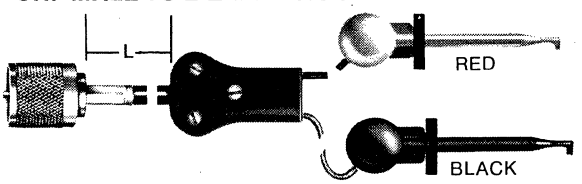


Connector: BNC Plug, Bright Finish
Cable: RG58C/U or MIC
Clips: E-Z-MINI-HOOKS®, Gold plated, Beryllium Copper Conductor, Nylon Body

NO. / LENGTH	NO. / LENGTH	NO. / LENGTH	
1020 — 18	**1020 — 30**	**1020 — 48**	
1020 — 24	**1020 — 36**	**1020 — 60**	**$6.25** ea. *

Note: For MIC Cable, use prefix 2020

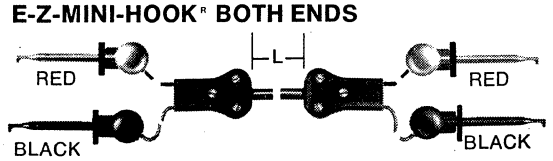
UHF MALE TO E-Z-MINI-HOOK®



Connector: UHF Plug, Bright Finish
Cable: RG58C/U
Clips: E-Z-MINI-HOOKS®, Gold plated, Beryllium Copper Conductor, Nylon Body

NO. / LENGTH	NO. / LENGTH	NO. / LENGTH	
1030 — 18	**1030 — 30**	**1030 — 48**	
1030 — 24	**1030 — 36**	**1030 — 60**	**$6.25** ea *

E-Z-MINI-HOOK® BOTH ENDS

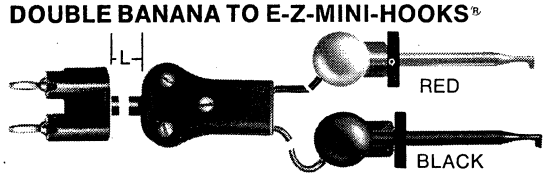


Clips: E-Z-MINI-HOOKS® both ends, Gold plated, Beryllium Copper Conductors, Nylon Bodies.
Cable: RG58C/U, MIC or Twisted Pair

NO. / LENGTH	NO. / LENGTH	NO. / LENGTH	
1040 — 24	**1040 — 36**	**1040 — 60**	
1040 — 30	**1040 — 48**		**$6.25** ea *

Note: For MIC Cable, use prefix 2040,
for Twisted Pair, use prefix 3040

DOUBLE BANANA TO E-Z-MINI-HOOKS®



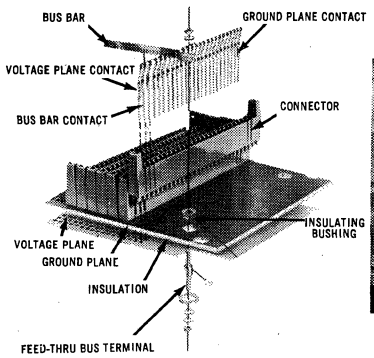
Connector: Double Banana Plug
Cable: RG58C/U, MIC or Twisted Pair
Clips: E-Z-MINI-HOOKS®, Gold plated, Beryllium Copper Conductor, Nylon Body

NO. / LENGTH	NO. / LENGTH	NO. / LENGTH	
1050 — 18	**1050 — 30**	**1050 — 48**	
1050 — 24	**1050 — 36**	**1050 — 60**	**$6.25** ea *

Note: For MIC Cable, use prefix 2050,
for Twisted Pair, use prefix 3050

* Prices include the finger-ease washers.

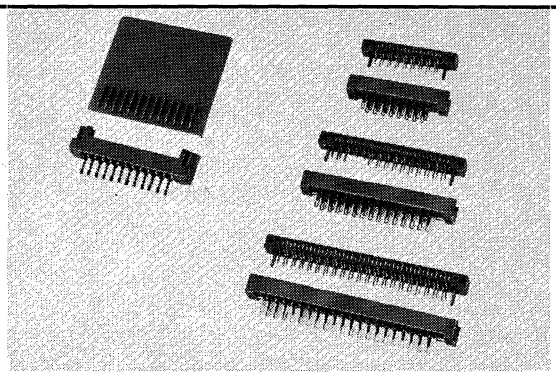
Total Connector Capability from the Innovator:



METAL PLATE BACK PANEL CONNECTORS AND WIRING SERVICE

The metal plate connecting system is the modern day method for mounting and interconnecting electronic components. Most dramatically used in the computer equipment field, this packaging system provides a high density system compatible with automatic wiring methods. The metal plate system is modular in concept and Elco has a wide assortment of standard parts we'll assemble and wire to your particular needs.

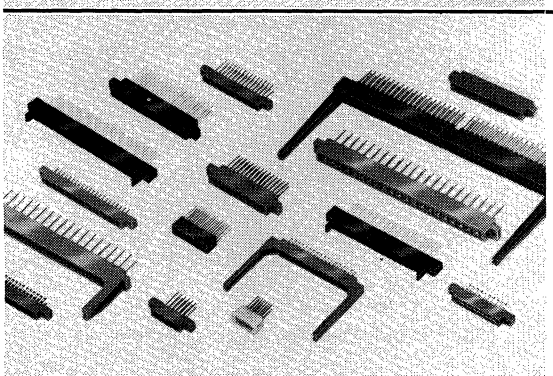
Request Catalogue MPR



METAL-TO-METAL PRINTED CIRCUIT CONNECTORS MINIATURE AND SUBMINIATURE

Three specifications (MIL-E-5400, MIL-E-8189, and MIL-T-21200) require two-piece metal-to-metal printed circuit connectors in airborne equipment. VARICON™ connectors are metal-to-metal and provide a multitude of options: contact spacings of .050", .075", .100", .156" and .200"; terminals for wire wrap, crimp, solder, and taper tab; connector sizes from 2 to 152 contacts.

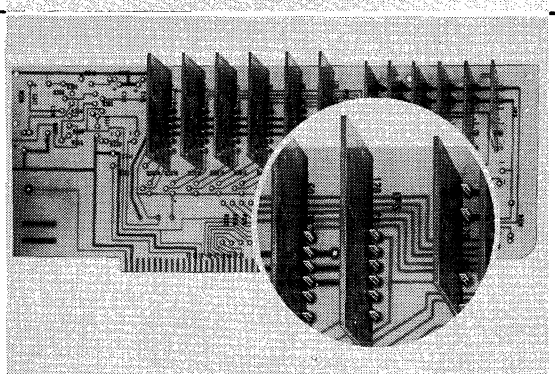
Request Catalogue PCR



CARD-EDGE PRINTED CIRCUIT CONNECTORS

Card-edge connectors mate directly with the printed circuit card, and are available in a wide range of sizes (4 to 100 contacts), configurations, and contact spacings (.100", .125", .150", .156", and .200"). Optional means for terminating include wire wrap, solder, and taper tab. Other options include: connectors with or without card guides; various mounting provisions — threaded inserts, floating eyelets, force fit hubs, and standard mounting holes.

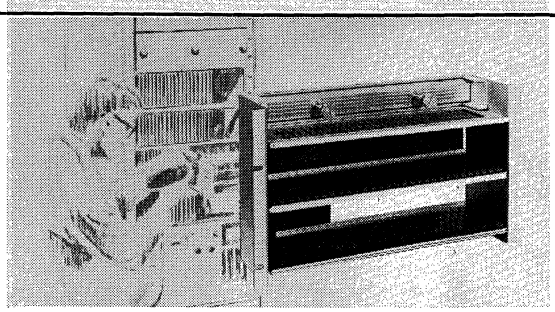
Request Catalogue CER



BOARD-TO-BOARD PRINTED CIRCUIT CONNECTORS

Make your connections with a total system (the Elco system). Whether your p.c. boards are perpendicular, parallel, or even tandem to each other, we have the right type, connector size, and contact spacing (.100", .125", .150", .156", and .200"). Each and every type uses, exclusively, the VARICON™ contact, a two-piece (metal-to-metal) contact complying fully with the latest revision of MIL-E-5400, MIL-E-8189, and MIL-T-21200.

Request Catalogue BBR



PRINTED CIRCUIT CARD ENCLOSURES

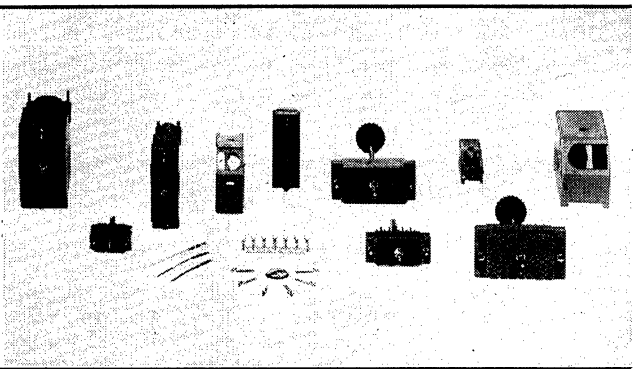
The Elco VARIPAK® II enclosure is a highly versatile device for packaging printed circuit cards and connectors. Made of rugged aluminum, the Varipak can be used in storage cabinets, pull-out drawers, and even as the framework for small instrument panels. The Varipak's construction allows air flow throughout the unit, aiding in longer component life. There are 32 standard sizes available with basic parts stocked at all authorized Elco distributors.

Request Catalogue VER

Elco Corporation, Willow Grove, Pa. 19090 • **(215) 659-7000; TWX 510-665-5573**
Elco Pacific, 2200 Park Place, El Segundo, Calif. 90245 • **(213) 675-3311; TWX 910-325-6602**
Elco Huntingdon Corporation, Huntingdon Industrial Park, Huntingdon, Pa. 16652 • **(814) 643-0700; TWX 510-691-3117**

Operations in USA, Australia, Belgium, Canada, Denmark, England, France, Germany, Israel, and Japan. Sales offices throughout the world.

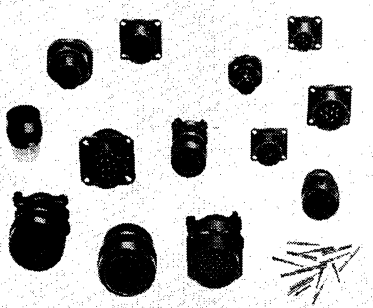
RECTANGULAR RACK AND PANEL CONNECTORS



Elco's full line of rack-and-panel and I/O (input/output) connectors come in a wide choice of styles. With standard, miniature, and even modular styles you can have from 2 up to 140 VARICON™ contacts, or practically any size in between. We've just created a family of high-density connectors (.100″ and .125″ spacing) engineered for high reliability (including military) as well as controlled-environment applications.

Request Catalogue RPR

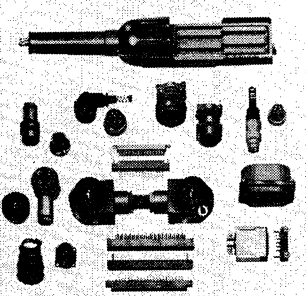
MIL-C-26482 MIL-C-26500 CIRCULAR CONNECTORS



Elco supplies both MIL-C-26482 (Navy) and MIL-C-26500 (USAF) circular connectors. MIL-C-26482 environment-resisting, quick-disconnect connectors are equipped with solder or crimp contacts; available in a choice of nine shell sizes with 3 to 61 contacts. MIL-C-26500 connectors are designed to be essentially voidless in order to withstand environmental extremes encountered by missiles and space vehicles. Equipped with crimp contacts, the connectors are available in nine shell sizes with 2 to 61 contacts.

Request Catalogue CCR

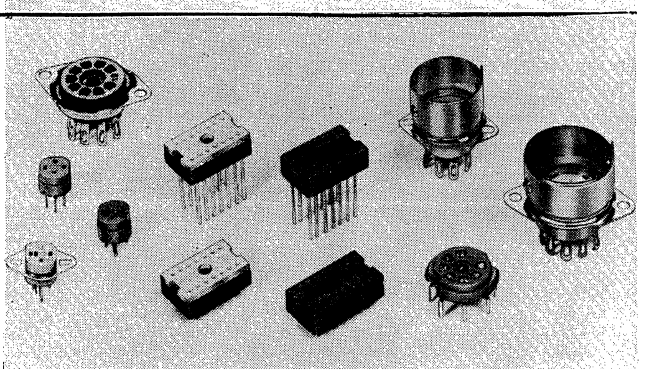
MILITARY SPECIFICATION CONNECTORS



Elco manufactures a full line of connectors designed to and meeting strict military system specifications. Connector types are: MIL-C-21097 and MIL-C-55302 printed circuit connectors; MIL-C-12520, MIL-C-26482, MIL-C-26500, MIL-C-55181, MIL-C-55243, and U-344/345 power connectors; MIL-C-10544, MIL-C-55074, and MIL-C-55116 communications connectors; MIL-C-23216 and MIL-C-26636 contacts.

Request Catalogue MSR

DIP TRANSISTOR AND TUBE SOCKETS



DIP, transistor, and tube sockets; all manufactured by Elco and all exhibiting the high quality expected of an Elco product. State-of-the-art design, stringent raw material control, and advanced manufacturing techniques all contribute to the exceptional performance of Elco high-reliability sockets. See our catalogue for 14- and 16-pin DIP sockets, 7- and 9-pin tube sockets, transistor sockets, relay sockets, and crystal sockets.

Request Catalogue CSR

CONNECTOR INSTALLATION TOOLS

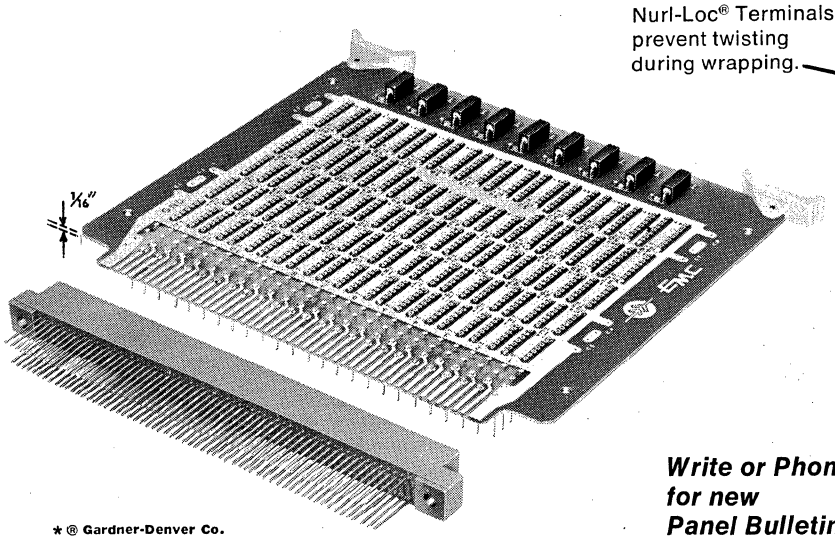
Elco provides all of the necessary equipment to install their connectors. Our automatic and manual contact staking tools firmly affix the contact to the printed circuit card, producing exceptional electrical as well as mechanical contact. Our automatic and manual crimping tools join contact to wire by mechanically deforming the contact around both the conductor and the insulation of the wire. All installation tools are engineered to provide long, efficient service.

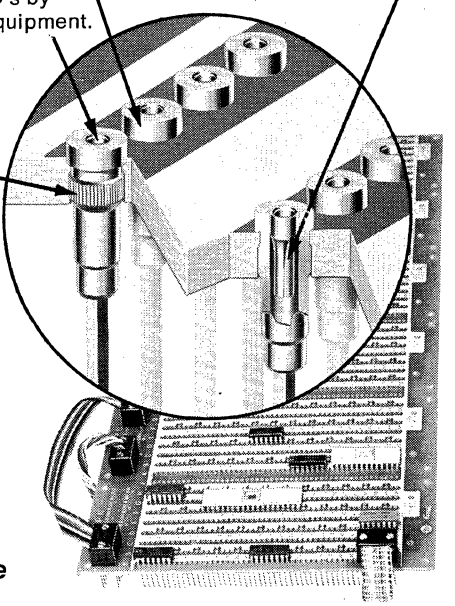
Request Catalogue ITR

EMC Standard/Custom Wire Wrap* Panels

WITH *Nurl-Loc*® LOW-PROFILE TERMINALS

EMC's new Wire-Wrap* packaging panels utilize high-density, non-warping glass epoxy board and low-profile Nurl-Loc terminals (patent pending). The board below is available in a space-saving 1/16" thickness, as well as 3/32" and 1/8" . . . in a standard or custom configuration. Other choices include 30 to 352 positions, edgeboard finger patterns, power and ground planes, in many combinations. Below right is the new EMC Universal Wire-Wrap* panel, for all standard IC's with 14 to 40 leads . . . with 9 to 54 parallel rows (in convenient groups) on .300" centers . . . all 100-grid spacing.

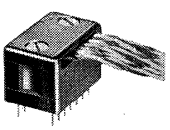


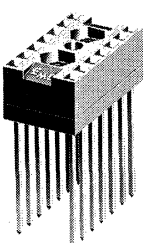


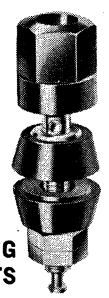
* ® Gardner-Denver Co.

Write or Phone for new Panel Bulletins

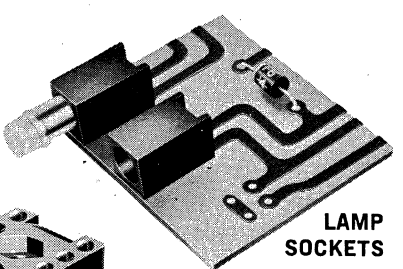
SOCKET EXTRACTOR TOOL

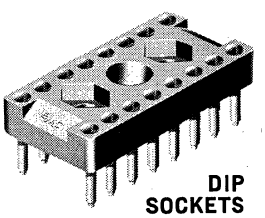

INTERFACING PLUGS

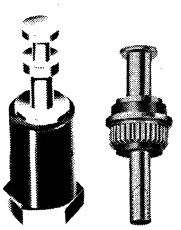

WIRE-WRAP* SOCKETS

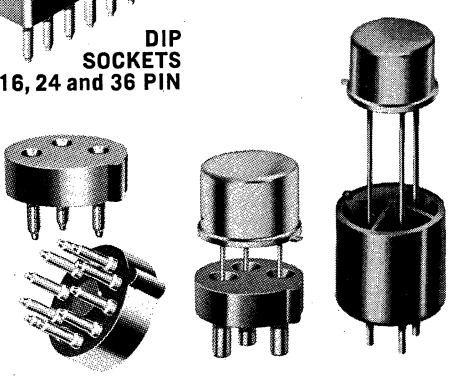

BINDING POSTS

TEST JACKS


LAMP SOCKETS


DIP SOCKETS 14, 16, 24 and 36 PIN


STANDOFF FEED-THRU TERMINALS


TRANSISTOR AND IC SOCKETS for TO-5 and TO-18

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Includes complete selection of Standoffs, Feed-Thrus, Test Jacks, Sockets and Binding Posts . . . with complete specifications.

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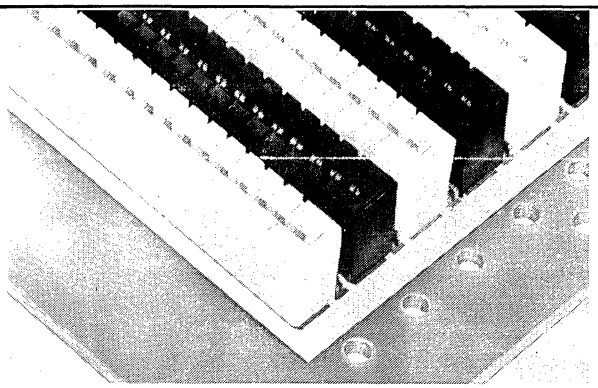
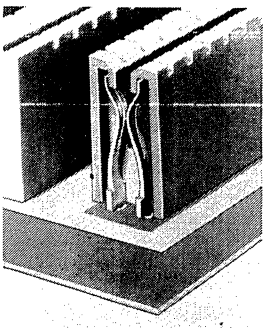




ELFAB

EDGE-PAC™ CONNECTOR BACK-PANELS

EDGE-PAC back-panels are printed circuit edge card connectors mounted on 1/8 inch thick epoxy glass board back-panels. This provides a rigid assembly which is designed for the interconnections to be made economically by automatic point-to-point wiring. The connectors accept 1/16 inch thick PC boards and are designed to provide any number of contacts without additional tooling. In short, we can provide any number of contacts without the expense of specials.

The use of glass epoxy G-10 material as the back-panel allows wiring to be etched on the panel. Voltage and ground planes or additional interconnecting wires are easily provided according to customer specifications.

Unique design of connector provides completely closed entry to protect the preloaded contacts from damage. Standard and custom sizes available with gold plated contacts for corrosion protection.

EDGE-PAC™ SPECIFICATIONS

Contact Material:	Phosphor bronze per QQB750 Composition A
Contact Plating:	10 to 20 microinches of gold over 30 to 150 microinches of nickel (standard)
Contact Resistance:	6 milliohms maximum
Current Rating:	5 amperes maximum
Withdrawal Force:	2 to 8 ounces per contact pair
Insulator Material:	Glass filled Polycarbonate (flame-retardant)
Insulation Resistance:	5,000 Megohms minimum
P. C. Card Size:	.062 (±.007) thick
Contact Retention:	8 pounds minimum
Operating Temperature:	−65°C to 125°C

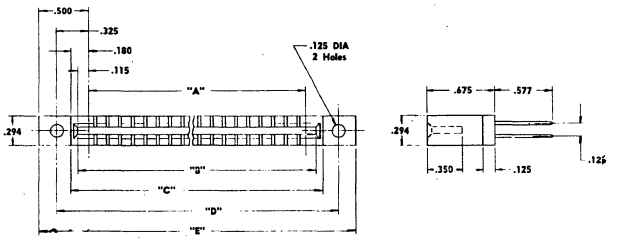
EDGE-PAC™ PRINTED CIRCUIT CONNECTORS

The EDGE-PAC connectors used on the EDGE-PAC back-panels can also be provided as discrete edge card connectors for individual 1/16 inch PC boards. The connectors are provided with .025 inch square tails for automatic point-to-point wiring. All connectors have dual-readout, preloaded, bifurcated contacts with a closed entry to protect the contacts from damage.

The design permits supplying any number of dual readout contacts in the connector that the designer needs without special tooling expense. In effect, the designer can select the number of contacts he actually needs rather than being bound by a connector manufacturer's arbitrary standards.

Contacts are gold plated over nickel plating on phosphor bronze for corrosion resistance. A polarization key can be provided without the loss of any contacts.

EDGE-PAC™ CONNECTOR DIMENSIONS



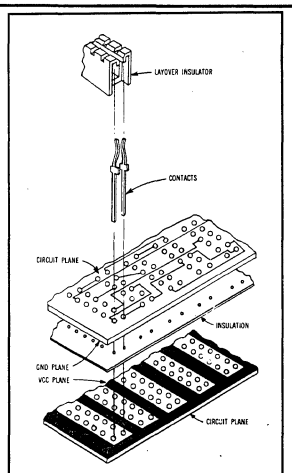
A = Number of Contacts Minus One Times .125
B = A + .230
C = A + .360
D = A + .650
E = A +1.000

ELFAB MULTI-PAC™ PROCESS

MULTI-PAC is a process designed to produce a multi-layer back panel at a very low cost. It will permit a drastic reduction or possibly complete elimination of automatic point-to-point wiring, at a great cost saving. It can be made a part of either the EDGE-PAC back-panels or the DIP-PAC socket boards.

Discrete printed circuit boards are used. Two or more are stacked and the DIP-PAC or EDGE-PAC contacts are pressed into plated-thru holes in the boards. The contacts serve two functions: to mechanically fasten the boards together and to make the electrical connections between the printed wire layers. Great savings are realized because no problems are encountered with adhesive bonding and circuit hole registration. Manufacturing is as simple as making a conventional two sided board.

The greatest savings are realized by the reduction or eliminating of the need for wrapping wire. Savings of as much as 80% of the wiring costs can be achieved with the MULTI-PAC process.



DIP-PAC™ DUAL-IN-LINE I. C. PACKAGING BOARDS

The ELFAB DIP-PAC System offers the ultimate in dual-in-line I.C. packaging density, flexibility, and reliability. The I. C. is inserted upside down, with leads pointing up. This overcomes the difficulties usually associated with standard I. C. sockets, where the lead may be bent and miss going in the socket causing a misconnection which is very difficult and time-consuming to locate. With DIP-PAC, production time and trouble-shooting are reduced to the bare minimum.

Better contact with the I. C. lead is made than with the standard socket. Mixtures of 14, 16, 24, 36, and 40 lead I. C.'s can be inserted in the standard boards. Custom lay-out of boards is easily accomplished without expensive tooling. Ground and voltage planes are provided as standard. Actually an I. C. with any number of leads can be easily accommodated without modification to the standard boards.

I. C.'s are spaced on .400 inch centers allowing a 25% more dense packaging than conventional sockets. Wiring tails are accurately positioned to permit automatic point-to-point wiring. Standard board sizes are shown in table below.

No. of Sockets	14 Lead Part Number	16 Lead Part Number	Length Inches	Width Inches	No. of 1/0 Connections
30	1014-DPI-30	1016-DPI-30	2.675	6.875	42
60	1014-DPI-60	1016-DPI-60	5.375	6.875	84
90	1014-DPI-90	1016-DPI-90	8.075	6.875	126
120	1014-DPI-120	1016-DPI-120	10.775	6.875	168
150	1014-DPI-150	1016-DPI-150	13.475	6.875	210
180	1014-DPI-180	1016-DPI-180	16.175	6.875	252

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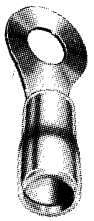
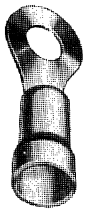
WIRING DEVICES FOR EVERY NEED

TERMINALS & SPLICES

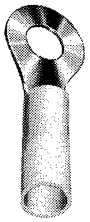
- Wire Ranges: #26 thru 1000 MCM, Loose Piece. Mounted on Tape or in Continuous Strips in #26 thru 10 sizes
- Tongue Types: Ring, Rectangular, Spade, Flanged Spade, Hook and Slotted Ring
- Approvals: Terminals are Covered by UL., CSA and Military Specifications, where Applicable



AVIKRIMP® — Tin-plated brass sleeve strengthens barrel. Color coded Nylon insulating sleeve adds more wire protection. Operating temperatures: continuous duty— —40°F to 250°F, intermittent duty — to 350°F. WIRE RANGE: #26-10

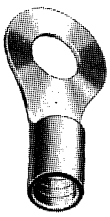


INSULKRIMP® — PVC insulation sleeve permanently attached to butted seam barrel (#22-10) or brazed seam barrel (#8-2). Operating temperatures: continuous duty— —40°F to 167°F, intermittent — to 300°F. WIRE RANGE: #22-2

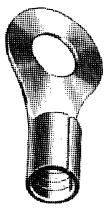


NYLAKRIMP™ — Ideal for larger wire applications involving temperature extremes and vibration. Rigid, overhanging Nylon insulating sleeve covers silver-brazed barrel. Withstands continuous duty temperatures from —60°F to 250°F. WIRE RANGE: #8-4/0

VIBRAKRIMP® — Made for excessive vibration applications. Seamless tin-plated brass sleeve covers basic KRIMPTITE barrel. Its overhang prevents wire flex. Single crimp terminates wire. WIRE RANGE: #22-10



VERSAKRIMP™ — Has silver brazed barrel. Seam will not open under stress or wire pull. Crimps using many types of tooling. Ideal for solid or stranded wires. WIRE RANGE: #22-4/0 Seamless barrel in Wire Sizes 250 MCM to 1000 MCM.



KRIMPTITE® — One piece, non-insulated design. Ideal general purpose terminal for uses where special features are unnecessary. Full length barrel makes crimping easy. WIRE RANGE: #26-10

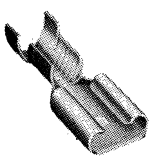
BUTT SPLICE — Accepts stripped wires from each end. Wires "butt" in center. A crimp at each end provides secure connection. Available in insulated and non-insulated styles. WIRE RANGE: #22-4/0

PARALLEL SPLICE — Stripped wires insert from each end and lie side - by - side. Single crimp in center forms a secure connection. Available in insulated and non-insulated styles. WIRE RANGE: #22-4/0

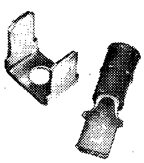
SEND FOR CATALOG OEM-6

QUICK CONNECTS

- Female Receptacles and Male Tabs



PDQ™ quick connect receptacle terminals handle 26-12 AWG wires and .110 x .020, .110 x .032, .187 x .020 and .250 x .032 inch male tabs. Insulated or non-insulated barrels. Available loose piece, on tape or continuous strip. Meet N.E.M.A. and U.L. standards.

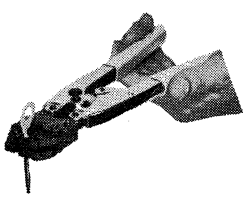


Male tab terminals and single or twin tab lugs fit PDQ receptacle terminals perfectly. Lugs have standard 180°, 90°, 45° angles. Custom angles available. Single, dual or custom mounting holes. Tabs are .250 thru .110 inches wide.

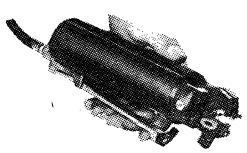
SEND FOR CATALOG PDQ-1

CRIMPING TOOLS

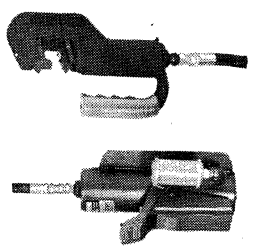
- Hand Operated and Semi-automatic . . . Matched-to-terminal Designs . . Free 30-day Evaluation Trials



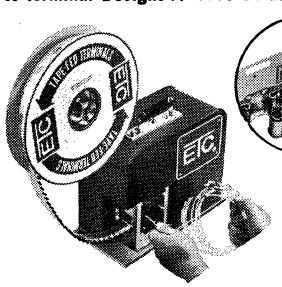
RATCHET HAND TOOLS — Special ratchet mechanism won't allow terminal to be released until fully crimped. Handles terminals and splices from #26 thru #10 AWG.

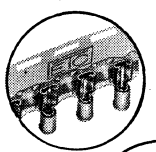


PORTABLE AIR TOOLS — 27 oz. AT-200 hand tool uses standard air pressure to crimp #26 thru #6 AWG terminals and splices. Bench adapter accessories available.

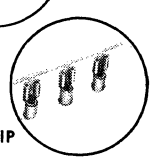


AIR-HYDRAULIC TOOL — Compact PUTT-PUMP™ operates on standard air pressure to crimp #8 thru #1/0 wires. ELECTRIC-HYDRAULIC RAPID-PUMP™ crimps #8 thru #4/0 wires.





TAPE



STRIP

AUTOMATIC FEED TAPE AND STRIP PRESSES — Terminals are loaded into crimping dies automatically. Cycled for up to 3,600 terminations per hour. Crimps #26 thru #10 AWG sizes. Air and electrically operated models.

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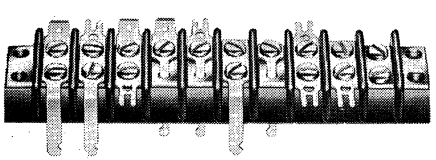
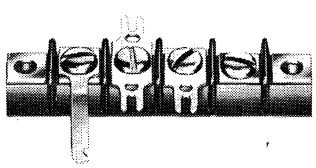
TERMINAL BLOCKS

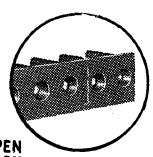
- Closed Back . . . Open Back . . . Military Blocks



CLOSED BACK

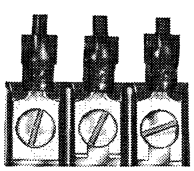


TWIN SCREW — Choose closed back design with molded-in plates and protected mounting holes. Or open back design. Rated 5 to 30 amps. Complete selection of lugs and hardware.



OPEN BACK

SINGLE SCREW — These blocks weigh less and occupy less space. Same design features as their twin screw counterparts. 5 to 30 amp. rating. Full selection of lugs and hardware.



TERMINAL BLOCK TERMINALS — Match-fitting to blocks assures reliability in sizes 26 thru 10 AWG. Spade, Flanged Spade and Rectangular tongues are 3/16", 13/64", 21/64" or 27/64" wide.

SEND FOR CATALOG TB-2

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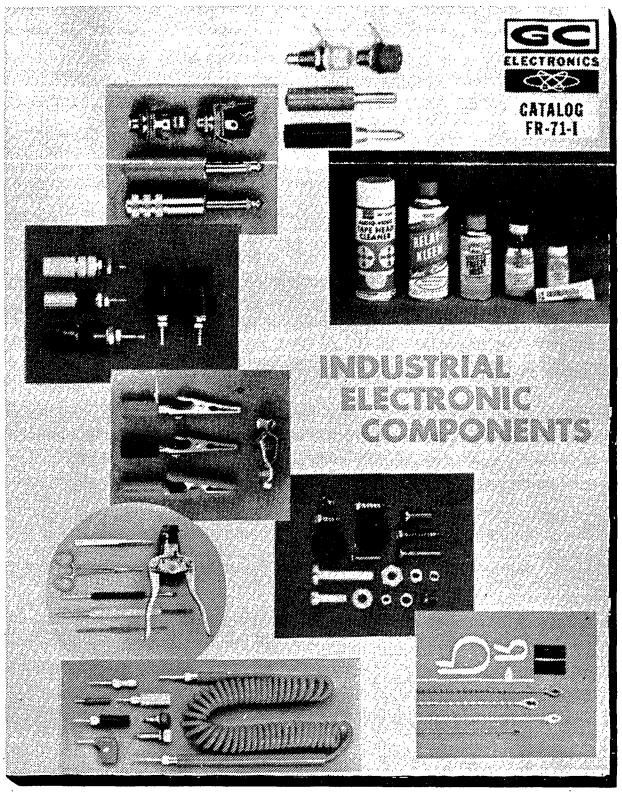
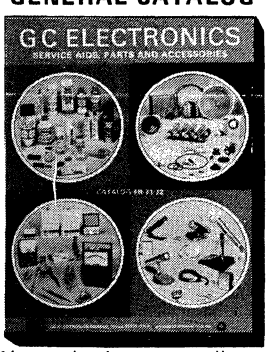


ALSO FROM GC

GENERAL CATALOG



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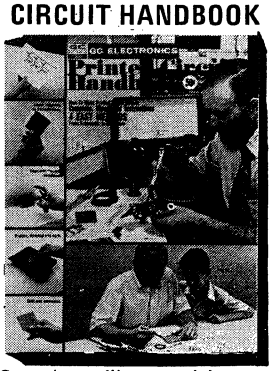
PRINTED CIRCUIT HANDBOOK



Complete, illustrated instructions of how to make printed circuit boards. Show four easy methods...from schematic to assembly; including the new "B" neg. drafting system.

...we wrote the book on it.

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GC ELECTROCRAFT COMPONENTS ARE QUALITY PRODUCTS — designed, engineered and manufactured to meet the most exacting standards. GC Electronics' over 40 years of experience in the electronics industry is your assurance of satisfaction.

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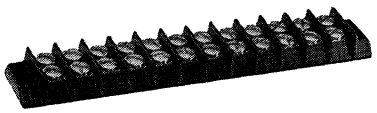
TERMINAL BOARDS

CR151 TYPE D ONE-PIECE BOARDS

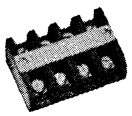


Eight terminal types.
Three board width — 7/8 in., 1 1/8 in., 1 5/16 in.

Boards rated 15, 20, and 30 amperes with breakdown voltages of 3600, 4800, and 7500 volts, respectively.
15-amp boards available in increments of 1 through 36 points; 20-amp boards in 1 through 30 points; 30-amp boards in 1-24 points.
Terminals on 15-amp boards accept through size #14 wire; 20-amp boards through size #12 wire; 30-amp boards through size #10 wire.
Choice of marked or unmarked boards or six types of marking strips.

Write for Bulletin GEA-7317

CR151 TYPE B ONE-PIECE BOARDS



Rated 30-amperes, 600-volts for control circuits.
Available with 4-, 6-, and 12-points.
Screw, captive saddle-clamp, or screw terminals on one side, clamp terminals on the other.
Terminals accept wires through size #10.
Write-on marking strips, 15/32-in. wide, provided with boards.

CR2960 ONE-PIECE BOARDS

Control circuit boards rated 20-amperes at 600-volts; available with 4- and 6-points.

Power circuit boards rated 50-, 100-, and 150-amperes at 600-volts; available with 3 points per board.

All types have screw terminals.

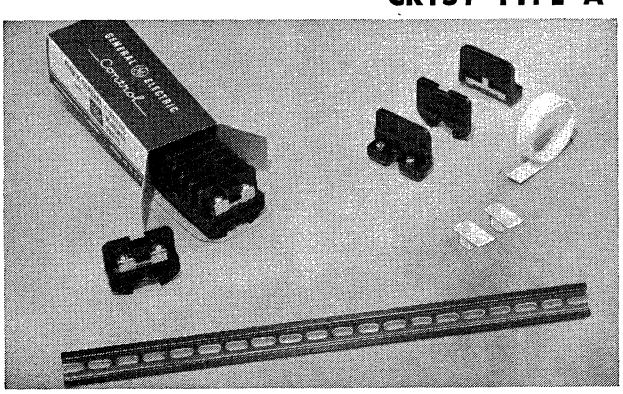
CR151 TYPE C SECTIONAL BOARDS

Can be mounted directly on panel (top) or in a channel (bottom) which is then mounted on panel.

Small CR151 Type C terminal boards provide two-way mounting and assembly flexibility. When the board has been assembled, you can mount it directly on a panel or you can assemble blocks in molded channels on applications where maximum flexibility is required. Blocks can be added after initial installation to meet increased requirements in control circuits.

These terminal boards can be ordered in three ways: 1) as individual blocks, 2) as factory-assembled blocks without channel, 3) as factory-assembled blocks in mounting channel based on specification.
Complete line of components for customer assembly.
Choice of three 25-amp terminal types and two 50-amp terminal types.
Both boards meet IEEE switchgear standards for 750 volts.
Screw terminals accept 5/16 in. ring or spade connectors, #22 - #12 wire.
25-amp box terminals accept #18 - #8 wire; 50-amp box terminals accept #10 - #4 wire.
25-amp box clamp terminals accept #22 - #10 wire; 50-amp clamp box terminals #14 - #4 wire.
Interlocking construction . . . blocks slide together.
25-amp blocks are 1 in. high, 1 1/8 in. wide; 50-amp blocks are 1 7/16 in. high, 1 1/2 in. wide.
Easy addition of blocks provides expansion flexibility.
Panel or channel mounting.
Factory-assembled forms for direct mounting in 2 through 12 point sections for 25-amp forms and 2 through 6 for 50-amp forms; for channel mounting, 2 through 99 points.
Choice of painted surface or separate marking strip.

CR151 TYPE A SECTIONAL BOARDS

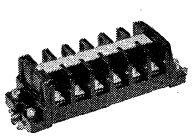


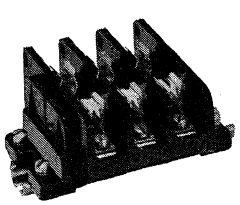
Components for customer assembly

From three basic components, you can build custom boards to meet most terminal board requirements:
- Mounting track — in lengths from 3 1/2 to 48 inches.
- Terminal blocks — ten types are available.
- Mounting assembly kit — contains two end blocks, one standard size barrier, two nylon guide inserts, and one 16-inch marking strip.

Additional blocks or blocks with different terminals can be added to existing boards.
Ten types of terminal blocks available.
Blocks rated 25-, 50-, 125-amperes.
30-amp fuse blocks, 15-amp isolating switch blocks offered.
25-amp forms accept #16 through #10 wire; 50-amp forms accept #14 through #4 wire; 125-amp forms accept #14 through #0 wire.
Adaptor kit available for installing overload relays.
Fanning strip accessory holds wires for fast, easy connection.
Marking strip can be marked with pencil or ink; can be cut to any length required.

Factory-assembled boards





74 standard factory-assembled boards with two through 36 points are available to meet most applications. All terminals on any one board are of the same type, and all boards are complete with marking strip ready for panel mounting.

For complete information contact your nearby GE Sales Office, or write to General Electric Co., Section 998-80. Schenectady, N. Y. 12305.

GENERAL ELECTRIC

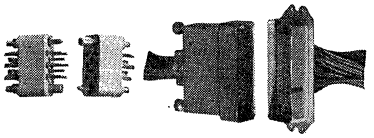
GORN CONNECTOR DIVISION

POSITRONIC INDUSTRIES Inc.

1906 S. Stewart • Springfield, Mo. 65804 417 883-3434

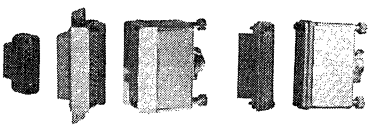
LOW COST, yet TOP QUALITY standard connectors to Industrial and Military specifications, now shipped in 10 DAYS or LESS. Application of our COMPLETE CAPABILITY CONCEPT also insures quick delivery of special design connectors. From drawing board to finished connector, all engineering and manufacturing operations performed on our equipment, within our three plant locations.

RECTANGULAR, RACK AND PANEL CONNECTORS



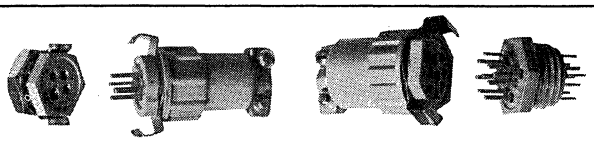
GM Series and XGM Series, Miniature Rectangular

Number of Contacts. 7, 8, 9, 14, 18, 20, 21, 26, 34, 41, 50.
Contacts. Rated 7.5 amps, copper alloy, gold plated.
Terminations. Solder cup accepts 20 AWG wire.
Insulator. Glass filled DAP, SDG-F.
Polarization. Guides or rotating threadlocks as desired.
Hoods & Shells. Available all size connectors. Hoods have both top and side cable opening.
Underwriters' Laboratory Approved.



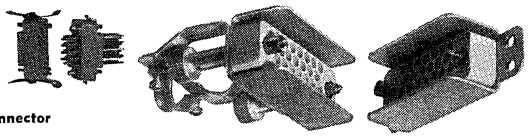
GMCT Series, Miniature, Rectangular Removable Contact

Number of Contacts. 14, 18, 20, 26, 34, 66, 75, 104.
Removable Contacts. Rated 13 amps and 7.5 amps, copper alloy, gold plated.
Contact Terminations. Solder crimp and wire wrap, accepts 14 to 30 AWG wire.
Insulator. Glass filled DAP, SDG-F.
Polarization. Guides or rotating threadlocks as desired.
Hoods & Shells. Available all size connectors, hoods have both top and side cable opening.
Underwriters' Laboratory Approved.



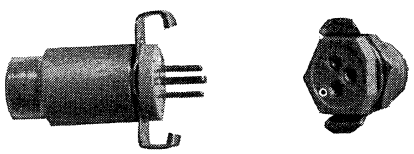
GH Series, Miniature Hexagonal

Number of Contacts. 4, 5, 7, 9, 10
Contacts. Rated 7.5 amps, copper alloy, gold plated.
Terminations. Solder cup accepts 20 AWG wire, dip solder. .025 dia. for PC board mounting.
Insulator. Glass filled DAP, SDG-F.
Polarization. Body design permits proper engagement only.
Hoods. Plastic and aluminum, with and without strain relief.
Accessories. Vibration locks, mounting nuts, and washers.



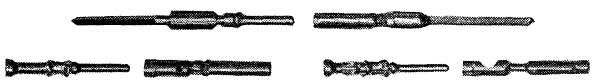
GCT Series, Economy Removable Contact Connector

Number of Contacts. 14, 20, 26, 34, 50, 75, 104.
Removable Contacts. Rated 13 amps and 7.5 amps, copper alloy, gold plated.
Contact Terminations. Solder crimp and wire wrap, accepts 14 through 30 AWG wire.
Insulator. Glass filled Phenolic, flame retardant.
Polarization. Guides and rotating threadlocks as desired.
Shells. Plug shells and receptacle shell bracket for all sizes.
Strain Relief. Open style strain relief for all sizes.



MGH Series, Subminiature Hexagonal

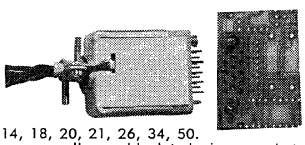
Body. 5/16 hexagonal glass DAP, SDG-F. Mated pair including hood, under one inch in length.
Contacts. Three only, gold plated copper alloy, solder cup accepts up to 22 AWG wire, 5 amps current rating.
Polarization. Oversized pin allows proper engagement only.
Hoods. Aluminum hood may be used on either plug or receptacle.
Accessories. Vibration locks, and mounting nuts.



Contacts, Removable Solder, Crimp, Wire Wrap

Removable contacts are for use with GMCT and GCT series connector bodies. Contacts are machined copper alloy, gold plate over copper flash. Crimp and solder styles are sized to accept from 14 to 30 AWG wire. Wire wrap terminations are .045 and .025 square. Crimp and solder styles are available in both. .062 and .040 pin diameters. Wire Wrap only .062 dia.
Contacts may be purchased on reels of 2,000 for automatic installation. Contact installation and crimping tools available from stock.

PRINTED CIRCUIT CONNECTORS

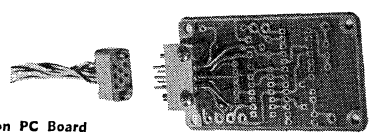


GM Series, Perpendicularly Mounted on PC Board

Number of Contacts. 7, 8, 9, 14, 18, 20, 21, 26, 34, 50.
Contacts. Rated 5 amps max., copper alloy, gold plated pin or socket type.
Termination. Dip solder .025 dia., 4/32, 5/32, and 6/32 long.
Insulator. Glass filled DAP, SDG-F.
Guides and Threadlocks. Used for polarization and mechanical mounting of connector to PC board.
Hoods. Available for all sizes of mating cable connector.
Mating Connector. Select from GM or GCT series.
Underwriters' Laboratory Approved.

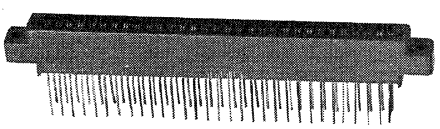
PCSD Series, Double Row, Card Receptacle .156 Centers, Solder Type

Number of Contacts. 15/30, 18/36, 22/44.
PC Board Thickness. .054 through .071.
Contacts. Bellows, gold plated phosphor bronze, 5 amps rating.
Insulator. Glass filled DAP, SDG-F.
Polarization. Between contacts.
Mounting. Clearance hole, bushing, or threaded inserts.



GMPL Series, Parallelly Mounted on PC Board

Number of Contacts. 8, 10, 16, 19, 37.
Contacts. Rated 5 amps max., copper alloy, gold plated, pin type.
Termination. Dip solder .040 and .025 dia.
Insulator. Glass filled, DAP, SDG-F.
Guides and Threadlocks. Used for polarization.
Mounting. Holes in connector body allow for fastener mounting to PC board.
Hoods. Available for all sizes of mating cable connector.
Mating Connector. Must be socket, select from GM or GMCT Series.

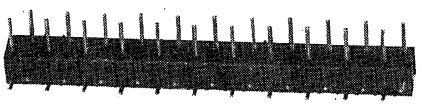


PCWD Series, Double Row, Card Receptacle .100 Centers, Wire Wrap, .025 Square

Number of Contacts. 22/44, 30/60, 43/86.
Contacts. Bellows type, gold plated phosphor bronze, 5 amps current rating.
PC Board Thickness. .054 through .071.
Insulator. Glass filled DAP, SDG-F.
Polarization. In contact.

GTC Series, Test Point Connector

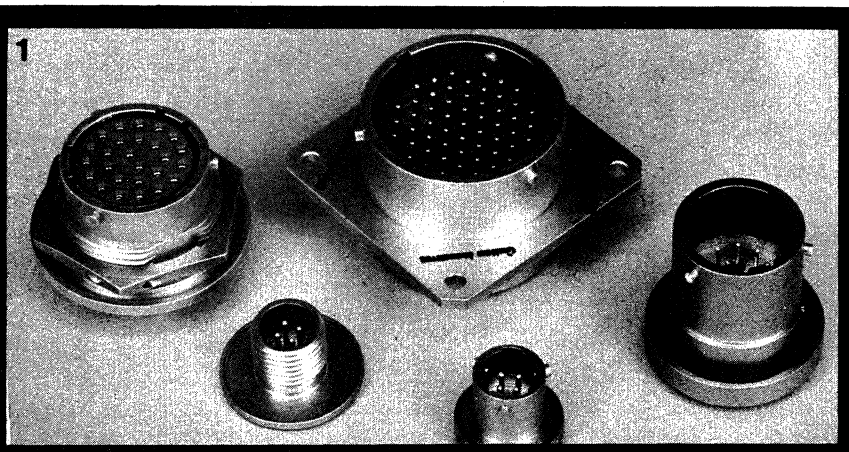
Number of Contacts. 8 and 16.
Socket Contact. Accepts .080 dia. probe, .030 dia. termination, 5 amps max. rating, copper alloy, gold plated.
Insulator. Glass filled DAP, SDG-F, .156 hole centers.
Mounting. Holes in connector body allow for fastener mounting to PC board.
Mil-Specification. Per Mil-C-39024.



GRP Series, Board Joiner

Number of Contacts. 10 and 22.
Pin Contact. .040 dia., bronze alloy, gold plate, rated 7.5 amps, .156 centers.
Insulator. Phenolic, MFE.

FREE 1971 HANDBOOK OF STANDARD CONNECTORS AVAILABLE UPON REQUEST.



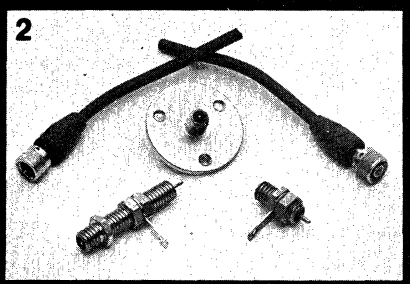
Glass to Metal Hermetically Sealed Connectors Headers and Feed-Thru terminals

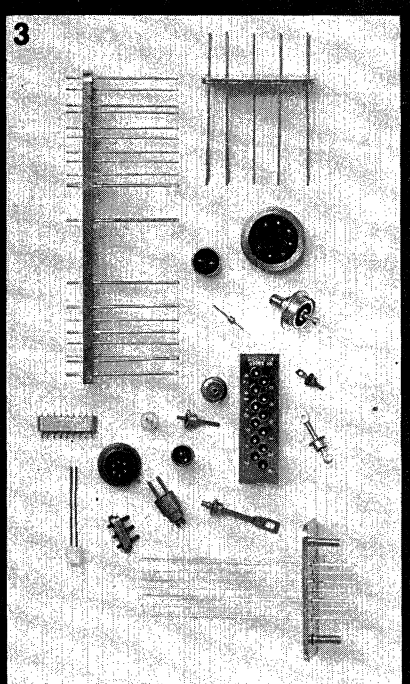
The Glass Technology division of GULTON INDUSTRIES offers a broad line of connectors, headers and feed-thru terminals for both commercial and aerospace applications. Geared for specials as well as standards, basic designs are available with stainless or cold rolled steel shells; weld, solder, box or flange mount styles; or in custom configurations to meet individual requirements.

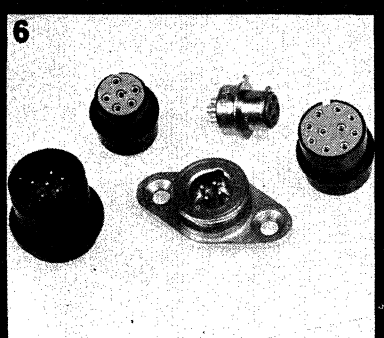
Typical Specifications:
Leak rate: 1.2 × 10^{-10}cc Helium/sec.
Vibration: 0-2,000 cps @ 100 g's rms
Operating range: —420°F to +800°F
Pressure range: to 40,000 psi
Insulation resistance: 1 × 10^{12} ohms @ 300°F

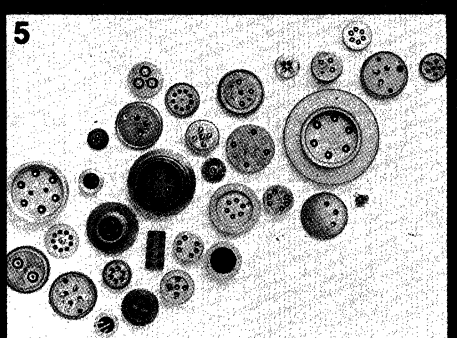
1. Hermetically sealed Military style connectors — MIL-C-26482, -26500, -26955, -38999, and -5015E.
2. Low noise co-axial cable assemblies and connectors.
3. Special custom hermetically sealed headers and terminals.
4. Microcircuit chip cases and packages.
5. Custom High Pressure, High Temperature, Weldable, Stainless Steel Headers.
6. Manifold component mounting connectors.

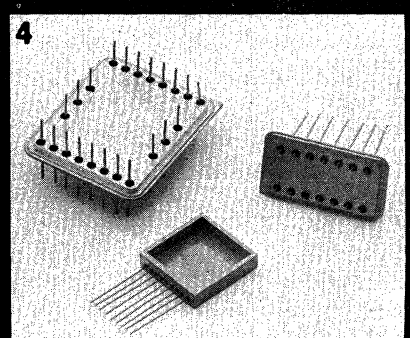
Gulton
GLASS TECHNOLOGY DIVISION
822 Production Place, Newport Beach, Calif. 92660 (714) 642-0163 TWX 910-596-1352











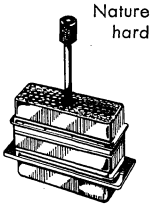
If you've got interconnection problems, we've got interconnection solutions.

And we've got solutions in any area, for any situation. Military or commercial. Miniature or subminiature. Rectangular or round. Complex circuits, tight space, critical environment.

We can do it. And still give you the greatest contact and mounting density available in an electrical connector. Or unparalleled interconnect capability with our flat flexible continuous and etched cable.

Hughes. We're problem solvers.

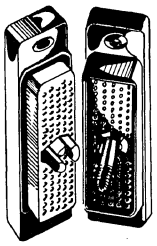
MINIATURE D-SERIES



Nature gives armadillos hard shell protection. We give it to our D series connectors. Stainless steel armor to keep 'em foolproof. They align perfectly. Fully environmental. 5 sizes.

- High density miniature using 20 gauge contacts.
- "Wrap-around" stainless steel shell for maximum protection in a minimum profile.
- Flanged or unflanged configuration.
- Contact arrangements of 18, 38, 66, 90, and 138 contacts.
- One-piece diallyl phthalate body.
- Silicone seals.
- Proven PolarHex center jackscrew.
- Available in non-environmental, environmental, and potting versions.

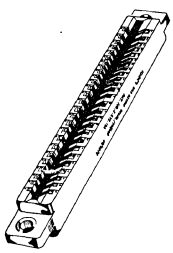
SUBMINIATURE WSS-SERIES



The way we make subminiatures, they're more subminiature. More fully packed. Same contact size and spacing, only we get 110 contacts to the inch.

- Highest contact density available — 110 size 22 contacts per square inch.
- Glass-filled diallyl phthalate bodies.
- Proven PolarHex center jackscrew coupling mechanism.
- Contact arrangement of 38, 88, 108, 132, and 244 contacts.
- Intermates with Hughes hardshell W-Series connectors.
- Available in non-environmental, environmental, and potting versions.

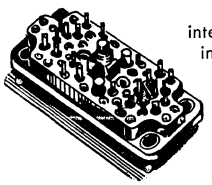
PRINTED CIRCUIT CONNECTORS



Miniature and subminiature printed circuit connectors in 10 sizes with 10 to 96 contacts. We're good at the numbers game.

- Withstand vibration, shock, and warping without losing electrical continuity.
- Bifurcated dual-socket contacts.
- 50 mil, 100 mil and 156 mil centers.
- Contact arrangements of 10, 20, 30, 40, and 50 positions, double readout (EPC submin. version).
- Contact arrangements of 15, 20, 30, 43, 48, and 68 positions, dbl. readout (EMS miniature, 100 mil ctrs; ERS miniature 156 mil ctrs).
- Bussing characteristics.
- Through or threaded mounting inserts available.
- PC board keying capabilities.

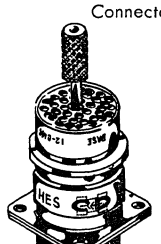
UNIVERSAL URS-SERIES



You decide what goes where. The crimp removable contacts are interchangeable in either body. The big difference at Hughes is the positive way they get together. The PolarHex way.

- Pin and/or socket contacts in the same body.
- Proven PolarHex center jackscrew.
- Glass-filled diallyl phthalate body.
- Standard contacts and coax contacts in same body.
- 12 available configurations with up to a maximum of 321 contacts in a variety of combinations of #16, #18 and #20 gauge contacts and coax (or #8 gauge) contacts.

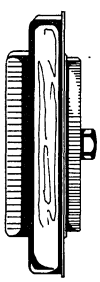
SUBMINIATURE BULLS-EYE SERIES



We invented the Bulls-Eye™ Connector and created a reputation as circular subminiature specialists. Shows you what a little concentration can do: 102 contacts in a #18 shell.

- Highest contact density in a circular subminiature with no decrease in contact spacing — 50% to 200% higher density than comparable connectors.
- Mounts in standard MS cutouts.
- Proven PolarHex center jackscrew.
- Lightweight stainless steel shell; diallyl phthalate body.
- Standard MS configurations. But with differences in contact density: Six shell sizes/contact density arrangements: 8/14, 10/30, 12/48, 14/66, 16/72 and 18/102.
- Cable or flanged configurations.
- Crimp snap-in size 22 contacts.
- Available in non-environmental, environmental, and potting versions.

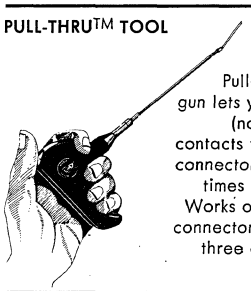
SUBMINIATURE FILTER CONNECTORS



Filter pin connectors in both rectangular and circular subminiatures. Nobody else guarantees a 100,000 to 1 reduction of RF energy.

- High contact density — 110 size 22 crimp removable contacts/sq. in.
- Complete RFI protection.
- Glass-filled diallyl phthalate bodies.
- Proven PolarHex center jackscrew.
- Contact arrangements of 38, 88, 108, 132, and 244 contacts.
- Working voltage: 200 vdc (25° & 85°C) 150 vdc (—55° & 125°C) Dielectric Withstanding Voltage (Hi-Pot): 500 vdc (for 5 sec, 50 ma max charging current). Feed-Thru Current: 3.0 amp. RF Current: 0.25 amp max. Insul. Resist.: 10,000 megohms, min. (After 2 min electrification at 200 vdc, 1 megohm current limiting resistor.); Capacitance: 1750 pf, nominal. Atten., min.: 40 db @ 100 MHz, 50 db @ 200 MHz to 10 GHz.

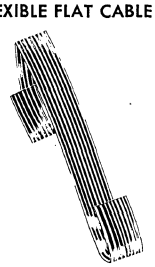
PULL-THRU™ TOOL



New Pull-Thru™ gun lets you pull (not push) contacts through connectors. Four times as fast. Works on many connectors. With three contact sizes.

- Covers three contact sizes: 16, 20, and 22 gauges.
- Permits desired contact cavity to be loaded from front face of connector.
- Grasps the contact body . . . not the wire — eliminating damage during insertion.
- Positive contact alignment through seals and block.
- Can use wire sizes equal in diam. to rear of the contact.
- Allows connector wiring at least four times faster than with conventional tools.

FLEXIBLE FLAT CABLE



Contour Cable™ happened here first: Flat, flexible, etched circuits. Flat, flexible continuous cable. Custom cable/harness assemblies.

- Continuous cable in similar or varied cross sections—with uniform or non-uniform spacing, varying insulation thickness, with different insulation materials on the two sides.
- Flat flexible etched circuits ideal for conductor system requiring circuits with 3-dimensional routing in a flat medium, or when point-to-point wiring must exhibit simple or complex flexibility in a flat plan — or both.
- We meet your specifications — just consult our application engineers.

For complete information, write or call:

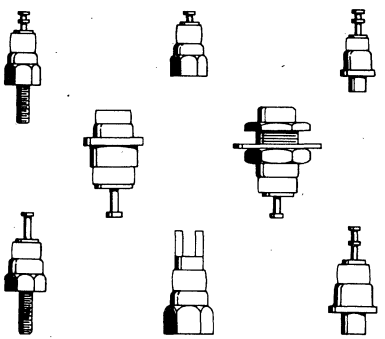
Hughes Connecting Devices, 500 Superior Avenue,
Newport Beach, CA 92663. (714) 548-0671; telex 714-910-596-1374

HUGHES
HUGHES AIRCRAFT COMPANY
CONNECTING DEVICES

HJ HIRAM JONES

manufacture and design of circuit components

Teflon† Insulated * One-Piece * Terminals and Test Jacks



*** DELIVERY** Immediate—from stock on catalog items.

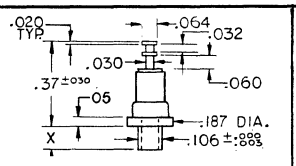
*** QUALITY** QPL facility, insuring highest product reliability. Complete traceability on all raw material and processes.

*** PRODUCTION** Precision Swiss automatic machines—long or short runs to customer design and specifications.

*** ONE-PIECE ***

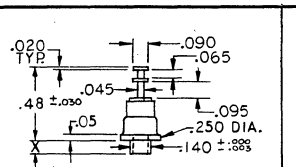
Teflon† Insulated Terminals

Male-Female Threads and Swage Types and Test Jacks



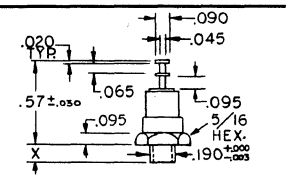
Single Turret also available
O/A Height above Board: .30 ±.030
P/N TS-111-A/-4

Part No.	X	Board Thickness
TS-112-A	.055	1/64
TS-112-0	.075	1/32
TS-112-1	.095	.050
TS-112-2	.105	1/16
TS-112-3	.135	3/32
TS-112-4	.165	1/8



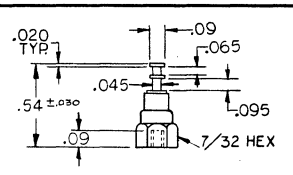
Single Turret also available
O/A Height above Board: .39 ±.030
P/N TS-231-0/-4

Part No.	X	Board Thickness
TS-232-0	.075	1.32
TS-232-1	.095	.050
TS-232-2	.105	1/16
TS-232-3	.135	3/32
TS-232-4	.175	1/8



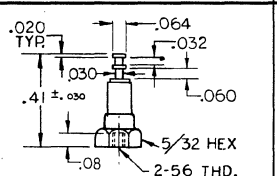
Single Turret also available
O/A Height above Board: .50 ±.030
P/N TS-351-0/-4

Part No.	X	Board Thickness
TS-352-0	.075	1/32
TS-352-1	.095	.050
TS-352-2	.105	1/16
TS-352-3	.135	3/32
TS-352-4	.165	1/8



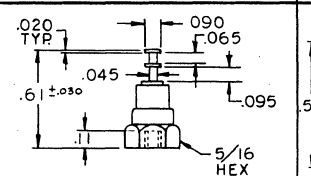
Part No.	Thread
TS-232-8F	4-40
TS-232-9F	6-32

Single Turret also available
O/A Length: .47 ±.030
P/N TS-231-8F/-9F



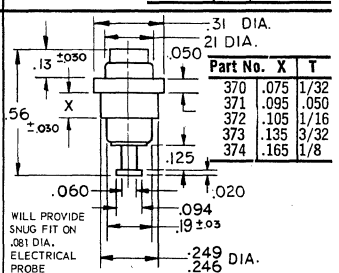
Part No.	Thread
TS-112-6F	2-56

Single Turret also available
O/A Length: .35 ±.030
P/N TS-111-6F



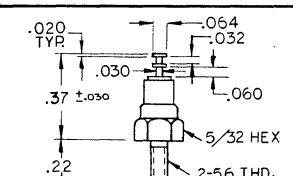
Part No.	Thread
TS-352-8F	4-40
TS-352-9F	6-32

Single Turret also available
O/A Length: .54 ±.030
P/N TS-351-8F/-9F



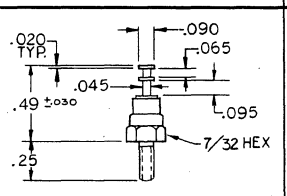
Part No.	X	T
370	.075	1/32
371	.095	.050
372	.105	1/16
373	.135	3/32
374	.165	1/8

SWAGE TEST JACK
Available in 10 Standard E.I.A. colors



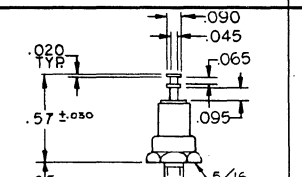
Part No.	Thread
TS-112-6M	2-56

Single Turret also available
O/A Height above Board: .34 ±.030
P/N TS-111-6M



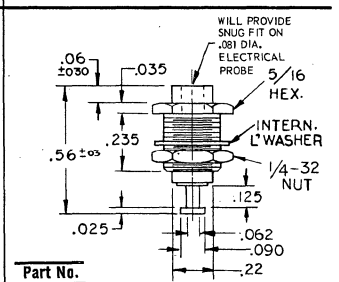
Part No.	Thread
TS-232-8M	4-40
TS-232-9M	6-32

Single Turret also available
O/A Height above Board: .42 ±.030
P/N TS-231-8M/-9M



Part No.	Thread
TS-351-8M	4-40
TS-351-9M	6-32

Single Turret also available
O/A Height above Board: .50 ±.030
P/N TS-351-8M/9M



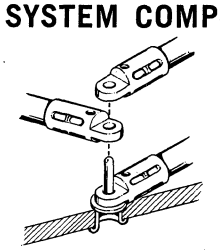
Part No. 375

THREADED TEST JACK

9W WIRE TERMINATION SYSTEM COMPONENTS

FOR BUILT-IN RELIABILITY:
Provides a solder-wicking barrier to minimize wire fatigue failures.

SERVICEABILITY:
Utilizing fast, simple wire connection and disconnection.



9W Crimp Terminal Part No.	O.D.	Lgth.	AWG Wire Sizes	Mating Terminal Post	Board Thickness
9W-206	.078	.265	20 & 22	9W-507-1 Standoff	3/32"
				9W-507-5 Standoff	1/16"
9W-207	.062	.226	24 & 26	9W-510-1 Feed-thru	3/32"
				9W-510-3 Feed-thru	1/16"
9W-230	.094	.282	16 & 18	9W-507-3 Standoff	3/32"
				9W-507-7 Standoff	1/16"
				9W-510-2 Feed-thru	3/32"
				9W-510-4 Feed-thru	1/16"

Write or call for complete 9W Wire Termination System Data

HIRAM JONES

Teflon† Insulated * Press-Type * Terminals and Test Jacks

TEFLON†

(TFE-FLUOROCARBON) per MIL-P-19468 has outstanding mechanical and electrical properties over a wide range of frequencies and temperatures (−100°C to +250°C), extreme chemical inertness, high heat resistance, zero water absorption and complete anti-hesiveness which make it a superior insulation.

TERMINALS

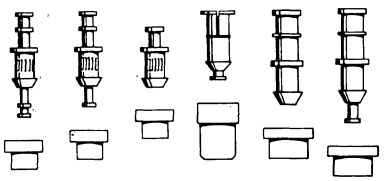
MATERIAL: Half-hard Brass per QQ-B-626, Comp 22.
FINISH: Standard plating is Gold per MIL-G-45204. Other finishes supplied on request.

INSTALLATION TOOLS

Tools are available for all HIRAM JONES components. Specify Part Number and prefix "S." Example: S-602 Assembly Tool.

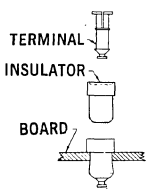
* PRESS-TYPE *

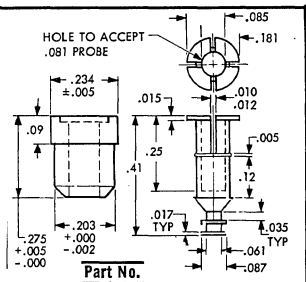
For simple, fast economical installation



* PRESS-TYPE *

Teflon† Insulated Test Jacks





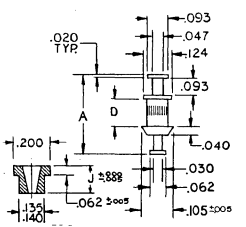
Part No. L-606

Also available without slots (non-gripping) P/N 606

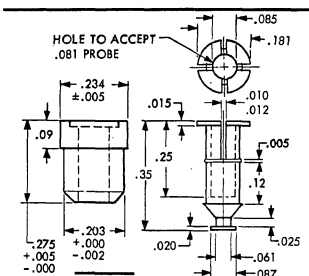
* PRESS-TYPE *

Teflon† Insulated Feed-Thrus and Standoffs

Available in Ten Standard E.I.A. Colors

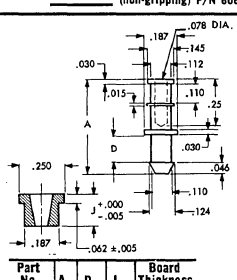


Part No.	A	D	J	Board Thickness
625-A	.41	.147	.147	1/32-.050
625-G	.42	.157	.157	1/16

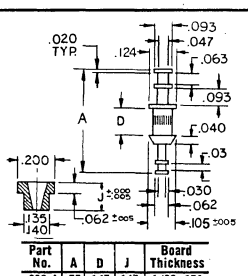


Part No. L-602

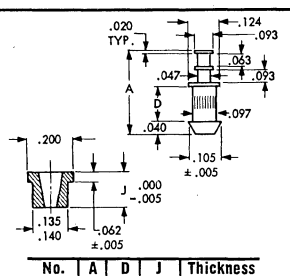
Also available without slots (non-gripping) P/N 602



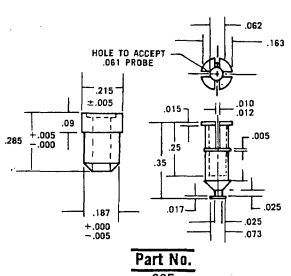
Part No.	A	D	J	Board Thickness
630-A	.51	.150	.150	1/32-.050
630-G	.52	.160	.160	1/16



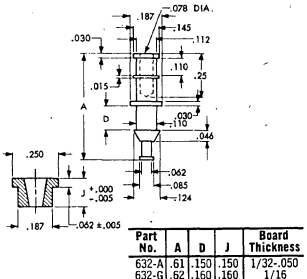
Part No.	A	D	J	Board Thickness
622-A	.55	.147	.147	1/32-.050
622-G	.56	.157	.157	1/16
622-H	.59	.189	.189	1/8



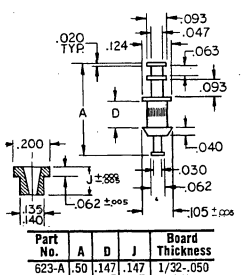
No.	A	D	J	Thickness
626-A	.40	.147	.147	1/32-.050
626-G	.41	.157	.157	1/16



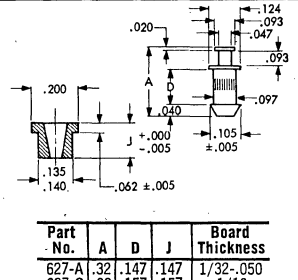
Part No. 605



Part No.	A	D	J	Board Thickness
632-A	.61	.150	.150	1/32-.050
632-G	.62	.160	.160	1/16
632-H	.69	.220	.220	1/8



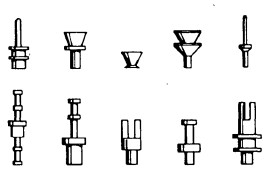
Part No.	A	D	J	Board Thickness
623-A	.50	.147	.147	1/32-.050
623-G	.51	.157	.157	1/16



Part No.	A	D	J	Board Thickness
627-A	.32	.147	.147	1/32-.050
627-G	.33	.157	.157	1/16

Other Hiram Jones Products:

Non-Insulated Terminals, Test Jacks and Contacts
Printed Circuit, MS and MIL-T-55155 Terminals



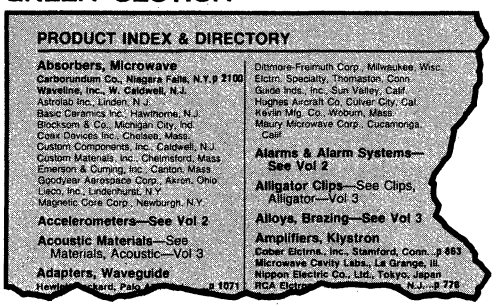
HIRAM JONES
11607 Vanowen Street
North Hollywood, California. 91605
(213) 875-0213

†Reg. Trademark, E.I. DuPont de Nemours and Co.

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

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Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. p 663
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electronic ... N.J. ... p 776

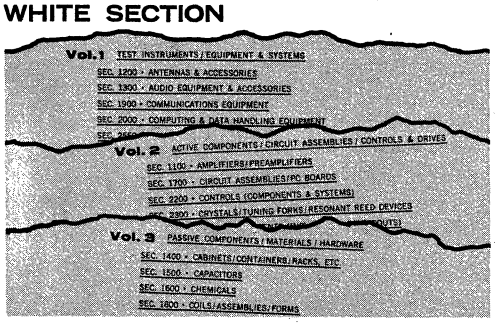
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
2300 • CRYSTAL S/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

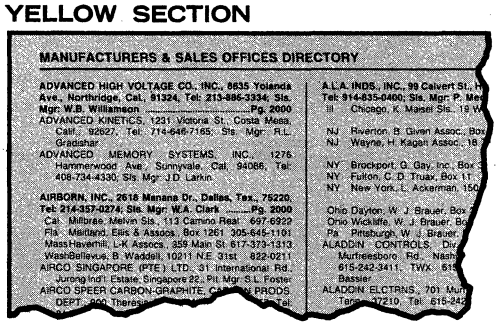
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real: 697-6222
Fla: Maitland, Ellis & Assocs, Box 1261 305-645-1101
Mass: Haverhill, L-K Assocs, 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22., Pit. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, ... PRODS. DEPT., 900 Theres... Tel.
A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mes... Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 16...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Dir... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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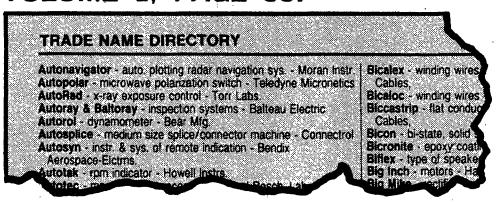
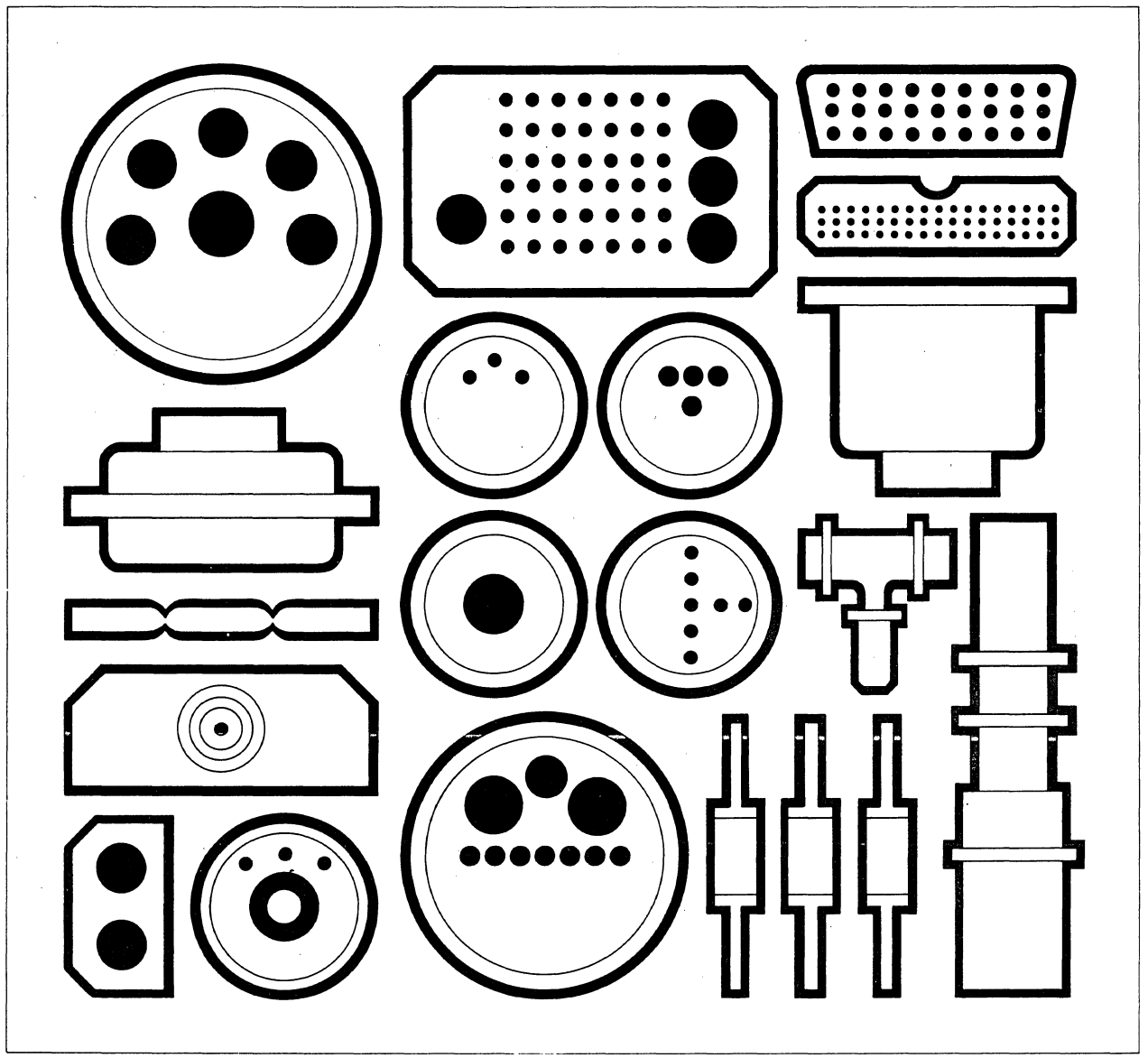

TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autospice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Bicalex - winding wires... Cables,
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...

Each of the 55 product sections in **eem** is identified by a vertical black band along the outside edge of the page. The Trade Name Directory is found in Volume 1, beginning on page 957. If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.



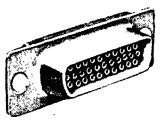
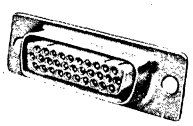
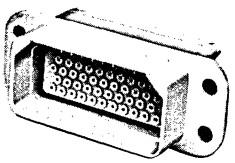
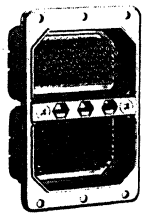
Connector Selection Guide

This Guide is designed to help you select the proper connector series and the appropriate catalog from which to specify your connector. Determine your basic application requirement: Rectangular Rack/Panel, Circular, Microminiature, or Special Application Connectors. Go to one of these four headings in the chart. Below each heading are several blocks listing the various connector series. (If a MIL Spec connector is required, turn to the back side of this Guide for the applicable catalog.) Check these requirements with the data on the right side (dark shaded area) of each block. Write for the proper catalog for detailed product data and ordering information.

ITT CANNON ELECTRIC
666 E. Dyer Rd., Santa Ana, Calif. 92702
A DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

CANNON® PLUGS

Rectangular & Rack/Panel

D Subminiature

D* — original D, solder contacts
D*M — monobloc insulator, solder contacts
D*MA — rear release of crimp snap-in contacts.
MIL-C-24308 — Full QPL

● 1/8 scale — **D CATALOG**

9-50 CONTACTS
Contact/Wire Size
20
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

DPX2 — two gang DPX

DPX2 —two gang shell
DPX2-F&M —screw coupling
DPX2-A —ARINC A shell
DPX2-B —ARINC B shell
DPX2MA —rear release of crimp snap-in contacts
DPX3 —three gang shell
DPX4 —four gang shell

1/8 scale

■ **DPX CATALOG**

2-212 CONTACTS
Contact/Wire Size
4
8
12
16
20
22
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

BURGUN-D connector — economical D subminiature

General purpose economy version of popular D Subminiature; rear release of crimp snap-in contacts

1/8 scale — **D CATALOG**

9-50 CONTACTS
Contact/Wire Size
20
Size 20 contacts one #18 or two #20
CRIMP TERMINATION

DPD — general purpose

DPD —standard rack/panel connector with widest range of contact arrangements
DPDL —large flange DPD
DPDB —back mounting DPD
DPDMA —rear release of crimp snap-in contacts

1/8 scale

■ **DPD CATALOG**

2-128 CONTACTS
Contact/Wire Size
0
2
4
6
8
10
14
16
20
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

2D — double density D

D subminiature shell and hardware; 19, 31, 52, 79 or 100 crimp removable contacts on .075" centers

1/8 scale — **D CATALOG**

■

19-100 CONTACTS
Wire Size
22 through 26
CRIMP TERMINATION

DPD2 — two gang DPD

DPD2 —two gang DPD
DPD2MA —two gang DPD with rear release of crimp snap-in contacts

1/8 scale

■ **DPD CATALOG**

4-224 CONTACTS
Contact/Wire Size
0
2
4
6
8
10
14
16
20
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

DPK — high performance, environmental

Environmental sealing, thermal resistant connector with rear release of crimp snap-in contacts

■● 1/8 scale — **DPK CATALOG**

18-161 CONTACTS
Contact/Wire Size
12
16
20
22
Coax. contacts avail.
CRIMP TERMINATION

DPX — small, rugged, general purpose

DPXA —solid shell DPX
DPXAF —float mount DPXA
DPXB —ARINC shell DPX
DPXL —large flange DPX
DPXLF —float mount DPXL
DPXAMA —rear release of crimp snap-in contacts

1/8 scale

■● **DPX CATALOG**

1-106 CONTACTS
Contact/Wire Size
4
8
12
16
20
22
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

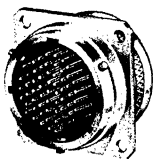
DJS — Environmental, high density, rugged

Single gang, two gang, size 22D crimp snap-in contacts, miniature

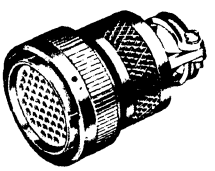
1/8 scale — **DJS CATALOG**

78-128 CONTACTS
Contact/Wire Size
22
24
26
28
CRIMP TERMINATION

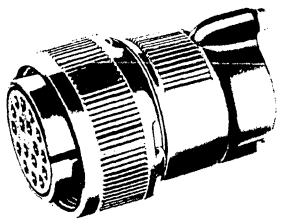
Circular



MIL-C-38999
SUBMINIATURE



MIL-C-83723
MINIATURE and STANDARD



MIL-C-5015
STANDARD

KJ – high density, MIL-C-38999

Bayonet Coupling

High performance, high density, lightweight, compact, environment-resistant connectors; rear release of crimp snap-in contacts.

☐ ●

KJ CATALOG

3-128 CONTACTS Contact/Wire Size
22M
22D
22
20
16
CRIMP TERMINATION

CV – standard circular MIL-C-83723

Threaded Coupling

High performance, mates with MIL-C-5015 thread coupled connectors. Environment and fluid resistant, rear release crimp snap-in contacts.

☐

MIL-C-83723 CATALOG

1-48 CONTACTS Contact/Wire Size
16
12
8
4
0
CRIMP TERMINATION

PV – miniature circular MIL-C-83723

Bayonet Coupling

Mates with MIL-C-26482 and NAS1599 bayonet coupled connectors. High performance, environmentally sealed; fluid resistant; rear release crimp snap-in contacts

☐

MIL-C-83723 CATALOG

3-61 CONTACTS Contact/Wire Size
20
16
12
CRIMP TERMINATION

K – lightweight, rugged general purpose

Quick Coupling

K – with special Acme thread coupling nut

K CATALOG

●

1-75 CONTACTS Contact/Wire Size
20
16
14
10
8
6
4
2
0
Coax. contacts avail.
SOLDER TERMINATION

KPT/KPTM/KPSE general purpose, MIL-C-26482

Bayonet Coupling

KPT —Solder termination
KPTM —Crimp contacts in DUAL-SHORE® insulator
KPSE —Crimp contacts in integrally molded insulator

Note: Receptacles with hard anodic, non-conductive finish and flanges positioned for rear panel mounting are available.

☐ ●

MCB CATALOG

2-61 CONTACTS Contact/Wire Size
20
16
SOLDER OR CRIMP TERMINATION

LR/MR – weatherproof, submersible

Submersible

Rugged environmental MIL-C-5015 type, designed to MIL-C-12520B
LR—hard insulator } Threaded
MR—resilient insulator }
MR—resilient insulator—bayonet

☐

LR/MR CATALOG

1-56 CONTACTS Contact/Wire Size
16
12
8
4
0
SOLDER TERMINATION

MS – general purpose, MIL-C-5015

Threaded Coupling

MS-E —environmental, cable clamp
MS-R —environmental, endbell

MS CATALOG

☐ ●

1-100 CONTACTS Contact/Wire Size
16
12
8
4
0
SOLDER TERMINATION
High Voltage Cartridges and Coax. Cartridges available.

OTHER SPECIAL CONNECTORS . . . consult factory

- Battery connectors
- Buffet connectors
- CAM-RAC™ modules
- Cupronickel connectors
- Custom harnessing
- Edgeboard connectors
- Electrical interconnections
- Environment-resistant connectors (see legend)
- Hermetically sealed connectors (see legend)
- High voltage contacts
- Hydrospace connectors
- Non-magnetic connectors
- RFI shielding
- Special finishes
- Special insulator materials
- Stainless steel connectors
- Thermocouple contacts
- Universal Interconnect System

LEGEND ☐ Environmental version only
■ Environmental versions available
● Hermetic versions available; For information refer to hermetic sections of respective catalogs.

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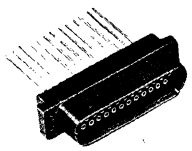
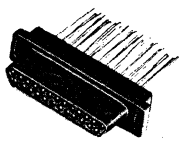
CANNON® PLUGS

Microminiature





USING PROVEN TWIST PIN CONTACTS *

MICRO-D connectors — rack/panel

1/8 scale
.050" Centers

- MD — Clip mounting, diallyl phthalate insulator
- MDA — Clip mounting, polycarbonate insulator
- MDB — Screw mounting, diallyl phthalate insulator
- MDC — Screw mounting, polycarbonate insulator
- MDN — Clip mounting, nylon insulator
- MDNB — Screw mounting, nylon insulator
- MDM — Screw mounting, aluminum die cast shell

MD CATALOG

9-51 CONTACTS
Amps
3
SOLID OR STRANDED LEADS

MICRO-K connectors — circular

Threaded Coupling
.050" Centers

A high density connector using twisted pin contacts on .050" centers; 75% smaller/80% lighter per contact than MIL-C-26482 types.

MK CATALOG

7-35 CONTACTS
Amps
3
SOLID OR STRANDED LEADS

50-MIL STRIP connectors

.050" Centers

For edge mounting on PC boards and encapsulation in modules

- MTA —polycarbonate insulator (up to 120 contacts)
- MTB —diallyl phthalate (up to 81 contacts)

MIL STRIP CATALOG

UP TO 120 CONTACTS
Amps
3
SOLID OR STRANDED LEADS

CENTI-LOC connectors — strip

.075" or .100" Centers

Low cost, commercial strip connector available in "yardage" form for up to 53 crimp snap-in contacts on .075" centers and up to 60 contacts on 100" centers.

CLS CATALOG

1-60 CONTACTS
Contact/Wire Size
22 thru 26

Special Applications

AUDIO/ELECTRONIC connectors

Used on microphones, tape recorders, amplifiers, test instrumentation, computers and other low level circuit applications.

AUD CATALOG

2-8 CONTACTS
Contact/Wire Size
10
14
16
Coax. contacts avai
SOLDER TERMINATION

FLAT FLEXIBLE CABLE terminations

Highly reliable, vibration-resistant cable assembly. Long flex life, effective shielding. Space & weight savings.

FWA CATALOG OR CONSULT FACTORY

MISSILE & SPACE APPLICATIONS

Interstage and umbilical connectors, electro-mechanical devices and pyrotechnic devices required in the missile and space field.

GM CATALOG

*Licensed by New Twist

HIGH TEMPERATURE connectors

Threaded Coupling

- HRM — 1300° F, nuclear radiation-resistant miniature circular connector
- CA-HR — 650° & 1000° F, radiation-resistant

HT CATALOG

1-73 CONTACTS
Contact/Wire Size
16
12
8
4
0
CRIMP OR WELD TERMINATIONS

FIREWALL CONNECTORS

Threaded Coupling

- MS-K — 350° F, meets MIL-C-5015 fireproof test, crimp contacts
- CA-KE — 350° F, moisture-resistant, for sealable wires, meets MIL-C-5015 fireproof test or 350° F continuous
- FRF — Firewall connector with front release of crimp snap-in MS90453 and MS90454 contacts; moisture sealed and exceeds MIL-C-5015 fireproof requirements, or 400° F continuous use and 800° F shorter term

FW CATALOG

1-47 CONTACTS
Contact/Wire Size
16
12
8
4
0
CRIMP TERMINATION

BACKPLANE assemblies

Economical, highly reliable edge-board connectors for use in computers, business machines, electro data processing equipment.

BP CATALOG

44-96 CONTACTS
wire wrapping termination

EDGECARD connectors

ADAPTA-CON low-force pin and socket interconnections for P.C. and I/O applications, custom made to any size or configuration, .025" square tail mounting plate pin for wire-wrapping termination

ACBP CATALOG

(UBS)
1-130 CONTACTS
(UBC)
2-64 CONTACTS
Contact/Wire Size
24 thru 28
SOLDER, CRIMP, WIRE-WRAPPING TERMINATIONS

EDGECARD connectors

Single-beam bifurcated preloaded contacts on .125" centers, mounted on custom-made precision-punched aluminum panels. Integrally molded card guides of 3/4" and 2" heights

SBBP CATALOG

CONTACTS
20/40, 30/60, 40/80
WIRE-WRAPPING TERMINATION

DL connectors

Low mating force, high performance, cam-actuated spring contacts on .100" centers. I/O, cord-to-cord, cord-to-panel applications

DL CATALOG

UP TO 156 CONTACTS
Contact/Wire Size
18 thru 30
CRIMP OR WIRE-WRAPPING TERMINATION

RFI FILTER CONTACT connectors

Rack/panel and circular connectors with type filter elements on each contact. Maximum RFI suppression with great space and weight savings over separate filters.

FP CATALOG

Contact/Wire Size
20
SOLDER TERMINATION
consult factory for availability of CRIMP filter contacts.

Popular Connector Specifications

MIL-C-24308 (Navy)

This specification covers miniature rack and panel connectors, polarized shell, with non-removable solder and removable crimp type contacts in the general purpose, nonmagnetic, and hermetic (non-removable pins only) classes.

See D Catalog

Specification Number	ITT Cannon Number	Specification Number	ITT Cannon Number
M24308/1-1	DEMM9S	M24308/5-1	DEMM9SNM
M24308/1-2	DAMM15S	M24308/5-2	DAMM15SNM
M24308/1-3	DBMM25S	M24308/5-3	DBMM25SNM
M24308/1-4	DCMM37S	M24308/5-4	DCMM37SNM
M24308/1-5	DDMM50S	M24308/5-5	DDMM50SNM
M24308/2-1	DEMAM9S	M24308/6-1	DEMAM9SNM
M24308/2-2	DAMAM15S	M24308/6-2	DAMAM15SNM
M24308/2-3	DBMAM25S	M24308/6-3	DBMAM25SNM
M24308/2-4	DCMAM37S	M24308/6-4	DCMAM37SNM
M24308/2-5	DDMAM50S	M24308/6-5	DDMAM50SNM
M24308/3-1	DEMM9P	M24308/7-1	DEMM9PNM
M24308/3-2	DAMM15P	M24308/7-2	DAMM15PNM
M24308/3-3	DBMM25P	M24308/7-3	DBMM25PNM
M24308/3-4	DCMM37P	M24308/7-4	DCMM37PNM
M24308/3-5	DDMM50P	M24308/7-5	DDMM50PNM
M24308/4-1	DEMAM9P	M24308/8-1	DEMAM9PNM
M24308/4-2	DAMAM15P	M24308/8-2	DAMAM15PNM
M24308/4-3	DBMAM25P	M24308/8-3	DBMAM25PNM
M24308/4-4	DCMAM37P	M24308/8-4	DCMAM37PNM
M24308/4-5	DDMAM50P	M24308/8-5	DDMAM50PNM

MIL-C-21617 (Ships)

This specification covers small, rectangular polarized-shell connectors for cord mounting and equipment rack/panel use. They are non-environmental type (DPX) connectors with solder-terminated contacts, size 20 through 4. Contact arrangements with coax contacts are also covered.

See DPX Catalog

Specification Number	ITT Cannon Number	Specification Number	ITT Cannon Number
PF 013A	DPX-13-33S	JM 013A	DPX-13-34P
PF 013A	DPXA-13-33S	JM 013A	DPXA-13-34P
PF 017A	DPX-17-33S	JM 017A	DPX-17-34P
PF 017A	DPXA-17-33S	JM 017A	DPXA-17-34P
PF 023A	DPX-23-33S	JM 023A	DPX-23-34P
PF 023A	DPXA-23-33S	JM 023A	DPXA-23-34P
PF 026A	DPX-26-33S	JM 026A	DPX-26-34P
PF 026A	DPXA-26-33S	JM 026A	DPXA-26-34P
PF 032A	DPX-32-33S	JM 032A	DPX-32-34P
PF 032A	DPXA-32-33S	JM 032A	DPXA-32-34P
PF 040A	DPX-40-33S	JM 040A	DPX-40-34P
PF 040A	DPXA-40-33S	JM 040A	DPXA-40-34P
PF 007C	DPX-C7-33S	JM 007C	DPX-C7-34P
PF 007C	DPXA-C7-33S	JM 007C	DPXA-C7-34P
PF 016C	DPX-16C3-33S	JM 016C	DPX-16C3-34P
PF 016C	DPXA-16C3-33S	JM 016C	DPXA-16C3-34P

MIL-C-5015

This specification covers circular, general purpose connectors. These MS connectors were the original AN (Army-Navy) specification connectors and feature threaded coupling and solder termination of size 16 thru 0 contacts.

See MS Catalog

MS Number	ITT Cannon Number	MS Number	ITT Cannon Number
MS3057	CA17711	MS25042	CA17530
MS3100	CA3100	MS25043	CA2209
MS3101	CA3101	MS3420	CA18220
MS3102	CA3102	MS3105	CA2182
MS3106	CA3106	MS3103	CA3100ER
MS3107	CA3107	MS25183	CA3106ER
MS3108	CA3108		

MIL-C-38999 (Air Force)

This specification covers high density, high performance, miniature circular connectors. These connectors feature bayonet coupling to meet the environmental and electrical requirements of MIL-C-38999.

See KJ Catalog

MS Number	ITT Cannon Number	MS Number	ITT Cannon Number
MS27472	KJ0	MS27473	KJ6
MS27513	KJ2R	MS27474	KJ7
MS27476	KJ2Y (hermetic)	MS27477	KJ7Y (hermetic)
MS27497	KJ3	MS27478	KJ1Y
—	KJ5R		

MIL-C-26482 (Navy)

This specification covers general purpose, miniature circular connectors, with environmental and non-environmental types. These connectors feature bayonet coupling, five keyway polarization and both solder and crimp removable contacts.

See MCB Catalog

MS Number	ITT Cannon Number	MS Number	ITT Cannon Number
MS3110	KPT00	MS3120	KPSE00
MS3112	KPT02	MS3122	KPSE02
MS3113	KPTH (hermetic)	MS3124	KPSE07
MS3114	KPT07	MS3126	KPSE06
MS3115	KPT	MS3180	KPT80
MS3116	KPT06	MS3181	KPT81
MS3119	KPTB		

MIL-C-83723

This specification covers two families of environment-resistant connectors. The CV (MIL-C-5015-type threaded coupling) and the PV (MIL-C-26482 and NAS1599-type bayonet coupling), accommodating crimp removable, rear release contacts. The connectors are fully qualified and QPL approved under MIL-C-83723 (USAF).

See MIL-C-83723 Catalog

CV

MS Number	ITT Cannon Number
M83723-17F XXXXX	CV1RXX-XS-113
M83723-18F XXXXX	CV1RXX-XP-113
M83723-19F XXXXX	CV0RXX-XS-113
M83723-20F XXXXX	CV0RXX-XP-113
M83723-21F XXXXX	CV2RXX-XS-113
M83723-22F XXXXX	CV2RXX-XP-113
M83723-23F XXXXX	CV6RXX-XS-113
M83723-24F XXXXX	CV6RXX-XP-113

PV

MS Number	ITT Cannon Number
M83723-01F XXXX N	PVS0G XX B XX S X
M83723-02F XXXX N	PVS0G XX B XX P X
M83723-03F XXXX N	PVS4G XX B XX S X
M83723-04F XXXX N	PVS4G XX B XX P X
M83723-05F XXXX N	PVS7G XX B XX S X
M83723-06F XXXX N	PVS7G XX B XX P X
M83723-07F XXXX N	PVS1G XX B XX S X
M83723-08F XXXX N	PVS1G XX B XX P X
M83723-13F XXXX N	PVS6G XX S XX S X
M83723-14F XXXX N	PVS6G XX S XX P X

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CANNON PLUGS

CONNECTORS

E. F. JOHNSON COMPANY®

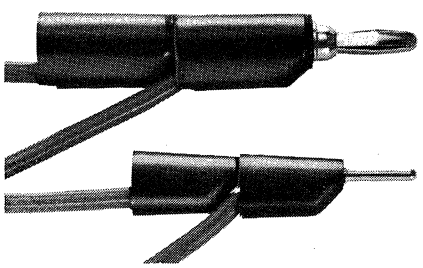
Johnson offers a complete line of polyamide insulated connectors to meet most military and commercial applications. Included are: subminiatures for printed circuit applications; insulated solderless tip and banana plugs; tip and banana jacks; tip jack and sleeve assemblies; metal-clad and "rapid-mount" tip jacks; dual banana plugs and "6-way" binding posts. Designed to operate throughout an extremely wide temperature range and under conditions of high relative humidity. Voltage breakdowns available up to 11,000 volts on some types. Polyamide housings available in six colors per Federal Standard 595 (10 colors available where indicated).

For price and ordering information call the nearest E. F. Johnson sales representative or the E. F. Johnson factory listed in the yellow pages of this volume.

Free Electrical Circuit Hardware Catalog
10-page catalog gives specific information on complete line. Send request on your letterhead to: E. F. Johnson Co., 1923 10th Avenue S.W., Waseca, Minn. 56093.

To specify color, change the 6th and 7th digits of the catalog numbers to the codes below.

Color	Code	Color	Code	Color	Code
white	01	orange*	06	violet*	12
red	02	yellow	07	gray*	13
black	03	brown*	08	*special for	
green	04	blue	10	some items	



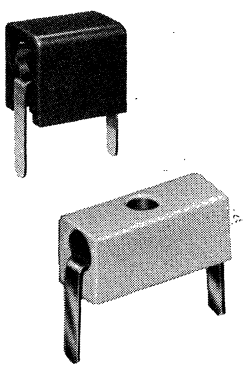
PATCHCORD STACKING PLUGS

Developed for custom patchcord assembly and replacement of damaged molded patchcord plugs. Allows assembly of patchcords with any length and color. Used with standard 0.144" diameter rubber or extra-flexible polyvinyl insulated wire. Plug body precision machined brass with 0.0002" nickel plating. Polyamide housing available in 6 colors. Operating temperature range −55°C. to +105°C.

Stacking Standard Banana Plug
Cat. No. 108-1080-001 (15 amps)

Stacking .080 Standard Tip Plug
Cat. No. 105-1200-001 (10 amps)

Engineering kits containing material to assemble 30 patchcords in six colors available from stocking distributors.



NEW HORIZONTAL JACK

Accepts 0.080" dia. tip plug in either end. Silver-plated and Iridited beryllium-copper formed contact. Two common terminals. Approximately one half size of standard Tip Jack. Channel on underside for air-flow cooling during solder operation. Current rating: 5 amps.

Cat. No. 105-1100-001 (10 colors)

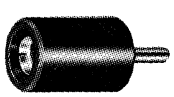
HORIZONTAL JACK

(U. S. Patent No. 3,208,027)

Accepts .080" dia. tip plug in either end, or from top or bottom! Cross-hole also accepts hook-type oscilloscope probe. Channel on underside for airflow cooling during solder operation. Silver-plated and Iridited beryllium-copper formed contact. Two common terminals. Current rating: 5 amps.

Cat. No. 105-0750-001 (10 colors)

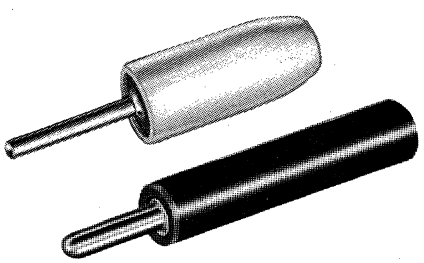
Note: Available as specials in production quantities without cross-hole or with gold flash.



VERTICAL JACK

Mounts through single .052" hole, min. mounting area. Accepts .080" dia. tip plug. Silver-plated, machined beryllium-copper contact. Current rating: 5 amps.

Cat. No. 105-0850-001 (6 colors)



SOLDERLESS TIP PLUG

Completely insulated, molded sleeve. Recessed metal head. All metal parts are nickel-plated brass. Designed for solderless connection of up to 16 gauge stranded wire. Fits all standard tip jacks. Current rating: 10 amps.

Cat. No. 105-0300-001 (10 colors)

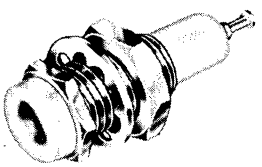
SUB-MINIATURE TIP PLUG

For use with miniature jacks. .080" dia. tip. Nickel-plated machined brass body, solder lead connection. Current rating: 5 amps.

Cat. No. 105-0770-001 (6 colors)

METAL-CLAD (MILITARY) TIP JACKS

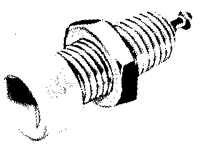
For military use or demanding industrial applications. Will withstand severe environmental temperature, vibration and salt spray conditions. Complies with MS-16108, Rev. F. of MIL-STD-242A and MIL-C-39024/10. Closed entry contact design prohibits entry of tip plug .085" or larger — prevents accidental contact damage by careless probe insertion. Heavy nickel-plated brass jacket. Gold-plated beryllium-copper contact spring greatly exceeds minimum insertion/withdrawal cycle requirements of MS-16108. Current rating: 5 amps. Peak withstanding voltage: 8,000 volts DC. Capacity to ⅛" panel: 3.8 pF. ¼"-32 nut and lock washer furnished. Terminal Style: "A." (Terminal Style "C" per MS-16108 available on special order in production quantities.) Brass solder terminal is gold-plated. **Cat. No. 105-0200-200** (10 colors)



DELUXE TIP JACK

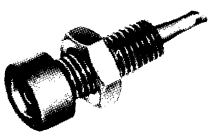
(U. S. Patent No. 2,704,357)

Molded body with recessed closed entry design contact. Silver-plated beryllium-copper contact spring. Brass solder terminal is hot tin dipped. Current rating: 10 amps. Peak withstanding voltage: 11,000 volts. Capacity to ⅛" panel: 2 pF. ¼"-32 nut furnished. **Cat. No. 105-0600-001** (10 colors)



STANDARD TIP JACK

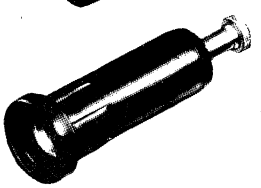
Molded body with recessed, cadmium-plated formed phosphor bronze contact. Current rating: 10 amps. Peak withstanding voltage: 9,000 volts. Capacity to ⅛" panels: 2 pF. ¼"-32 nut furnished. **Cat. No. 105-0800-001** (10 colors)



RIB-LOC® PRESS-IN TIP JACKS

RIB-LOC tip jacks install by pressing into proper size chassis hole. Accept .080" tip plug in recessed, closed-entry type contact that rejects plugs .085" or larger. Silver-plated beryllium-copper contact spring. Brass solder terminal silver-plated and Iridited. Current rating: 10 amps. Peak withstanding voltage: 5,000 volts. Capacity to ⅛" panel: 1.4 pF nominal.

Cat. No. 105-1040-001 (10 colors)



MINIATURE BANANA PLUGS

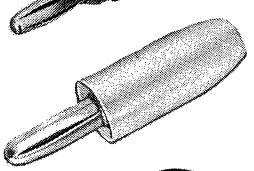
Extremely small insulated banana plugs with precision machined phosphor bronze body, nickel-plated. One-piece springs are beryllium-copper, nickel-plated, .120" dia. Polyamide sleeve. Current rating: 5 amps.

Cat. No. 108-1000-001 (6 colors)

SOLDERLESS BANANA PLUGS

Compact, high voltage insulated plug for a wide variety of applications. Designed for fast, solderless connection of up to 16 gauge standard wire. Body and pin are constructed of one-piece, nickel-plated brass with high grade nickel-silver springs. Polyamide sleeve. Current rating: 15 amps.

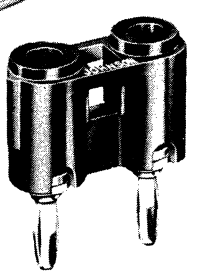
Cat. No. 108-0300-001 (10 colors)



DUAL BANANA PLUGS

Extremely versatile dual banana plug available for either solderless or set screw connection. Molded body incorporates polarity indication and strain relief hole for wire leads. Springs are high quality nickel-silver — bodies are nickel plated. Accurately machined brass studs extend full length of pins for extra strength. Peak withstanding voltage: 10,000 volts. Capacity plug to plug: 1.3 pF. Current rating: 15 amps. **Cat. No. 108-0200-001** (solderless)

Cat. No. 108-0250-001 (with set screws) (6 colors)



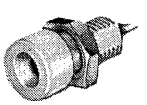
NEW MINIATURE BANANA JACK

Internal .104" hole accepts miniature banana plug 108-1000-001 with .120" dia. plug. Precision machined brass, nickel-plated. Copper terminal is preplated .00004" tin, hot-tin-dipped beyond solder area. **Cat. No. 108-1021-001**

BANANA JACK

Completely insulated polyamide body with cadmium-plated insert. Accommodates banana plugs of nominal .175" diameter. Peak withstanding voltage: 10,000 volts DC. Capacity to 1/16" panel: 2.4 pF nominal. Mounts in 21/64" diameter circular, "D," or double flat hole (¼" across flats). Single nut furnished for mounting — no other mounting hardware needed.

Cat. No. 108-0900-001 (10 colors)



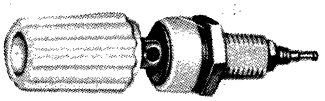
CONNECTORS

E. F. JOHNSON COMPANY

BINDING POSTS

New miniature binding post. Rated at 15 amps, thumb nut to terminal, 5 amps. Jack to terminal. Peak withstanding voltage: 5,000 volts. Capacitance to 1/8" panel; 3 pF. Mounts in 17/64" diameter circular hole; "D" or double flat hole — .219" across flats. Equipped with single 1/4"-32 nut for fast mounting. The 200 series accepts .080 tip plug; 400 series accepts .120 miniature banana plug 108-1000-001.

Cat. No. 111-0200-001 (6 colors)
Cat. No. 111-0400-001



Rated at 15 amps. Peak withstanding voltage: 8,000 volts. Capacitance to 1/8" panel: 3.3 pF. Mounts in 21/64" diameter circular hole; "D" or double flat hole — 1/4" across flats. Single 5/16"-32 mounting nut furnished — no other hardware required.

Cat. No. 111-0100-001 (10 colors)

COAXIAL CONNECTORS

The JCM connector is a semi-precision, miniature (3mm) connector giving repeatable electrical performance from DC to 3 GHz. At a fraction of the price of MIL-C-39012B SMA connectors, the JCM offers full mating compatibility with SMA types.

The bright gold finish is more dense and twice as hard as ordinary gold. The non-galling finish is 40% more resistant to wear and abrasion. Plating is 98.5 to 99.5% pure gold with a Knoop hardness of 120-140.

Cable clamp JCM plugs and jacks consist of 5 or fewer parts which are easily assembled. Only one set of stripping dimensions is required for all cables from 0.070 to 0.220" overall diameter.

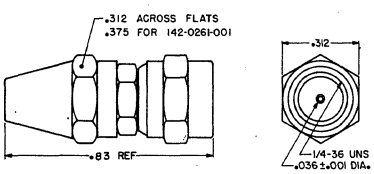
Beryllium-copper contacts assure superior spring qualities and lowest contact resistance.

ELECTRICAL, TYPICAL

Impedance	50 ohms
Frequency	DC—3 GHz
Voltage Rating	500 V RMS @ sea level
Dielectric Withstanding Voltage	1000 V RMS @ sea level
VSWR	1.15: 1 to 3 GHz
Contact Resistance	Center: 2.5 milliohms Body: 1.0 milliohms Braid to body: 0.5 milliohms
Insulation Resistance	5000 megohms

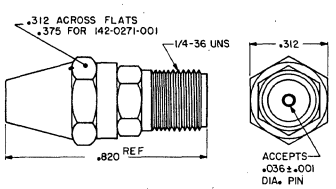
PLUG-CLAMP TYPE

Cat. No.
142-0201-001
142-0221-001
142-0261-001



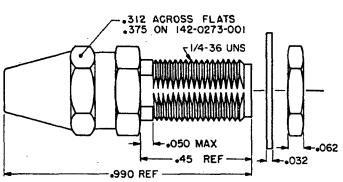
JACK-CLAMP TYPE

Cat. No.
142-0211-001
142-0231-001
142-0271-001



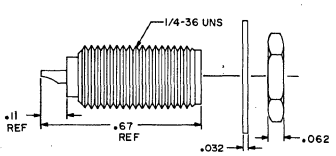
BULKHEAD JACK-CLAMP TYPE

Cat. No.
142-0213-001
142-0233-001
142-0273-001



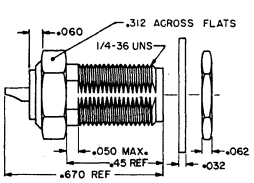
BULKHEAD FEEDTHROUGH RECEPTACLE

Cat. No.
142-0293-001



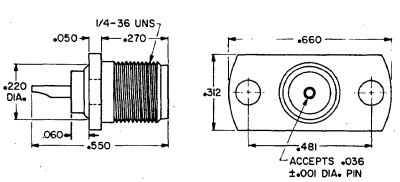
BULKHEAD RECEPTACLE REAR MOUNT

Cat. No.
142-0294-001



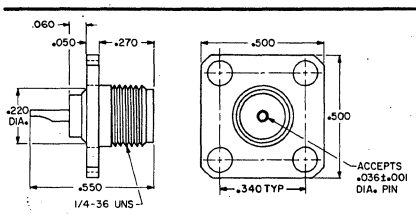
2-HOLE PANEL RECEPTACLE, FRONT MOUNT

Cat. No.
142-0296-001



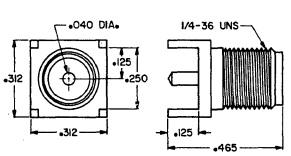
4-HOLE PANEL RECEPTACLE, FRONT MOUNT

Cat. No.
142-0297-001

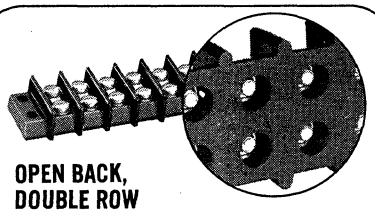


PC RECEPTACLE

Cat. No.
142-0298-001

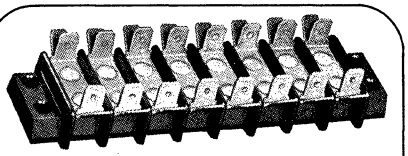


Kulka TERMINAL BLOCKS



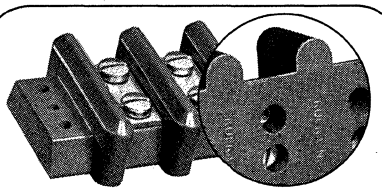
OPEN BACK, DOUBLE ROW

Current range: Up to 30 Amps.
Rated voltage: 1600 Volts RMS.*
Wire sizes: AWG #22 to 12.
Terminations: 1 thru 26.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Multiple variations available.



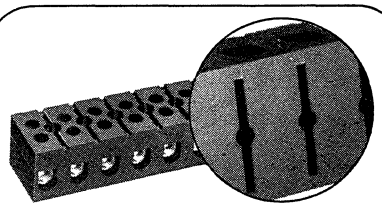
"KLIPTITE" (PUSH-ON TERMINALS) SINGLE AND DOUBLE ROW

Current range: Up to 70 Amps.
Rated voltage: 5000 Volts RMS.*
Wire sizes: AWG #22 to 12.
Terminations: 1 thru 26.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: "Kliptite" in multiple variations available.



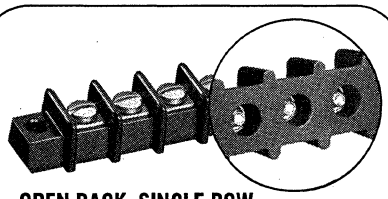
HEAVY DUTY OPEN BACK DOUBLE ROW

Current range: Up to 90 Amps.
Rated voltage: 2100 Volts RMS.*
Wire sizes: AWG #6 to 2.
Terminations: 1 thru 12.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Multiple variations available.



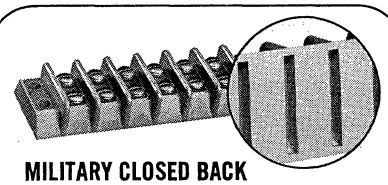
TUBULAR SCREW, DEAD FRONT

Current range: 85 Amps.
Rated voltage: 3500 Volts RMS.*
Wire sizes: AWG #16 to 6.
Terminations: 2 thru 12.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Screw type.



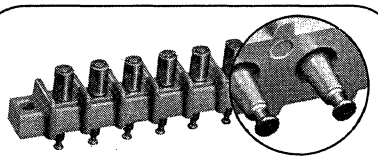
OPEN BACK, SINGLE ROW

Current range: Up to 30 Amps.
Rated voltage: 1600 Volts RMS.*
Wire sizes: AWG #20 to 12.
Terminations: 1 thru 23.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Multiple variations available.



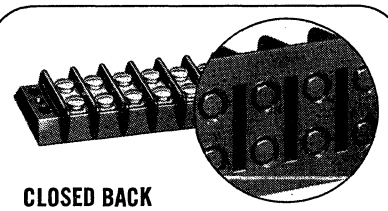
MILITARY CLOSED BACK (MOLDED IN TERMINALS) SINGLE AND DOUBLE ROW

Current range: Up to 30 Amps.
Rated voltage: 1000 Volts RMS.*
Wire sizes: AWG #22 to 10.
Terminations: 1 thru 28.
Materials: Military Grade.
Hardware: Multiple variations available.



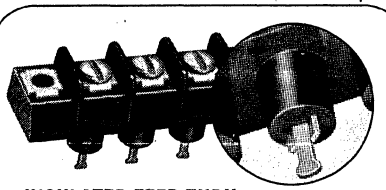
STUD AND FEED-THRU TURRET SINGLE AND DOUBLE ROW

Current range: Up to 30 Amps.
Rated voltage: 2100 Volts RMS.*
Wire sizes: AWG #22 to 2.
Terminations: 1 thru 26.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Multiple variations available.



CLOSED BACK SINGLE AND DOUBLE ROW

Current range: Up to 30 Amps.
Rated voltage: 3300 Volts RMS.*
Wire sizes: AWG #22 to 12.
Terminations: 1 thru 30.
Materials: General Purpose Phenolic.
Hardware: Multiple variations available.

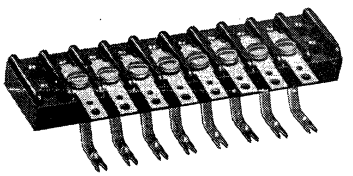


INSULATED FEED-THRU TURRET SINGLE ROW

Current range: 20 Amps.
Rated voltage: 1100 Volts RMS.*
Wire sizes: AWG #16 to 14.
Terminations: 1 thru 25.
Materials: General Purpose Phenolic unless otherwise specified.
Hardware: Multiple variations available.

PRE-MOUNTED MARKER AND INSULATOR STRIP

Kulka offers any type of marker strip or insulator strip pre-mounted on the back of each board. Pre-mounting simplifies assembly and inventory control; and the cost is the same as blocks and strips sold separately.



PROTOTYPE SERVICE

Kulka provides personal design assistance to help solve unique application problems. Where appropriate, Kulka also prepares prototypes of special terminal boards for customers' use and evaluation.

CATALOG AND DESIGN MANUAL

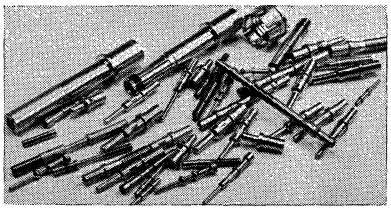
Kulka's catalog contains drawings, dimensions and application criteria presented in conjunction with data on related components and overall terminal block configurations. (Send for your copy today.)

based on ⅓ breakdown voltage

A North American Philips Company

KULKA ELECTRIC CORPORATION
520 S. Fulton Ave., Mt. Vernon, N. Y. 10551
KULKA DISTRIBUTORS ARE LOCATED THROUGHOUT THE U.S. AND CANADA

Joining of Individual Circuits



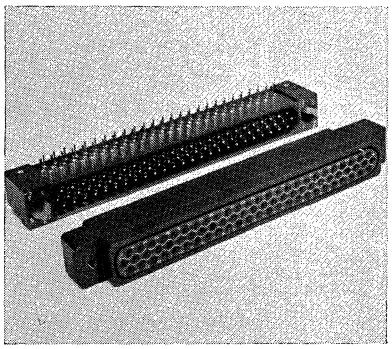
We make contacts to customer specifications and to Military specifications. Our socket retention design is the most reliable in existence (patents pending).

Contacts Started Our Business:

- Designs to meet:
  Long Life and operation in a wide spectrum of environmental conditions.
  Contact Qualifications
  Mil-C-26636 Mil-C-83723
  Mil-C-23216 Mil-C-38999
  Mil-C-39029
- Contact Resistance:
  Due to the large contact area of the Micro Electronics socket design, contact resistance is well within the specification requirements. This allows connectors to handle extremely low level signals with no distortion.
- Insertion/Withdrawal:
  Contacts can be designed to produce less than 2 oz. withdrawal or if greater than spec. values are needed we can go as high as the application requires. Life cycles show a very low wear rate and far exceed Mil. Specs.
- Mechanical Stability:
  Because of the symmetrical pattern of socket and pin engagement, these contacts are insensitive to the effects of shock and vibration.

Micro Electronics utilizes the finest materials and takes every step to retain the ductile and tensile properties, so that destructive tests such as, probe damage will not effect the normal operation.

In the Air

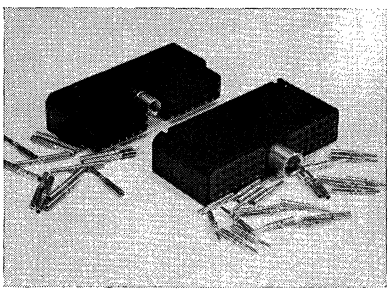


We have developed many firsts including a fully environmental connector pair, now being used in the printed circuits (Avionics) of todays flying machines. We'll even take your connectors to 110,000 ft., without leaving our facility. (Testing performed in our complete environmental test lab).

- Receptacle, Series 10-0003-00-05 has right angle 20 AWG Pins for assembly to circuit board.
- Plug, Series 11-0002-0005 utilizes MS 27491 20 AWG Sockets - Rear Release.
- Contacts, seventy-six (76) each on .100 centers.
- Connectors Designed to meet or exceed requirements of Mil-C-38999.
- Available in non-environmental and potting versions, designs can be modified to incorporate customers mounting & contact quantity requirements.
- Designs are being established to provide .050 spacing between contacts in circular and rectangular series connectors.

Space

[word meaning: Area]



We fill our Space with circuitry that almost exceeds the Area.

Why don't you try us for size.

When it comes to design we have miniature and subminiature connecting devices to meet the widest range of critical environments — We'll prove it.

- High Strength connector body.
- Center Jack-screw coupling mechanism.
- Silicone Interfacial Seals.
- Silicone Grommet for wire seals.
- Contacts, forty-two (42) each 22 AWG - rear-release, on .080 centers.
- Connectors designed to meet or exceed requirements of Mil-C-26482.
- Available in non-environmental and potting versions.

micro electronics corporation

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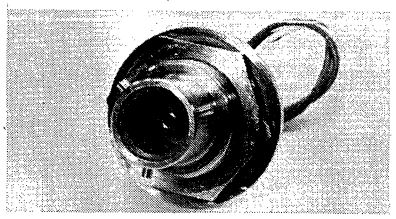
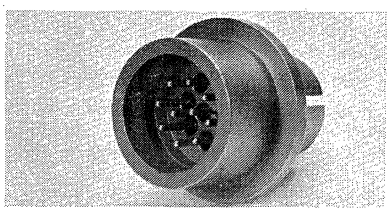
(805) 947-8908 / SALES (805) 947-0398

Under the Sea



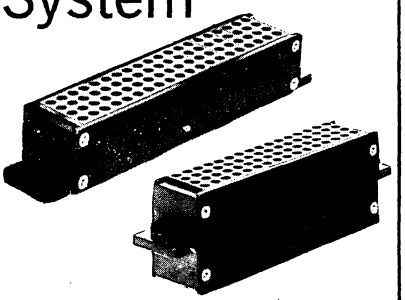
- Micro Electronics contacts have surpassed critical electronics specifications for the Navy — Poseiden Missile.
- Our contacts are currently being used in computers on board the latest craft.
- Designs are being established for molded connector assemblies to operate at 2,000 ft., 10,000 ft., and 20,000 ft. per Mil-C-24217.

Where Reliability Counts



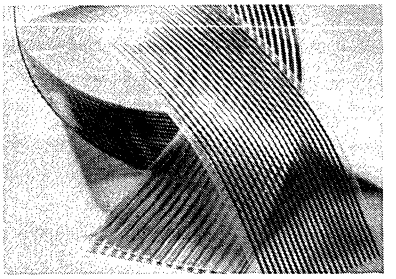
- Micro Electronics is proud to be part of the electrical connecting systems now being used in Nuclear power generating stations.
- Design Criteria:
  40 year life with temperature cycling from −20°F to 300°F. Design requirements include environmental and electrical integrity under normal and incident conditions with provisions for seismic forces.
- Power contacts to Mil-C-5015 and power plugs are our specialty.

Mil-T-81714 Terminal Junction System



- Profile Terminal Junction:
  Micro Electronics has designed and is incorporating a system that eliminates wafer stack up — proportionately reducing height by as much as ⅓.
- Retention and Bussing:
  Sockets have the reliability and surface contact of Mil-Spec. gauges packaged into mounting matrice that becomes integral with other sockets from which a logical progression of modules can be packaged, creating an interconnection system for an unlimited number of wires in gauges ranging from 12 AWG through 26 AWG.
- Installation:
  The male contact is pushed into position with a non-conductive tool. The male contact is held solidly in place by a self locking retainer. The retention system features "closed entry".
- High Strength:
  Module body with silicone interfacial seals for environmental applications.
- Mounting:
  Construction and Design is adaptable to customer mounting requirements.

On the Way



Flex-Con ™

Tomorrow's Wiring Systems Today

- Flex-Con: Cable is made up of superflex flat conductors that are made from fully annealed copper and rolled flat with this reduction producing greatest yield strength and texture crystal matrix of optimum bend. All conductors share stresses equally in the cable. Conductors are held parallel to very close tolerances across one of the largest size cable areas up to 13" wide, providing balanced electrical values. Conductors 4/0 through 24 gauge have proportionate space, and weight savings when compared to round wire construction. As an example of weight consideration each extra pound on a flight from Minneapolis to London represents a ton mile of cargo.
- Cables designed to Mil-C-55543 with connectors per Mil-C-55544. Cable construction meeting National Aerospace Standard NAS-729 Flat Flexible Conductor Cable 300 volts copper can be provided. Cable sizes under the classification of Marshall Space Flight Center Specification MSPC-220A.
- Cables produced with insulation materials such as polyester +125°C, Teflon 200°C and Polyamide 240°C.
- Applications:
  Flat Signal transmission. Jumper Cables, and Power Cables.

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MIL-C-28748 Rectangular Connectors Removable Contacts (Supersedes Mil-C-8384 & Mil-C-22857)

Specifications:

Number of Contacts: 14, 18, 20, 26, 34, 41, 42, 50, 66, 75, 104

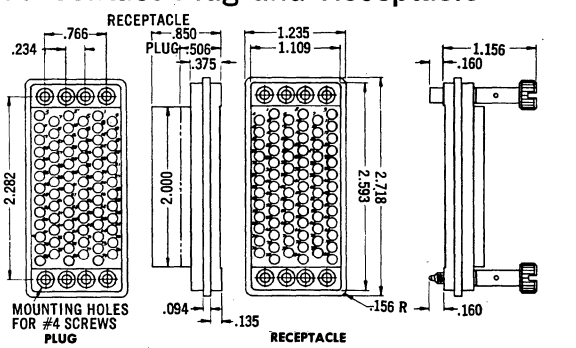
Mechanical Characteristics (Connector)
- **Temperature:** −55°C to +125°C
- **Vibration:** 10g 10 - 55 Hz
- **Shock:** 50g Shock Loading
- **Durability:** 500 Cycles
- **Contact Retention:** 25 lbs. Axial Load after 10 Insertion & Withdrawal.

Electrical Characteristics (Connector)
- I.R.: 5,000 Megohms @ 500 V.A.C.
  1,000 Megohms @ 500 V.A.C. After Moisture Test
- **High Potential:** 2,000 V.A.C. @ Sea Level
  1,000 V.A.C. After Corrosion
  750 V.A.C. After Moisture

Materials:
- Insulators: Diallyll Phthalate per Mil-M-14 SDG-F or Mil-P-19833 GDI-30F
- Contacts: Leaded Copper per CA 187
- Contact Finish: Gold .000050 per Mil-G-45204B Type I, Grade D, Class I, over Copper.

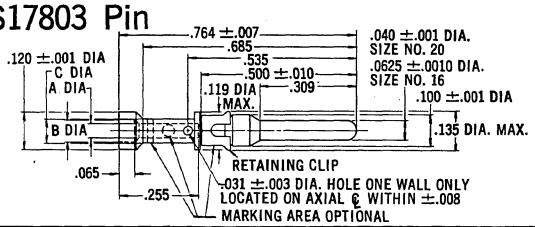
Modified Hardware: Consult factory for special plating, and protective shield for applications having live pins in the plug, or where pin protection is needed.

75 Contact Plug and Receptacle



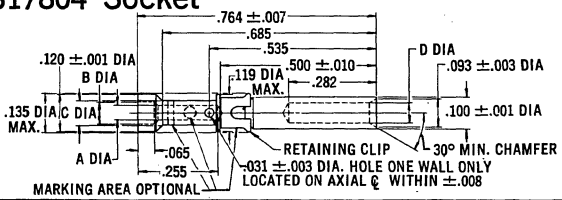
Contact/Crimp Size / Pot	Wire Size	Amperes	M.V. Drop
16/16	16	13	50
16/16	18	10	—
16/16	20	7.5	45
16/20	22	5.0	55
16/20	24	3.0	45
20/20	20	7.5	55
20/20	22	5.0	55
20/20	24	3.0	55

MS17803 Pin



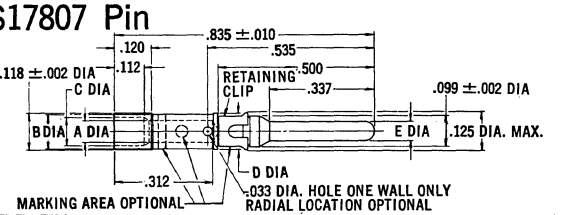
Micro Electrs. Part Number	Military Part Number	Contact Size	Barrel Size	Wire Range	Marking Require.	A DIA.	B DIA.	C DIA.	D DIA.	E DIA.
00-17803-016	MS 17803-16-20	16	20	20-22-24	RED	.048 .044	.070 .067	.079 .076		
06-17803-016	MS 17803-16-16	16	16	16-18-20	BLUE	.070 .066	.095 .092	.112 .109		
00-17803-020	MS 17803-20-20	20	20	20-22-24	RED	.048 .044	.070 .067	.079 .076		

MS17804 Socket



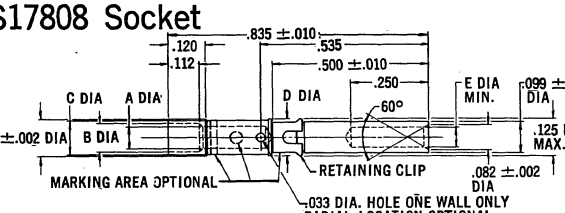
00-17804-016	MS 17804-16-20	16	20	20-22-24	RED	.048 .044	.070 .067	.079 .076	.0645 Min.	
06-17804-016	MS 17804-16-16	16	16	16-18-20	BLUE	.070 .066	.095 .092	.112 .109	.0645 .Min.	
00-17804-020	MS 17804-20-20	20	20	20-22-24	RED	.048 .044	.070 .067	.079 .076	.042 Min.	

MS17807 Pin



06-17807-016	MS 17807-16-16	16	16	16-18-20	BLUE	.070 .067	.090 .088	.112 .109	.119 .116	.0635 .0615
00-17807-016	MS 17807-16-20	16	20	20-22-24	RED	.048 .045	.070 .068	.079 .076	.119 .116	.0635 .0615
011-0006-000	———	20	20	20-22-24	RED	.048 .045	.070 .068	.079 .076	.119 .116	.041 .039

MS17808 Socket



06-17808-016	MS 17808-16-16	16	16	16-18-20	BLUE	.070 .067	.090 .088	.112 .109	.119 .116	.064 .064
00-17808-016	MS 17808-16-20	16	20	20-22-24	RED	.048 .045	.070 .068	.079 .076	.119 .116	.064 .064
016-0038-000	———	20	20	20-22-24	RED	.048 .045	.070 .068	.079 .076	.119 .116	.042 .042

Insertion Tool MS 17805 — Withdrawal Tool MS 17806
Crimping Tool MS 3191 — Positioner 5T

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mueller clips

THE WORLD'S LARGEST AND ONLY COMPLETE LINE

MANUFACTURED FOR GENERAL SALE SINCE 1908

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"WE BEGIN WHERE THE WIRE ENDS"

(For detailed information, refer to the Mueller Clip pages in the "Radio Electronic Master.")

IN UNIVERSAL USE FOR ALL KINDS OF QUICK, TEMPORARY ELECTRICAL CONNECTIONS. PLATED STEEL AND SOLID COPPER. INSULATORS IN STANDARD RED AND BLACK, AND IN SPECIAL COLORS — WHITE, BLUE, YELLOW AND GREEN.

"Mini-gator" and "Micro-gator" clips to fit the smallest crevices in tightly compacted equipment. Separate insulators for skin-tight, complete insulation.

Alligator Clips, including completely insulated model.

Crocodile Clips. (Nesting teeth.)

"Pee Wee" Clips, including completely non-ferrous type.

General purpose test clips with meshing teeth.

Needle Clips — Twin Clip — Geophone Clips.

Clips for Battery Booster Cables and Chargers.

Heavy duty Test and Battery Clips.

Large welding ground clamps.

Appliance ground clamps.

Separate flexible insulators.

NO. 123 DISPLAY-SELECTOR BOARD, a permanent, gloss-finish board of our entire line. Shipped complete, set up, with items in place over their printed code numbers. We absorb much of the cost, charging only $10.00 net postpaid in order to provide a unit which solves all quick-testing and clip-terminal problems for engineering and design departments, manufacturers and laboratories. Order direct from factory.

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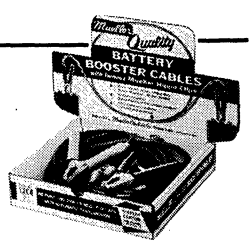
Toronto, Ontario — W. H. Cooper & Co., 4480 Chesswood Dr. #3, Downsview 462
Waco, Texas 76710 — Sanders-Willis Co., P. O. Box 7452



QUALITY BATTERY BOOSTER CABLES . . .

Heavy duty design for the commercial or industrial user who knows what he wants. Finely stranded pure copper cable with rubber insulation for maximum flexibility in coldest weather. 6 ga. 259 strands #30 wire, 4 ga. 413 strands #30. Mueller Hippo-Clips strongly clinched to cable and soldered for maximum current flow. Three models: 8' and 12' 6 ga. 100 amp.; 12' 4 ga. 200 amp.

Our Reader Service Department will answer your technical questions, and will honor your request for the latest catalog of our complete line.

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Factory will supply free sample clips for your inspection. Refer to complete listing in "Radio Electronic Master."

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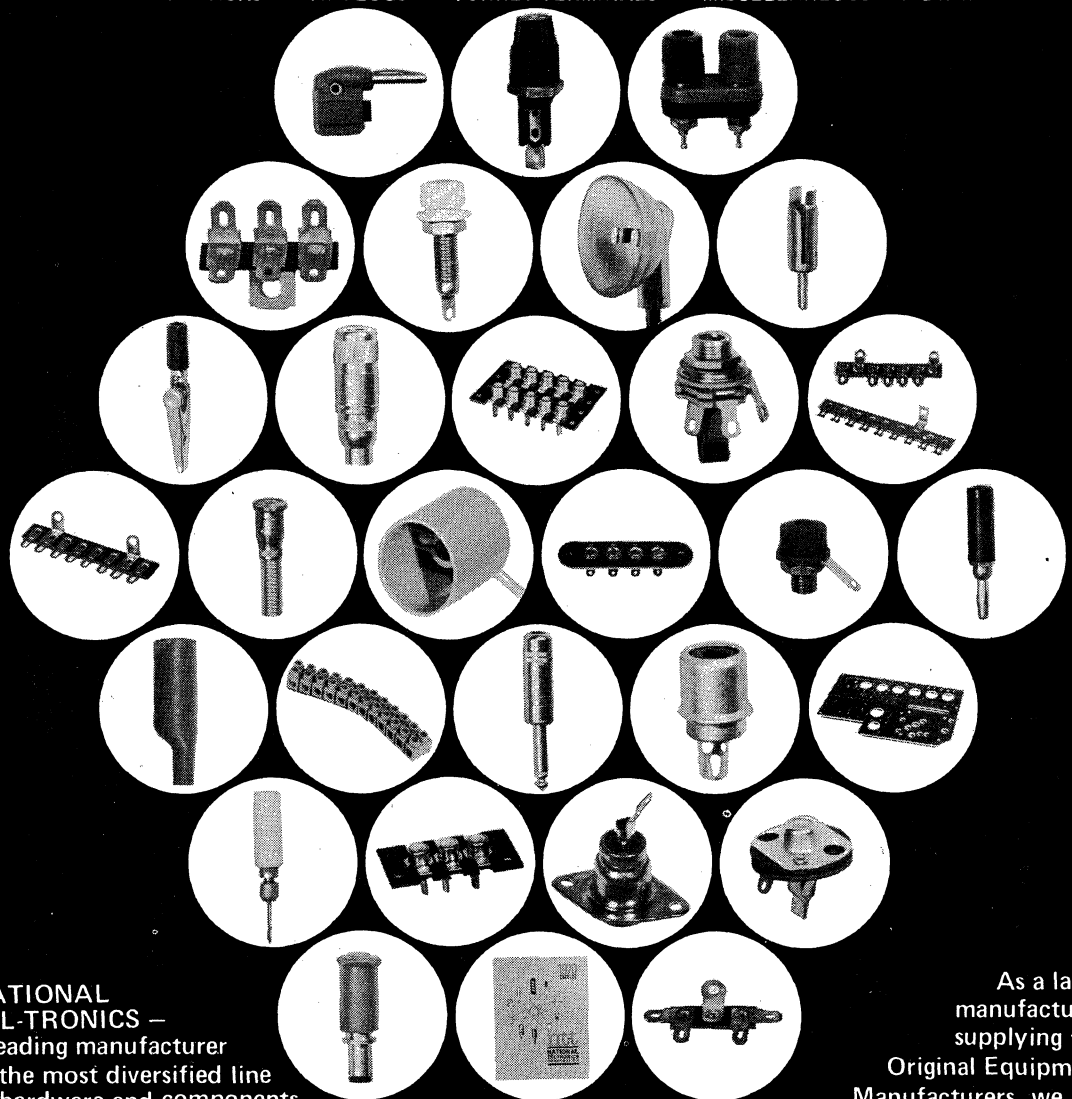
ALLIGATOR CLIPS • ANODE CONNECTORS • BANANA JACKS • BANANA PLUGS • BINDING POSTS • BINDING POST BOARDS • COAXIAL JACKS • COAXIAL ANTENNA PLUGS AND JACKS • CONTACT STRIPS AND CONNECTORS • EXTENSION/IN-LINE PHONE JACKS • FABRICATED PARTS • FUSE AND DIODE HOLDERS • INTERLOCK RECEPTACLES • MICROPHONE CONNECTORS • MOLDED TERMINAL BLOCKS AND COMPRESSION TYPE CONNECTORS • PHONE JACKS • PHONE PLUGS • PHONO JACKS • PHONO PLUGS • PILOT LIGHT SHIELDS • PIN PLUGS AND SOCKETS • PLATE CAPS, HIGH VOLTAGE • SPEAKER TERMINAL STRIPS • SWITCHING JACKS • TERMINAL STRIPS, STANDARD, MINIATURE, SUB-MINIATURE • TEST PRODS AND TEST LEAD SETS • TIP JACKS • TIP PLUGS • TURRET TERMINALS • MISCELLANEOUS HARDWARE



NATIONAL TEL-TRONICS – a leading manufacturer of the most diversified line of hardware and components for the electronic industry.

FULL DETAILS, AND ENGINEERING SPECIFICATIONS IN OUR BIG CATALOG. SEND FOR YOUR COPY

FOR RELIABILITY

As a large manufacturer supplying the Original Equipment Manufacturers, we and our distributors in your local area maintain a stock of standard parts. Specify NTT for Hi-Reliability and Service.

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A DIVISION OF EASTERN AIR DEVICES, INC.

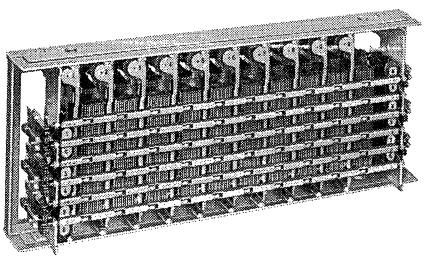
NATIONAL TEL-TRONICS CORPORATION

55 NORTHERN BLVD. GREAT NECK, L.I. NEW YORK 11021, (516) 466-5100

No one does more switching and connecting than the telephone industry.

Ever wonder why they almost always specify "electro-mechanical" equipment?

The answer is clear:
Telephone-type components offer virtually total reliability at a fraction of the cost. And North Electric offers the finest line of telephone-type components available.



North Electric Company manufactures a 1200 point Crossbar Switch which provides the most economical approach to switching. Reliability is excellent - greater than 50 million operations per select unit.

SPECIFICATIONS:

Operating Voltage – 24, 48, 100 VDC.

Timing – Typical operate and release times.

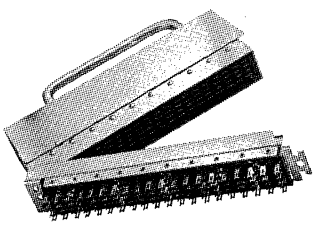
operate of select bar	– 15 MS
delay required for damping	– 15 MS
operate of hold bar	– 15 MS
total operate time is	– 45 MS
release time of select bar is	– 8 MS

dealy time required before operation of new cycle is 30 MS, therefore, a complete typical cycle time is approximately 83 MS.

Contact Rating – Bank contacts are bifurcated silver or gold which with adequate spark protection, are rated at 25 MA at 48 VDC or 110 VAC. They will provide a life in excess of 50 x 10^6 operations. Off normal contacts are bifurcated silver, rated at 0.4 ampers at 48 VDC or 110 VAC with proper contact protection.

Contact Resistance – Resistance of typical path is less than 50 milliohms for silver or gold contacts.

Size – 1200 point crossbar switch measures 1067 cubic inches. **length** 23 inches. **height** 8.674 inches. **width** 5.350 inches. **weight** 29 lbs.



North Electric Company manufactures 40, 60, 80 and 100 pin connectors using the torsion blade design which assures positive contact.

SPECIFICATIONS:

Dielectric Strength – Measured between conducting parts and frame, breakdown to voltage is in excess of 2000 volts R.M.S. when measured for one minute at sea level.

Contact Rating – The current rate is three (3) amperes. When several adjacent contacts are required to carry the same maximum load, current rating should be reduced two (2) amperes per contact.

Contact Resistance – Measured between soldering points, average resistance is 12 milliohms (silver) 9 milliohms (gold), measured with an open circuit voltage of .100 volts and a short circuit current of .100 amperes D.C.

Mechanical Life – Standard connector unit withstands 4000 plug-in operations with negligible mechanical wear.

NORTH ELECTRIC COMPANY

Electronetics Division / Galion, Ohio 44833 / A subsidiary of United Utilities, Incorporated
For immediate service, call 419/468-8279.

POMONA ELECTRONICS

¾" SPACED MOLDED BANANA PLUGS

General Specifications listed below apply to items using banana plugs in this catalog.

FEATURES . . .

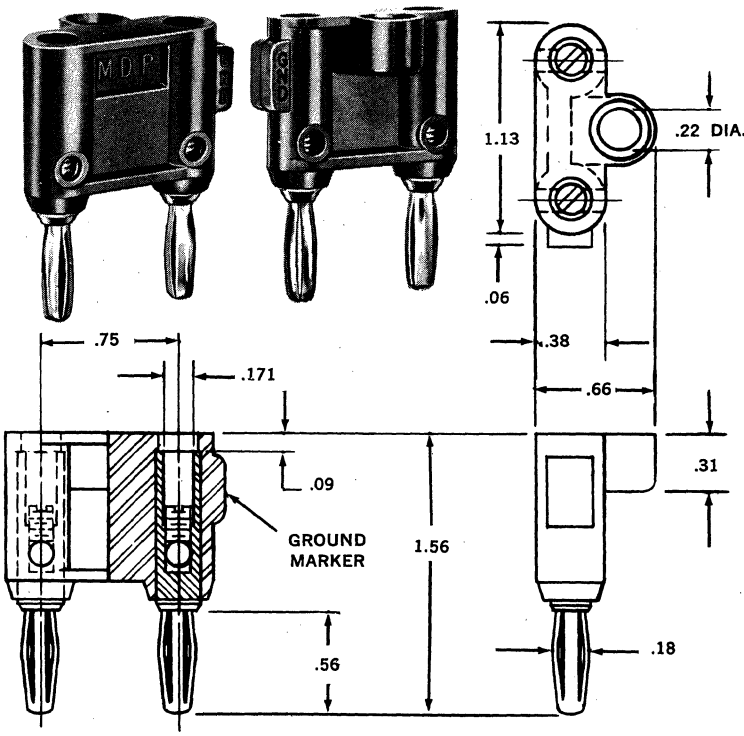
- One piece beryllium copper heat treated spring for maximum long life.
- Rounded spring design results in maximum contact area.
- STACK-UP feature allows an unlimited number of connections at the same electrical point.
- Tough thermoplastic molded directly on to the metal body of the plugs and connectors.

SPECIFICATIONS . . .

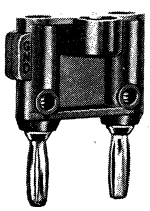
- Fits standard 0.166 dia. banana jacks.
- Spring, beryllium copper alloy 170 per QQ-C-533.
- Plug body, Brass per QQ-B-626. Comp. 22.
- Nickel plated per QQ-N-290, Class 2.
- Contact resistance less than 0.001 ohms per banana plug.

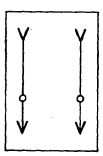
RATINGS	Models: MDP; MDP-ST; 1330; 1330-ST; 2970
■ Capacity :	0.8 pf to 10 MC
■ Current :	15 Amps. Cont., 30 Amps. Int.
■ Voltage :	5000 W.V. D.C.
■ Temperature :	—25°C to +85°C, operating temp.

ACTUAL SIZE



DOUBLE BANANA PLUG



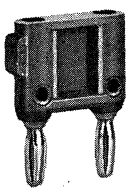


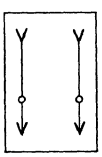
Double banana plug on ¾" centers; set screws secure leads; simplifies cable construction or component mounting; banana jacks permit top Stack-Up for multiple connections.

COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL MDP (Specify Color) QUANTITY DISC. CODE (A) **NET .75**

COMPONENT MOUNTING DOUBLE BANANA PLUG



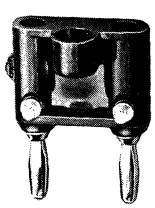


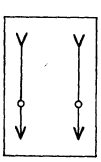
Double banana plug on ¾" centers; set screws secure leads; features recess for mounting small components; banana jacks permit top Stack-Up for multiple connections.

COLORS: Black, Red

MODEL 1330 (Specify Color) QUANTITY DISC. CODE (A) **NET .75**

DOUBLE BANANA PLUG WITH SOLDER TURRET TERMINALS



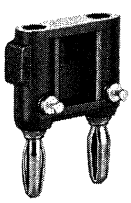


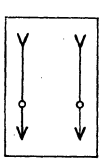
Similar to Model MDP, except has solder turret terminals for permanent noise-free connections of cables and components. Double banana plug on ¾" centers; banana jacks permit top Stack-Up for multiple connections.

COLOR: Black

MODEL MDP-ST QUANTITY DISC. CODE (A) **NET .95**

COMPONENT PLUG WITH SOLDER TURRET TERMINALS



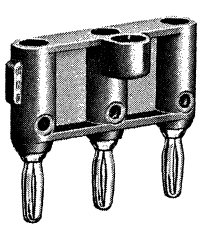


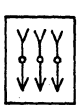
Similar to Model 1330, except has solder turret terminals for permanent noise-free connections of components, etc. Double banana plug on ¾" centers: Banana jacks permit top Stack-Up for multiple connections.

COLORS: Black, Red.

MODEL 1330-ST (Specify Color) QUANTITY DISC. CODE (A) **NET .95**

TRIPLE BANANA PLUG



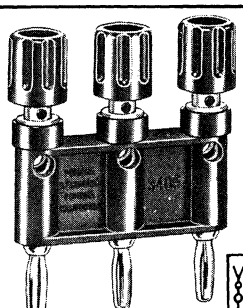


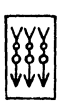
Triple banana plug on ¾" centers; set screws secure leads. Ideal for balanced line 2 conductor shielded cable assemblies. Banana jacks permit top Stack-up for multiple connections.

COLORS: Black, Red.

MODEL 2970 (Specify Color) QUANTITY DISC. CODE (A) **NET 1.25**

BINDING POSTS TO TRIPLE BANANA PLUG





Features insulated binding posts on ¾" centers for rapid mounting and interchangeability of components. Binding posts allow top Stack-Up for multiple connections. Side Stack-Up provided by thru-holes in plug body.

UPPER: Insulated Triple binding posts, on ¾" centers. Cross holed (.166 dia.) in body provide side Stack-Up connections.

LOWER: Triple banana plug, on ¾" centers.

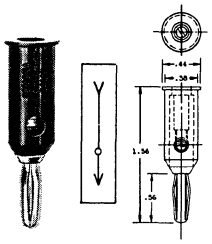
COLORS: Body, Black. Binding Posts, Red/Black/Black.

MODEL 3405 QUANTITY DISC. CODE (A) **NET 4.50**

POMONA ELECTRONICS

BANANA PLUG ACCESSORIES

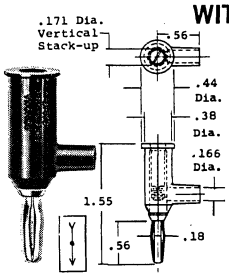
SOLDERLESS BANANA PLUG —STACK-UP



Wire firmly held in place with internal set screw, eliminating soldering. Assembly of test leads simplified.
UPPER: Banana jack, .171 dia.; Brass, nickel plated.
LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 0.166 dia. banana jack.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 1325 (Specify color) QUANTITY DISC. CODE (A) **NET .50**

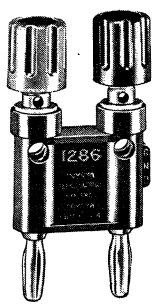
SOLDERLESS BANANA PLUG WITH SAFETY COLLAR —STACK-UP

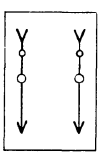


Features: Integral safety collar insulates exposed wire leads. Wire firmly held in place with internal set screw, eliminating soldering. Assembly of test leads simplified.
UPPER: Banana jack, .166 dia.; Brass, nickel plated.
LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 0.166 dia. banana jack.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 1825 (Specify Color) QUANTITY DISC. CODE (A) **NET .50**

BINDING POSTS TO DOUBLE BANANA PLUG

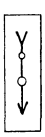




Features insulated binding posts on ¾" centers for rapid mounting and interchangeability of components. Binding posts allow top Stack-Up for multiple connections. Side Stack-Up provided by thru-holes in plug body.
UPPER: Insulated double binding posts, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: Double banana plug, on ¾" centers.
COLORS: Body, Black. Binding Posts, Black/Red.

MODEL 1286 QUANTITY DISC. CODE (A) **NET 2.75**

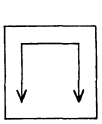
BINDING POST TO SINGLE BANANA PLUG



Features insulated binding post. Binding post allows top Stack-Up for multiple connections. Side Stack-Up provided by thru-hole in plug body.
UPPER: Insulated binding post. Cross hole (.166 dia.) in body provides side Stack-Up connections.
LOWER: Single banana plug, one piece nickel plated beryllium copper spring for use with standard 0.166 dia. banana jack.
COLORS: Black, Red.

MODEL 2894 (Specify color) QUANTITY DISC. CODE (A) **NET 1.50**

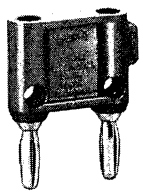
METAL SHORTING BAR

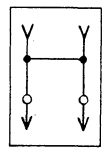


Low profile, nickel plated brass shorting bar. Double banana plugs on ¾" centers swaged to 3/32" thick brass bar. Resistance, less than 1.5 milliohms installed. Current rating: 15 Amps. Cont., 30 Amps. Int.

MODEL 1855 QUANTITY DISC. CODE (A) **NET .85**

INSULATED SHORTING BAR

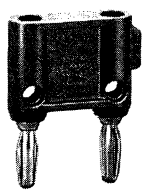


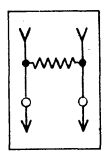


Ideal as a connecting link for use with ¾" spaced banana jacks. Banana plugs internally solder-bonded with #14 AWG wire. Banana jacks provide top Stack-Up. Cross holes (.166 dia.) in body provide side Stack-Up connections. Resistance less than 1.5 milliohms installed. Current rating 15 Amps. Cont., 30 Amps. Int. "Shorting Bar" marked on top of plug.
COLORS: Natural, Black, Red.

MODEL MDP-S (Specify Color) QUANTITY DISC. CODE (A) **NET 1.25**

MOLDED PRECISION RESISTOR



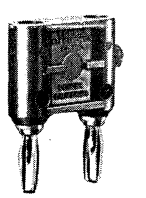


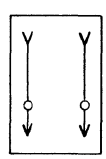
Ideal where rapid interchange of resistance values is required. Used in breadboarding, R & D labs., Standards, Terminations, etc. Deposited carbon 1% resistor, ½ watt, molded internally. Resistor soldered to double banana plug, on ¾" centers. Top Stack-Up provided for multiple connections. Cross holes (.166 dia.) in body provide side Stack-Up connections. Resistance value stamped on top of plug.

(OHMS)				
50	200	1K	100K	1 Meg.
75	250	5K	200K	2 Meg.
120	500	10K	250K	5 Meg.
130	600	20K	500K	10 Meg.
150	900	50K		

MODEL MDP-R (Specify Value) QUANTITY DISC. CODE (A) **NET 2.95**

ADAPTER — .080 TIP JACKS TO DOUBLE BANANA PLUG

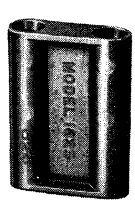


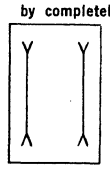


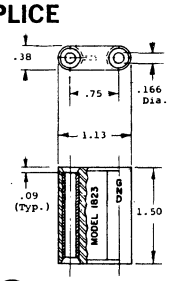
Permits .080 Tip plugs to be used with equipment having banana jacks.
UPPER: Tip jacks, beryllium copper, gold flashed; spaced on ¾" centers to accept .080 dia. pin tip plugs.
LOWER: Double banana plug, on ¾" centers, nickel plated. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1845 QUANTITY DISC. CODE (A) **NET .95**

DOUBLE BANANA PLUG SPLICE



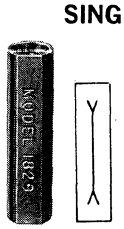


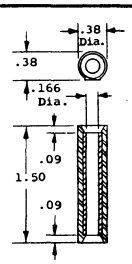


Provides rapid method for splicing cables. Reduces necessity of storing extra long cables. Molded thermo-plastic body eliminates shock hazard by completely enclosing banana plug contact. Brass, nickel plated banana jacks. .166 dia., on ¾" centers.
COLORS: Black, Red.

MODEL 1823 (Specify color) QUANTITY DISC. CODE (A) **NET .50**

SINGLE BANANA PLUG SPLICE





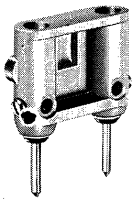
Provides rapid method for splicing single banana plug patch cords. Reduces the necessity of storing extra long patch cords. Molded thermo-plastic body eliminates shock hazard by completely enclosing banana plug contact. Brass, nickel plated banana jack, .166 dia.
COLORS: Black, Red.
Standard Package: 10 (per color)

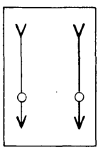
MODEL 1829 (Specify color) QUANTITY DISC. CODE (A) **NET .25 ea.**

POMONA ELECTRONICS

.080 PIN TIP PLUG ACCESSORIES

COMPONENT MOUNTING — TIP JACKS TO DOUBLE PIN TIP PLUG — SET SCREWS

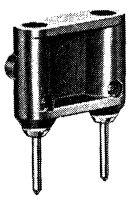


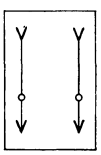


Features set screws on side of body to secure leads or components. Recess permits mounting of small component parts.
UPPER: Tip jacks, beryllium copper, gold flashed, spaced on ¾" centers, to accept .080 dia. pin tip plugs.
LOWER: Pin tips, .080 dia. on ¾" centers. Brass, nickel plated.
COLORS: Black, Red.

MODEL 2192 (Specify color) QUANTITY DISC. CODE (A) **NET 1.85**

COMPONENT MOUNTING PLUG— BANANA JACKS TO DOUBLE PIN TIP —SET SCREWS

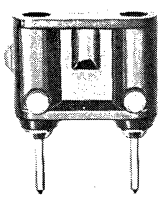


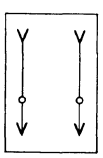


Permits single or double banana plugs to be used in equipment having tip jacks. Features recess for component mounting. Internal set screws firmly secure wire leads.
UPPER: Banana jacks, .166 dia., on ¾" centers. Brass, nickel plated.
LOWER: Pin tips .080 dia. on ¾" centers. Brass, nickel plated.
COLOR: Black.

MODEL 1858 QUANTITY DISC. CODE (A) **NET .75**

PLUG — COMPONENT MOUNTING — DOUBLE PIN TIP PLUG—SOLDER TURRETS

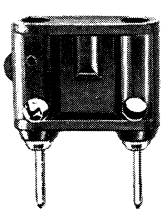


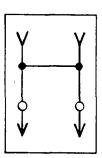


Features recess for mounting components. Gold flashed solder turrent terminals for permanent noise-free connections.
UPPER: Tip jacks, beryllium copper, gold flashed; spaced on ¾" centers to accept .080 dia. pin tip plugs.
LOWER: Pin tips, .080 dia. brass, nickel plated.
COLORS: Black, Red.

MODEL 1904 (Specify color) QUANTITY DISC. CODE (A) **NET 1.10**

INSULATED SHORTING BAR

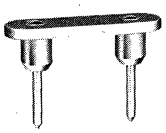


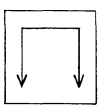


Used as a connecting link with equipment having tip jacks. Plugs internally solder bonded with 14 AWG wire. Top stack-up feature.
Current rating: 5 AMPS. cont., 10 AMPS. int. "Shorting Bar" marked on top of plug.
UPPER: Banana jacks, .166 dia. on ¾" centers. Brass, nickel plated.
LOWER: Pin tips, .080 dia. on ¾" centers. Brass, nickel plated. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLORS: Black, Red.

MODEL 1730 (Specify color) QUANTITY DISC. CODE (A) **NET 1.25**

METAL SHORTING BAR

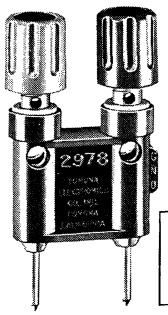


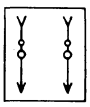


Used as a connecting link with equipment having tip jacks. Low profile, nickel plated brass shorting bar. Double pin tip plugs on ¾" centers swaged to 3/32" thick brass bar.
RESISTANCE: Less than 1.5 milliohms installed.
CURRENT RATING: 5 Amps Cont., 10 Amps Int.

MODEL 2072 QUANTITY DISC. CODE (A) **NET .85**

BINDING POSTS TO DOUBLE PIN TIP PLUG

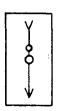




Features insulated binding posts on ¾" centers for rapid mounting and interchangeability of components. Binding posts allow top Stack-Up for multiple connections. Side Stack-Up provided by thru-holes in plug body.
UPPER: Insulated double binding posts on ¾" centers. Top and side stack-up connectors (.166 dia.). Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: Pin tips, .080 dia. on ¾" centers. Brass, nickel plated.
COLORS: Body, Black, Binding Posts, Black/Red.

MODEL 2978 QUANTITY DISC. CODE (A) **NET 2.25**

BINDING POST TO SINGLE PIN TIP PLUG



Features insulated binding post. Binding post allows top Stack-Up for multiple connections. Side Stack-Up provided by thru-holes in plug body.
UPPER: Insulated binding post. Top and side Stack-Up connectors (.166 dia.). Cross hole (.166 dia.) in body provide side Stack-Up connections.
LOWER: Pin tip, .080 dia. brass, nickel plated.
COLORS: Black, Red.

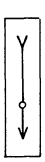
MODEL 2953 (Specify color) QUANTITY DISC. CODE (A) **NET 1.35**

SOLDERLESS PIN TIP PLUG—STACK-UP

Wire firmly held in place with internal set screw, eliminating soldering. Assembly of test leads simplified.
UPPER: Tip jack, beryllium copper, gold flashed; accepts .080 dia. pin.
LOWER: Pin tip, .080 dia., brass, nickel plated.
COLORS: Black, Red.

MODEL 1922 (Specify color) QUANTITY DISC. CODE (A) **NET .95**

ADAPTER — BANANA JACK TO PIN TIP

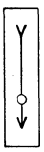


Permits standard single banana plug patch cords to be used with equipment having tip jacks.
UPPER: Banana jack, .166 dia. Brass, nickel plated.
LOWER: Pin tip, .080 dia. Brass, nickel plated. Cross hole (.166 dia.) in body provides side Stack-Up connection.
COLORS: Black, Red.

Standard Package: 10 (per color)

MODEL 1432 (Specify Color) QUANTITY DISC. CODE (A) **NET .20 ea.**

ADAPTER — .080 TIP JACK TO BANANA PLUG

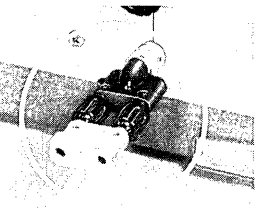


Permits .080 dia. pin tip patch cords to be used with equipment having banana jacks. Insulation molded to plug body.
UPPER: Tip jack, beryllium copper, gold flashed. Accepts .080 dia. pin.
LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 0.166 dia. banana jack. Cross hole (.166 dia.) in body provides side Stack-Up connection.
COLORS: Black, Red.

MODEL 1809 (Specify Color) QUANTITY DISC. CODE (A) **NET .75**

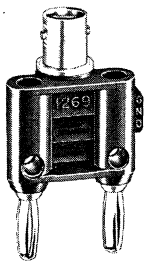
POMONA ELECTRONICS

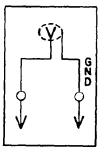
BNC ADAPTERS



Now! Increase the flexibility of your laboratory with the use of POMONA Molded test accessories. Minimize the necessity of stocking a large quantity and variety of coaxial cables by using POMONA molded adapters. Tough thermo-plastic material molded to plug body or connectors insures maximum strength, moisture resistance and excellent insulative properties.

ADAPTER — BNC RECEPTACLE TO DOUBLE BANANA PLUG

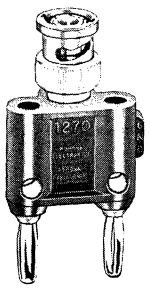


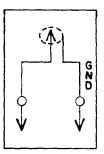


Permits BNC plug to be used with equipment having banana jacks. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.
UPPER: BNC receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1269 QUANTITY DISC. CODE (A) **NET 3.25**

ADAPTER — BNC PLUG TO DOUBLE BANANA PLUG

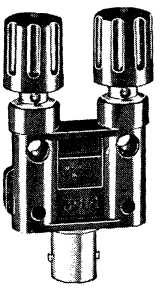


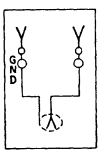


Permits BNC receptacle to be used with equipment having banana jacks. Minimizes number of coaxial connections for maximum efficiency.
UPPER: BNC plug.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1270 QUANTITY DISC. CODE (A) **NET 3.95**

ADAPTER — BINDING POSTS TO BNC RECEPTACLE

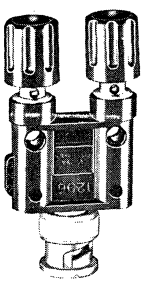


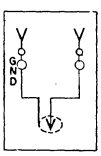


Permits single or double banana plugs to be used with equipment having BNC plug.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: BNC receptacle.
COLOR: Body, Black. Binding Posts: Black/Red.

MODEL 1452 QUANTITY DISC. CODE (A) **NET 4.95**

ADAPTER — BINDING POSTS TO BNC PLUG

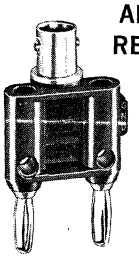


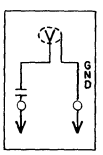


Permits single or double banana plugs to be used with equipment having BNC receptacle. Excellent for use with laboratory oscilloscopes.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: BNC plug.
COLOR: Body, Black. Binding Posts: Black/Red.

MODEL 1296 QUANTITY DISC. CODE (A) **NET 4.95**

ADAPTER — SIGNAL ISOLATOR — BNC RECEPTACLE TO DOUBLE BANANA PLUG





Permits BNC male connector to be used with equipment having banana jacks. General purpose ceramic capacitor molded internally. Rated @ .01 mfd ±20%, 200 WVDC. Insulation resistance 10,000 megohms min. Ideal for isolating DC signals from VTVM inputs and signal generator outputs.
UPPER: BNC receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Blue.

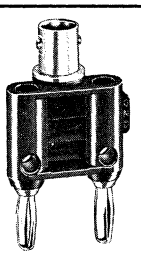
MODEL 1868 QUANTITY DISC. CODE (A) **NET 7.85**

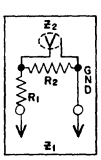
ADAPTER — SINGLE BINDING POST TO BNC PLUG

Permits single banana plug to be used with equipment having a BNC receptacle. Connector body features a Non-Tarnish finish.
UPPER: Insulated binding post for multiple stacking.
LOWER: BNC Plug.
COLOR: Binding Post: Black or Red (specify)

MODEL 3430 (Specify color) QUANTITY DISC. CODE (A) **NET 2.50**

ADAPTER — BNC MATCHING PAD

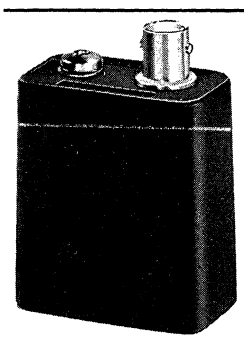


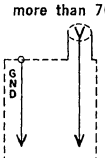


Adapts 600 OHM sources to 50, 75 or 93 OHM cables. Excellent for matching signal generators and VTVM's to standard coaxial cables. Ideal for receiver alignment. Molded in deposited carbon resistors 1%, ¼W.
UPPER: BNC receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.

MODEL	COLOR	RANGE — OHMS	NET	QUANTITY DISC. CODE
1656-1	Yellow	600 to 50	10.85	(A)
1656-2	Red	600 to 75	10.85	
1656-3	White	600 to 93	10.85	
1656-4	Blue	300 to 50	10.85	

ADAPTER — BNC RECEPTACLE TO SHIELDED BANANA PLUGS

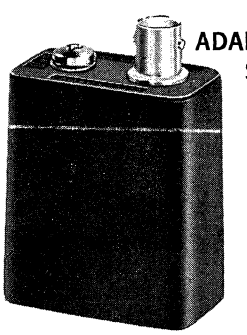


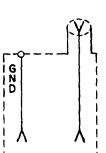


Permits BNC plug to be used with equipment having banana jack binding posts. Black anodized aluminum shield reduces noise Pick-up more than 70 DB. Ideal for low level inputs to oscilloscopes, wave analyzers, etc.
UPPER: BNC receptacle.
LOWER: Shielded double banana plug, on ¾" centers.

MODEL 1645 QUANTITY DISC. CODE (A) **NET 3.75**

ADAPTER — BNC RECEPTACLE TO SHIELDED BANANA JACKS



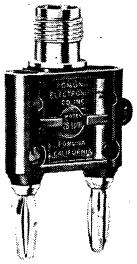


Permits BNC plug to be used with equipment having banana plugs. Black anodized aluminum shield reduces noise pick-up more than 70 DB. Ideal for low level inputs to oscilloscopes, wave analyzers, etc.
UPPER: BNC receptacle.
LOWER: Shielded double banana jacks, on ¾" centers.
COLOR: Black.

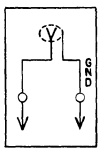
MODEL 1681 QUANTITY DISC. CODE (A) **NET 3.75**

POMONA ELECTRONICS

TNC & "N" ADAPTERS

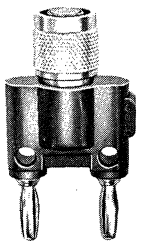


ADAPTER — TNC RECEPTACLE TO DOUBLE BANANA PLUG

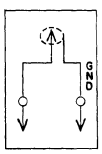


Permits TNC plug to be used with equipment having banana jacks. Perfect for connecting modern control systems to laboratory test equipment.
UPPER: TNC receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1340 QUANTITY DISC. CODE (A) **NET 6.85**

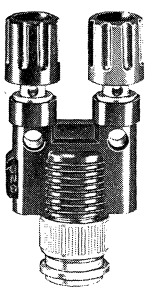


ADAPTER — TNC PLUG TO DOUBLE BANANA PLUG

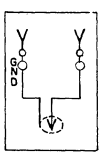


Permits TNC receptacle to be used with equipment having banana jacks. Minimizes your stock of coaxial cables.
UPPER: TNC plug.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1981 QUANTITY DISC. CODE (A) **NET 7.85**

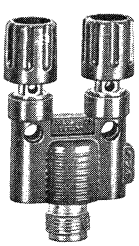


ADAPTER — BINDING POSTS TO TNC PLUG

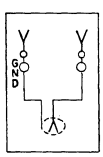


Permits single or double banana plugs to be used with equipment having a TNC receptacle. Exceptional for signal insertion with rapid interchangeability of terminations.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: TNC plug.
COLOR: Body, Black. Binding Posts: Black/Red.

MODEL 1982 QUANTITY DISC. CODE (A) **NET 7.85**

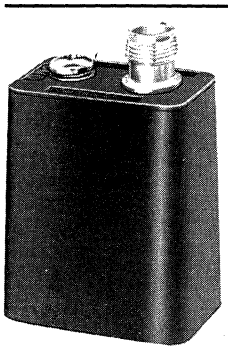


ADAPTER — BINDING POSTS TO TNC RECEPTACLE

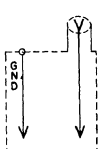


Permits single or double banana plugs to be used with equipment having TNC plug. Useful for rapid interconnection of systems and components.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: TNC receptacle.
COLOR: Body, Black. Binding Posts: Black/Red.

MODEL 1976 QUANTITY DISC. CODE (A) **NET 6.85**

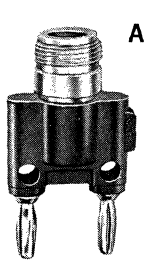


ADAPTER — TNC RECEPTACLE TO SHIELDED BANANA PLUGS

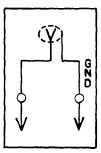


Permits TNC plug to be used with equipment having banana jack binding posts. Black anodized aluminum shield reduces noise pick-up more than 70 DB.
UPPER: TNC receptacle.
LOWER: Double banana plug, on ¾" centers.
COLOR: Black.

MODEL 1975 QUANTITY DISC. CODE (A) **NET 6.85**

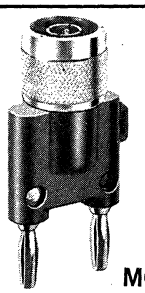


ADAPTER — TYPE "N" RECEPTACLE TO DOUBLE BANANA PLUG

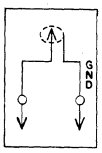


Permits Type "N" plug to be used with equipment having banana jacks. Ideal for connecting R.F. equipment to conventional test equipment.
UPPER: Type "N" receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1740 QUANTITY DISC. CODE (A) **NET 6.85**

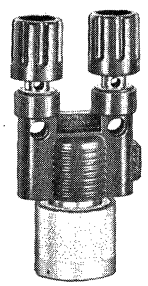


ADAPTER — TYPE "N" PLUG TO DOUBLE BANANA PLUG

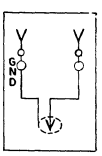


Permits type "N" receptacle to be used with equipment having banana jacks.
UPPER: Type "N" plug.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1770 QUANTITY DISC. CODE (A) **NET 7.85**

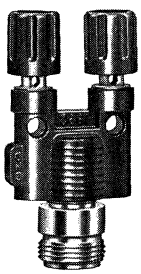


ADAPTER — BINDING POSTS TO TYPE "N" PLUG

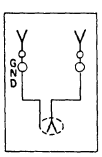


Permits single or double banana plugs to be used with equipment having Type "N" receptacle. Binding posts allow component insertion.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: Type "N" plug.
COLOR: Black. Binding Posts: Black/Red.

MODEL 1796 QUANTITY DISC. CODE (A) **NET 7.85**

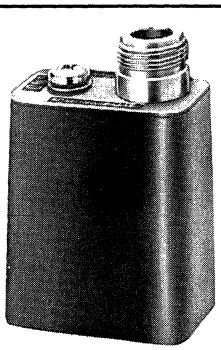


ADAPTER — BINDING POSTS TO TYPE "N" RECEPTACLE

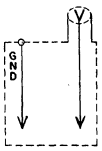


Permits single or double banana plugs to be used with equipment having type "N" plug. Useful for rapid interconnection of systems and components.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: Type "N" receptacle.
COLOR: Body, Black. Binding Posts: Black/Red.

MODEL 1992 QUANTITY DISC. CODE (A) **NET 6.85**



ADAPTER — TYPE "N" RECEPTACLE TO SHIELDED BANANA PLUGS

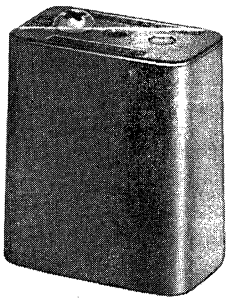


Permits type "N" plug to be used with equipment having banana jack binding posts. Black Anodized aluminum shield reduces noise pick-up more than 70 DB.
UPPER: Type "N" receptacle.
LOWER: Double banana plug, on ¾" centers.
COLOR: Black.

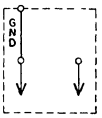
MODEL 1983 QUANTITY DISC. CODE (A) **NET 6.85**

POMONA ELECTRONICS

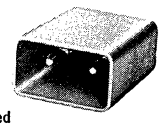
SHIELDED BANANA PLUGS
UHF ADAPTERS

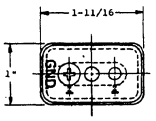


SHIELDED DOUBLE BANANA PLUG
IN-LINE CABLE ENTRY

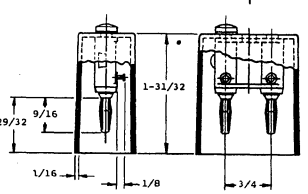


RATED: 15A CONTINUOUS
1200 WVDC
3400 VDC BREAKDOWN
2.5 PF @ 1 MC

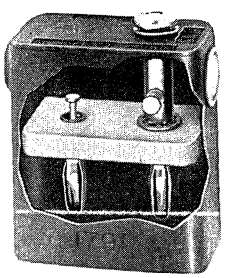




- Shielded double plug ¾" spaced
- Die cast aluminum shell, black anodized
- Noise pick-up reduced 70 DB
- Gold flashed solder turret terminals for positive reliable cable connections
- One piece nickel plated beryllium copper springs for use with standard 0.166 dia. banana jack binding posts.
- Rounded banana spring design results in maximum contact area and minimum contact resistance
- GND clearly molded in shell
- Cable opening, 7/32" diameter

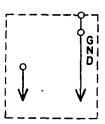


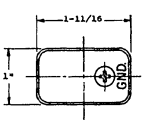
MODEL 1433 QUANTITY DISC. CODE (A) **NET 2.75**



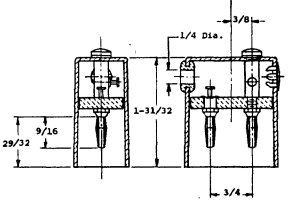
SHIELDED DOUBLE BANANA PLUG
RIGHT ANGLE CABLE ENTRY

RATED: 15A CONTINUOUS
2800 PEAK WV
5000 VDC BREAKDOWN
2.0 PF @ 1 MC.



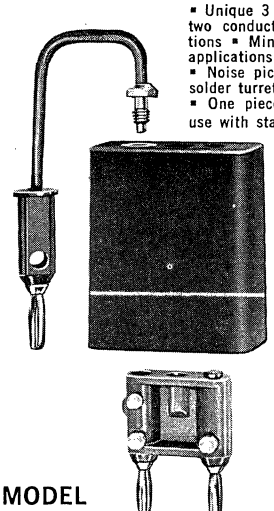


- Shielded double plug, ¾" spaced
- Ceramic insulating base
- Die cast aluminum shell, black anodized
- GND clearly molded in shell
- Noise pick-up reduced 70 DB
- One piece nickel plated beryllium copper springs for use with 0.166 diameter banana jack binding posts.
- Rounded banana spring design results in maximum contact area and minimum contact resistance
- Vinyl grommet and nickel plated snap button supplied



MODEL 1791 QUANTITY DISC. CODE (A) **NET 3.95**

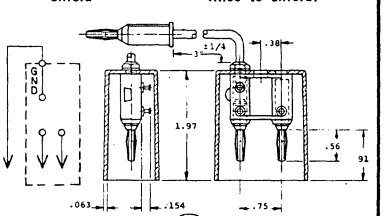
BALANCED LINE SHIELDED DOUBLE BANANA PLUG



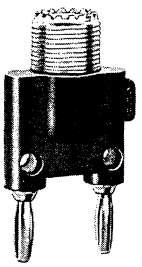
- Unique 3 terminal design allows connection to shielded two conductor cable while maintaining balanced conditions • Minimizes ground loop errors in low signal level applications • Die cast aluminum shell, black anodized • Noise pick-up reduced at least 70 DB • Gold flashed solder turret terminals for reliable noise free connections • One piece nickel plated beryllium copper springs for use with standard 0.166 dia. banana jack binding posts.

RATED:

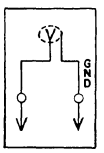
- 15A Continuous
- 1000 WV Peak; line to shield
- 2000 WV peak; line to line
- 2500 V peak breakdown; line to shield
- 5000 V peak breakdown, line to line
- 2.0 pf @ 1 MC Capacity; line to line
- 3.0 pf @ 1 MC. capacity; both lines to shield.



MODEL 1921 QUANTITY DISC. CODE (A) **NET 5.85**

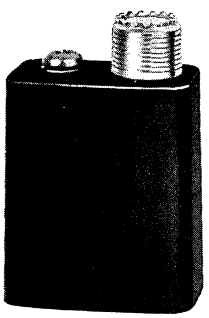


ADAPTER — UHF RECEPTACLE TO DOUBLE BANANA PLUG

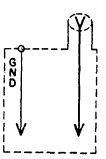


Permits UHF plug to be used with equipment having banana jacks.
UPPER: UHF receptacle, ⅝" dia.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.
COLOR: Black.

MODEL 1707 QUANTITY DISC. CODE (A) **NET 4.85**

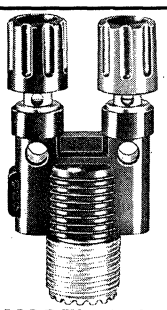


ADAPTER — UHF RECEPTACLE TO SHIELDED BANANA PLUGS

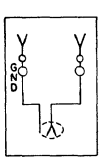


Permits UHF plug to be used with equipment having banana jack binding posts. Black anodized shield reduces noise pick-up at least 70 DB.
UPPER: UHF receptacle, ⅝" dia.
LOWER: Double banana plug on ¾" centers.
COLOR: Black.

MODEL 1708 QUANTITY DISC. CODE (A) **NET 5.85**

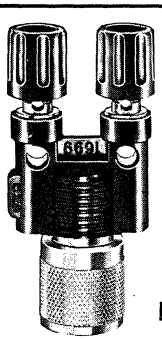


ADAPTER — BINDING POSTS TO UHF RECEPTACLE

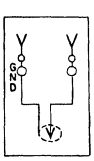


Permits single or double banana plugs to be used with equipment having UHF plug.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: UHF receptacle, ⅝" dia.
COLOR: Body, Black. Binding posts: Black/Red.

MODEL 1792 QUANTITY DISC. CODE (A) **NET 5.85**



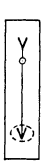
ADAPTER — BINDING POSTS TO UHF PLUG



Permits single or double banana plugs to be used with equipment having a UHF receptacle, ⅝" dia. Convenient for use with modern oscilloscopes. Center conductor binding post Red; Ground, Black.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. jacks.
LOWER: UHF plug.

MODEL 1699 QUANTITY DISC. CODE (A) **NET 5.85**

ADAPTER — BINDING POST TO UHF PLUG



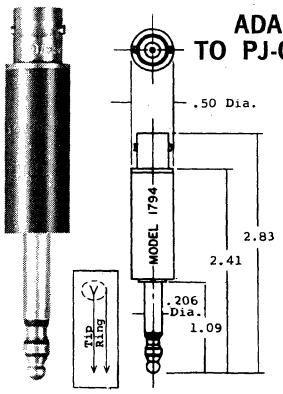
Permits single banana plug to be used with equipment having a UHF receptacle, ⅝" dia. Adds flexibility to your oscilloscope.
UPPER: Insulated binding post with .166 dia. banana jack.
LOWER: UHF plug.

MODEL 1698 QUANTITY DISC. CODE (A) **NET 3.85**

POMONA ELECTRONICS

PHONE AND PHONO PLUG ADAPTERS

ADAPTER-BNC RECEPTACLE TO PJ-068/PJ-309* PHONE PLUG

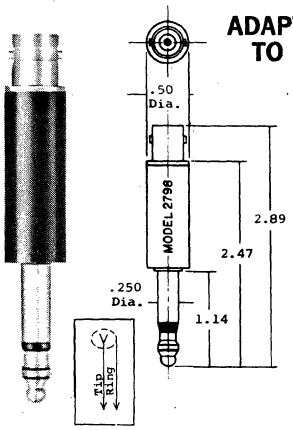


Permits BNC plug to be used with equipment having three circuit phone jacks for .206 dia. phone plugs. Readily adapts equipment to available BNC coaxial cables. Tip connected to inner contact of connector and Ring connected to shell. Sleeve, no connection.

LOWER: Phone Plug, PJ-068/PJ-309*
COLOR: Black
*PJ-309 Interchangeable with WE-309

MODEL 1794 QUANTITY DISC. CODE (A) **NET 6.85**

ADAPTER — BNC RECEPTACLE TO PJ-051* PHONE PLUG

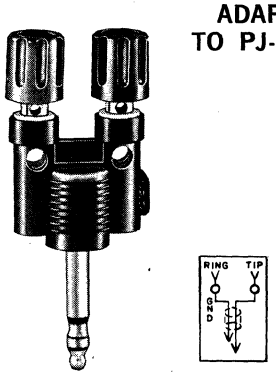


Permits BNC plug to be used with equipment having three circuit phone jacks for .250 dia. phone plugs. Readily adapts equipment to available BNC coaxial cables. Tip connected to inner contact of connector and Ring connected to shell. Sleeve, no connection.

UPPER: BNC receptacle, UG1094/U.
LOWER: Phone Plug, PJ-051*
*PJ-051 Interchangeable with WE 310

MODEL 2798 QUANTITY DISC. CODE (A) **NET 6.85**

ADAPTER-BINDING POSTS TO PJ-068/PJ-309* PHONE PLUG

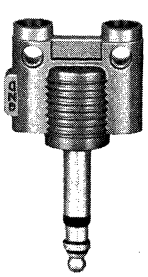


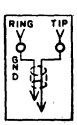
Permits single or double banana plug to be used with equipment having three circuit phone jacks for .206 dia. phone plugs. Ideal for rapid mounting of components and test leads. The PJ-068 and PJ-309 Plug have the same mechanical dimensions.

UPPER: Insulated binding posts on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side stack-up.
LOWER: Phone Plug, PJ-068/PJ-309*
COLOR: Body, Black. Binding Posts: Black/Red.
*PJ-309 Interchangeable with WE 309.

MODEL 3365 QUANTITY DISC. CODE (A) **NET 6.85**

ADAPTER-BANANA JACKS TO PJ-051* PHONE PLUG



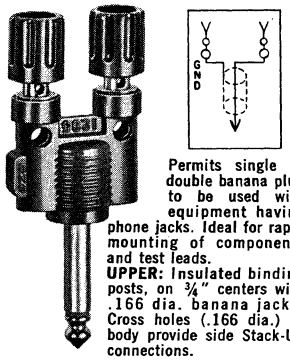


Permits single or double banana plugs to be used with equipment having three circuit phone jacks for .250 dia. phone plugs. Tip connected to hot side of adapter and Ring connected to ground side. Sleeve, no connection.

UPPER: Double banana jack, on ¾" centers. Crossholes (.166 dia.) in body provide side Stack-up connection.
LOWER: Phone Plug, PJ-051*
COLOR: Black
*PJ-051 Interchangeable with WE310

MODEL 2112 QUANTITY DISC. CODE (A) **NET 5.85**

ADAPTER — BINDING POSTS TO PHONE PLUG



Permits single or double banana plug to be used with equipment having phone jacks. Ideal for rapid mounting of components and test leads.

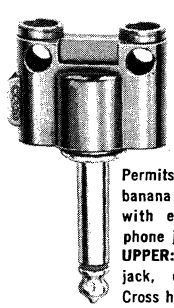
UPPER: Insulated binding posts, on ¾" centers with .166 dia. banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.

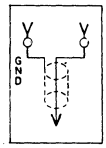
LOWER: ¼" dia. phone plug, 1-3/16" long.
COLOR: Body, Black. Binding Posts: Black/Red.

QUANTITY DISC. CODE (A)

MODEL 1285 NET 4.85

ADAPTER — BANANA JACKS TO PHONE PLUG





Permits single or double banana plugs to be used with equipment having phone jacks.

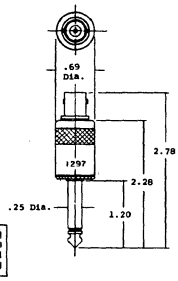
UPPER: Double banana jack, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.

LOWER: Standard ¼" dia. phone plug, 1-3/16" long.
COLOR: Black.

QUANTITY DISC. CODE (A)

MODEL 1980 NET 2.85

ADAPTER — BNC RECEPTACLE TO PHONE PLUG

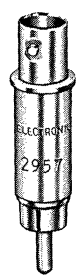


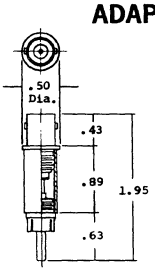
Permits BNC plug to be used with equipment having standard ¼" dia. phone jacks. Readily adapts equipment to available BNC coaxial cables. All metal construction to insure proper shielding.

UPPER: BNC receptacle, UG1094/U.
LOWER: Standard ¼" dia. phone plug, 1 3/16" Long.

MODEL 1297 QUANTITY DISC. CODE (A) **NET 5.85**

ADAPTER — BNC RECEPTACLE TO PHONO PLUG



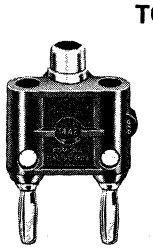


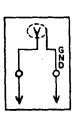
Permits BNC plug to be used with equipment having phono jacks. Readily adapts equipment to available BNC coaxial cables. All metal construction reduces pick-up more than 70 DB. to insure proper shielding.

UPPER: BNC receptacle UG1094/U.
LOWER: Phono plug.

MODEL 2957 QUANTITY DISC. CODE (A) **NET 3.50**

ADAPTER — PHONO JACK TO DOUBLE BANANA PLUG





Permits Phono plug to be used with equipment having banana jacks or binding posts. Quickly converts a cable with a phono plug to a double banana plug.

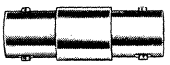
UPPER: Phono jack.
LOWER: Double Banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide Side Stack-Up connections.
COLOR: Black.

MODEL 1442 QUANTITY DISC. CODE (A) **NET 3.85**

POMONA ELECTRONICS

TEST ADAPTERS

ADAPTER — BNC JACK TO JACK

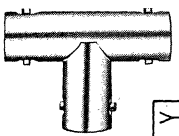


Allows the interconnection of two coaxial cables with BNC plugs.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.

MODEL 3283 QUANTITY DISC. CODE (A) **NET 1.50**

ADAPTER — BNC "T" — 3 JACKS

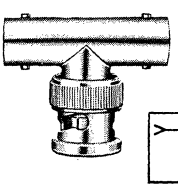


Allows the interconnection of three coaxial cables with BNC plugs.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.

MODEL 3284 QUANTITY DISC. CODE (A) **NET 5.45**

ADAPTER — BNC "T" JACK — PLUG — JACK

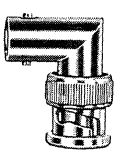


With this adapter, equipment or coaxial cables having a single BNC jack are changed to two BNC jacks.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper female and outer male contact.

MODEL 3285 QUANTITY DISC. CODE (A) **NET 3.25**

ADAPTER — RIGHT ANGLE BNC JACK TO BNC PLUG

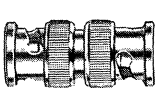


Adapts straight BNC plug to right angle BNC plug.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper female and outer finger contact.
- Gold flashed female and male contact.

MODEL 3534 QUANTITY DISC. CODE (A) **NET 3.25**

ADAPTER — BNC PLUG TO PLUG



Allows the interconnection of two coaxial cables with BNC Jacks.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contacts.
- Gold flashed male contacts.

MODEL 3533 QUANTITY DISC. CODE (A) **NET 2.95**

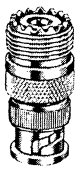
ADAPTER — BNC JACK TO UHF PLUG

Allows the use of a BNC plug on equipment having a UHF Jack.

FEATURES:
- Non-Tarnish finish.
- Rexolite insulation.
- Gold flashed beryllium copper female contact.
- Gold flashed male contact.

MODEL 3286 QUANTITY DISC. CODE (A) **NET 1.75**

ADAPTER — UHF JACK TO BNC PLUG



Allows the use of a UHF Plug on equipment having a BNC Jack.

FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Rexolite insulation.
- Gold flashed Phosphor Bronze female UHF and male BNC contacts.

MODEL 3287 QUANTITY DISC. CODE (A) **NET 3.25**

ADAPTER — BNC JACK TO TYPE "N" PLUG

Allows the use of a BNC Plug on equipment having a type "N" jack.

FEATURES:
- Non-Tarnish finish.
- Teflon insulation.
- Gold flashed contacts.

MODEL 3288 QUANTITY DISC. CODE (A) **NET 2.25**

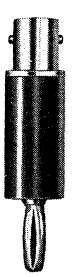
ADAPTER — TYPE "N" JACK TO BNC PLUG

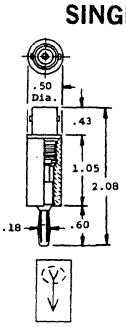
Allows the use of a Type "N" plug on equipment having a BNC jack.

FEATURES:
- Non-Tarnish finish.
- Teflon insulation.
- Beryllium copper female "N" contact and BNC outer finger contact.
- Gold flashed female "N" and male BNC contact.

MODEL 3535 QUANTITY DISC. CODE (A) **NET 2.95**

ADAPTER—BNC RECEPTACLE TO SINGLE BANANA PLUG



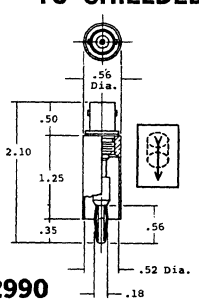


Permits BNC plug to be used with equipment having banana jacks. Inner conductor connected only. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.

UPPER: BNC receptacle, UG1094/U.
LOWER: Single Banana Plug.
COLOR: Black.

MODEL 1894 QUANTITY DISC. CODE (A) **NET 2.50**

ADAPTER — BNC RECEPTACLE TO SHIELDED BANANA PLUG



Permits BNC plug to be used with equipment having banana jacks or binding posts. Ideal for use when shielding of single banana jacks is needed. Nickel plated brass shield reduces pick-up more than 70 DB.

UPPER: BNC Receptacle, UG1094/U.
LOWER: Shielded single banana plug.

MODEL 2990 QUANTITY DISC. CODE (A) **NET 2.50**

POMONA ELECTRONICS

ISOLATION PLUGS — COMPONENT MOUNTINGS

CREATE passive and active networks, voltage dividers, isolation networks or attenuators with the Split-Terminal isolation plugs described below.

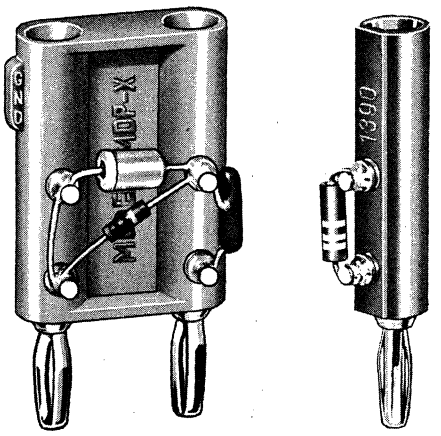
Gold flashed solder turret terminals provide permanent, reliable noise-free connections for component mounting.

Tough thermo-plastic material molded to plug body and connectors insures maximum strength, moisture resistance and excellent insulative properties.

Specifications for MDP-X, 1390, 1837, 1468:

- Fits standard 0.166 dia. banana jack.
- Spring, heat treated beryllium copper alloy 170 per QQ-C-533.
- Plug body, Brass per QQ-B-626 Comp. 22.
- Nickel plated per QQ-N-290, Class 2.
- Contact resistance less than 0.001 ohms per banana plug.

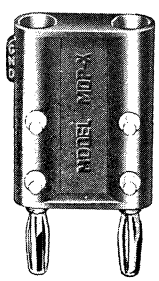
TYPICAL APPLICATION



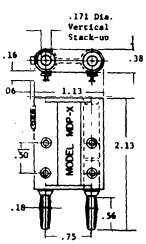
ACTUAL SIZE

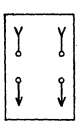
MODEL MDP-X **MODEL 1390**

DOUBLE BANANA PLUG, FOUR TERMINAL ISOLATION



Provides four terminal isolation. Top Stack-Up receptacles isolated from lower plugs. Ideal for insertion of matching networks in laboratory VTVM's, signal generators, etc. Gold flashed solder turret terminals for permanent noise-free connections.

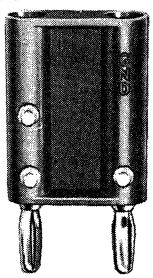




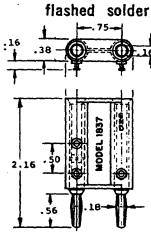
UPPER: Double banana jacks, .166 dia., on ¾" centers.
LOWER: Double banana plug on ¾" centers.
COLOR: Red.

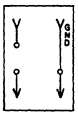
MODEL MDP-X QUANTITY DISC. CODE (A) **NET 3.25**

DOUBLE BANANA PLUG, THREE TERMINAL ISOLATION



Provides three terminal isolation. Excellent for "L" and "Pi" networks. Plug and receptacle nickel plated. Gold flashed solder turret terminals for permanent noise-free connections. "Ground" is straight feed-thru. Hot side isolated.

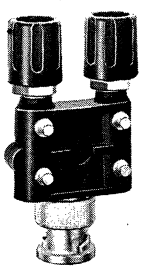


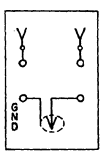


UPPER: Banana jacks, .166 dia. on ¾" centers.
LOWER: Double banana plug on ¾" centers.
COLOR: Blue.

MODEL 1837 QUANTITY DISC. CODE (A) **NET 2.75**

ADAPTER — BINDING POSTS TO BNC PLUG, ISOLATION

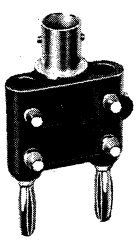


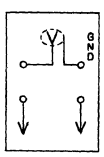


Permits single or double banana plugs to be used with equipment having BNC receptacle. Provides isolation for a four terminal network. Binding posts facilitate connections of test leads or additional components. Gold flashed solder turret terminals provide permanent noise-free connections.
UPPER: Insulated binding posts, on ¾" centers with .166 dia. jacks.
LOWER: BNC plug.
COLOR: Body, Black.
Binding Posts: Black/Red.

MODEL 1469 QUANTITY DISC. CODE (A) **NET 10.85**

ADAPTER — BNC RECEPTACLE TO DOUBLE BANANA PLUG, ISOLATION

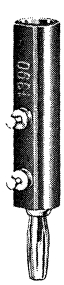


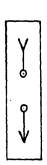


Permits BNC plug to be used with equipment having banana jacks. Provides isolation for a four terminal network. Excellent for matching pad networks. Gold flashed solder turret terminals for permanent noise-free connnections.
UPPER: BNC receptacle.
LOWER: Double banana plug, on ¾" centers.
COLOR: Black.

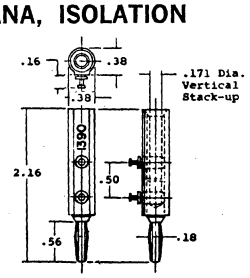
MODEL 1468 QUANTITY DISC. CODE (A) **NET 9.85**

PLUG — SINGLE BANANA, ISOLATION



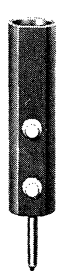


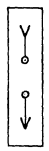
Provides two terminal isolation. Top Stack-Up receptacle is isolated from lower plug to permit addition of series resistors, diodes, etc. Ideal for computers, lab. circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.
UPPER: Banana jack, .166 dia.
LOWER: Banana plug.
COLORS: Black, Red.



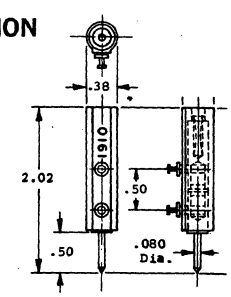
MODEL 1390 (Specify color) QUANTITY DISC. CODE (A) **NET 1.50**

PLUG — PIN TIP, ISOLATION





Pin tip jack is isolated from .080 pin tip plug. Provides for addition of series components. Ideal for use with computer boards, lab circuit designs, etc. Gold flashed solder turret terminals for permanent noise-free connections.
UPPER: Tip jack, beryllium copper, gold flashed; accepts .080 dia. pin.
LOWER: Pin tip, .080 dia. Brass, nickel plated.
COLORS: Black Red.

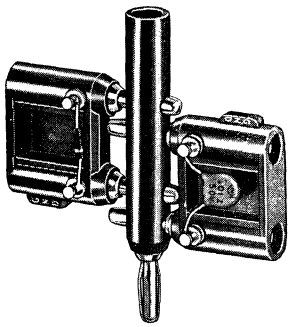


MODEL 1910 (Specify color) QUANTITY DISC. CODE (A) **NET 1.50**

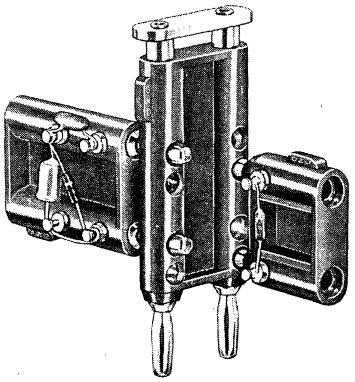
POMONA ELECTRONICS

SERIES-PARALLEL ISOLATION PLUGS CONNECTOR TEST ADAPTERS

SERIES PARALLEL ISOLATION PLUGS



MODEL 3501



MODEL 3502

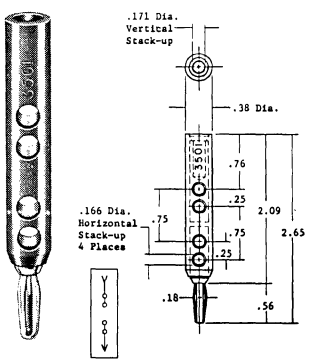
These plugs enable you to build unlimited combinations of series parallel networks eg., voltage dividers attenuator and etc.

Upper crossholes spaced ¾" on centers from lower crossholes to allow connection of double banana plugs. Double banana plugs may be plugged in from both sides.

FEATURES:

- Fits .166 dia. Banana jacks.
- Spring, heat treated beryllium copper alloy 170 per QQ-C-533.
- Plug bodies and jacks, Brass, nickel plated per QQ-N-290 class 2.
- Tough thermoplastic molded to banana jacks and plug bodies.

SERIES-PARALLEL ISOLATION PLUG

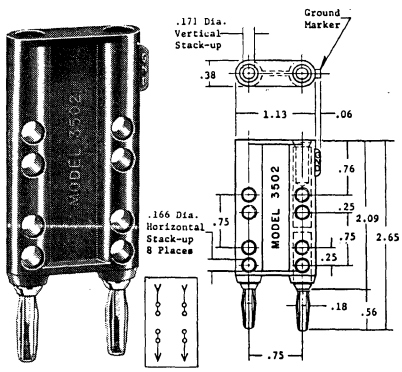


Top banana jack and upper pair of crossholes isolated from lower pair of crossholes and banana plug.

UPPER: Banana jack .166 dia.
CENTER: 4 crossholes .166 dia.
LOWER: Banana Plug.
COLOR: Red.

MODEL 3501 QUANTITY DISC. CODE (A) **NET 1.50**

DUAL SERIES-PARALLEL ISOLATION PLUG

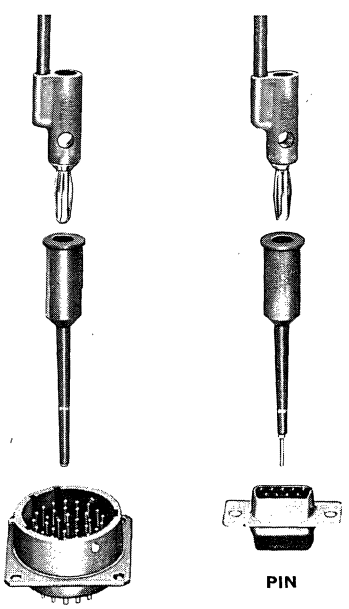


Excellent for building attenuators, voltage dividers, isolation networks, etc. Top banana jacks and upper pair of crossholes isolated from lower pair of crossholes and banana plugs.

UPPER: Double banana jack .166 dia., on ¾" centers.
CENTER: 8 crossholes .166 dia.
LOWER: Double banana plug on ¾" centers.
COLOR: Red.

MODEL 3502 QUANTITY DISC. CODE (A) **NET 3.25**

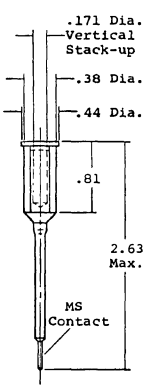
TYPICAL APPLICATION



CONNECTOR TEST ADAPTERS

An ideal test adapter for the rapid testing of the hard to get at contacts of multi-pin MS type connectors such as miniature circular, standard circular and rack and panel. Excellent for testing of continuity, voltage and signal on individual contacts. Test adapter available in Pin and socket contacts sizes of 20, 16 and 12.

- Gold flashed contacts conform to "MS" Dimensions.
- Flexible tip prevents damage to connector contacts if test adapter is accidently bent.
- Flexible tip allows testing of adjacent contacts.
- Fully insulated to prevent accidental shorting.
- Accepts standard banana plug.



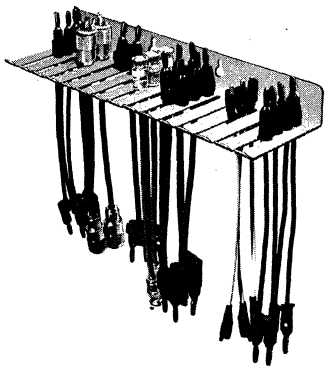
UPPER: Banana jack, .166 dia., brass, nickel plated.
LOWER: "MS" style contact, gold flashed, see tab block.
Color: See tab block.

MODEL	CONTACT SIZE	TYPE	COLOR	NET
3560	20	Socket	Red	1.25
3561	20	Pin	Black	1.25
3562	16	Socket	Red	1.50
3563	16	Pin	Black	1.25
3564	12	Socket	Red	1.75
3565	12	Pin	Black	1.50

QUANTITY DISC. CODE (A)

POMONA ELECTRONICS

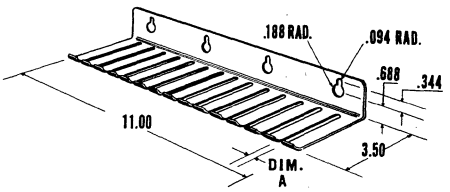
MISCELLANEOUS ACCESSORIES



TEST LEAD HOLDER

No need to spend time searching for a particular test lead. With this new rack, all of your patch cords and cable assemblies can be conveniently filed for instant selection — within easy reach. Holder mounts quickly on any vertical surface. Test leads are easy to store, easy to remove. Two models to choose from for different size cables.

MATERIAL: Cold Rolled Steel.
FINISH: Baked Enamel.

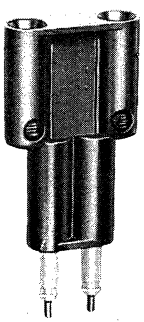


	MAX. CABLE DIA. (DIM. A)	COLOR	NET
MODEL 1508	.210"	Orange	2.95
MODEL 2708	.450"	Blue	2.95

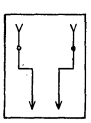
QUANTITY DISC. CODE (A)

SEE PAGE 58 FOR TEST SOCKET ADAPTER HOLDER

ADAPTER — AMP PROGRAM BOARD



Permits single or double banana plugs to be used with AMP program boards having ¼" or ⅜" center to center spacing. Ideal for mounting components. Internal set screws secure leads. Useful in analog computer applications, etc.

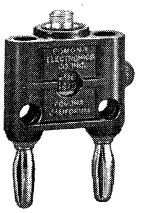


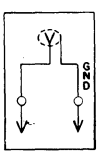
UPPER: Banana jacks, on ¾" centers. Brass, nickel plated.
LOWER: Dual AMP pins, on ¼" or ⅜" centers.

QUANTITY DISC. CODE (A)

MODEL	PIN SPACING	COLOR	NET
1977	⅜"	Black	4.85
1991	¼"	Gray	4.85

ADAPTER — MICRODOT RECEPTACLE TO DOUBLE BANANA PLUG



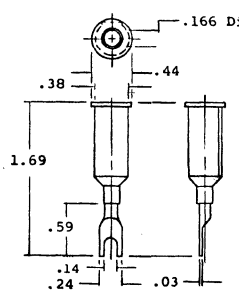


Permits Microdot miniature coaxial plug to be used with equipment having banana jacks. Cross holes in body provide side Stack-Up connections.
UPPER: Microdot receptacle, Screw-On Type.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 dia.) in body provide side Stack-Up connections.

MODEL	TYPE (Ohms)	BODY COLOR	RECEPTACLE TYPE	NET	QUANTITY DISC. CODE
1275	50	Green	10-32 thread	7.85	(A)
1276	50	Black	Slide-on	9.85	
1277	70	Violet	12-32 thread	9.85	
1279	93	White	¼-32 thread	9.85	

INSULATED BARRIER STRIP SPADE LUG ADAPTER

NEW

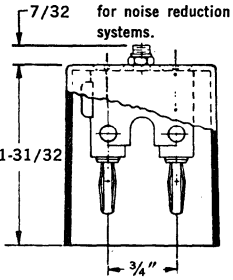


Permits single banana plug to be used with equipment having barrier strips. Lug fits a No. 4, 5 or 6 screw. Tough Thermoplastic molded to body for maximum reliability.
UPPER: Banana jack, .166 dia. Brass, nickel plated.
LOWER: Spade lug, .14 opening. Copper, electro-tin plated.
COLORS: Black, Red.

MODEL 3744 (Specify Color) QUANTITY DISC. CODE (A) **NET .50**

ADAPTER—MICRODOT RECEPTACLE TO SHIELDED BANANA PLUGS

Permits Microdot miniature coaxial plug, 50 ohm, to be used with equipment having banana jack binding posts. Black anodized aluminum shield reduces noise pick-up more than 70 DB. Ideal for noise reduction in low level acceleration systems.



UPPER: Microdot Receptacle, Screw-On Type, Receptacle Thread 10-32.
LOWER: Shielded Double banana plug, on ¾" centers.
COLOR: Black.

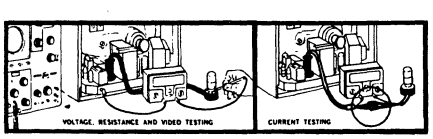
MODEL 1575 QUANTITY DISC. CODE (A) **NET 11.85**

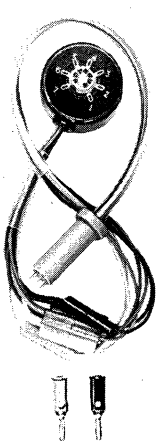
Universal Harness

TESTING ADAPTER

Takes the Trouble out of Trouble Shooting!

TEST SOCKET: Extended test tabs, phosphor bronze contacts, heavy duty molded phenolic base with easy-to-read socket connections. **CURRENT MEASUREMENT CONNECTIONS:** Fully insulated, molded .080 phone tip plugs. **INSULATED PLUG:** Fits either shielded or unshielded tube sockets.





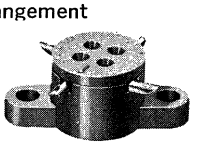
Model 1737 (7 Pin) Model 1738 (8 Pin)
Model 1739 (9 Pin)

QUANTITY DISC. CODE (D) **NET 9.95**

TRANSISTOR BREADBOARD SOCKET

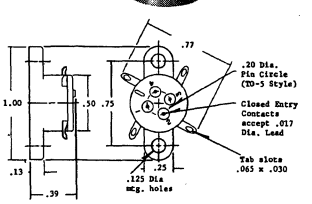
For Transistors with TO-5, and TO-12 Lead Arrangement

Excellent for breadboarding. All connections made on top of breadboard for quick accessible test points.



FEATURES:

- Closed entry contacts accept .016—.019 dia. leads.
- Beryllium copper contacts silver plated.
- Contact numbers on top of socket.
- Socket molded of low loss mica filled phenolic.
- Easily mounted with two #2 screws.



MODEL XS-T4 QUANTITY DISC. CODE (C) **NET .95**

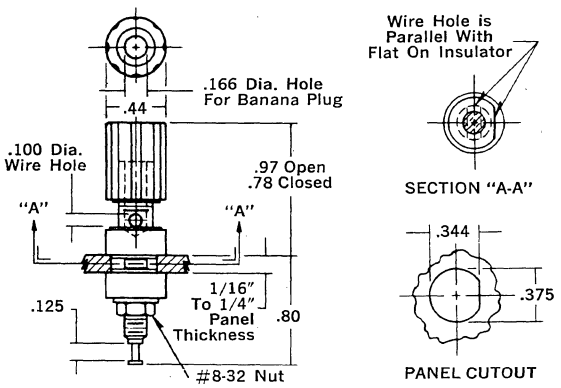
POMONA ELECTRONICS

INSULATED LEXAN* POLYCARBONATE BINDING POSTS

Three Miniaturized standard insulated Lexan* Binding Posts to fill the needs of most critical requirements. The plastic molding on these units is Lexan* Polycarbonate which has high impact strength, low loss, low power factor and high insulation resistance. Smaller design than presently available.

FEATURES:
- Polycarbonate insulation.
- Small design.
- Standard and low thermal EMF types available.
- 5 way Binding Post.
- Accepts std. Banana Plug.
- Captive thumb nut.
- Gold or nickel plated.

RATINGS:
- Operating Temp.: —65°C. to +150°C.
- Working Voltage: 1500 VDC.
- Current: 15 Amps Cont., 30 Amps Int.



NEW

MINIATURIZED STANDARD TYPE

BRASS body and thumb nut insert, available GOLD FLASHED per MIL-G-45204 (or) NICKEL PLATED per QQ-N-290 class 2.

COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 3750	MODEL 3760
(Specify Color) Gold Flashed	(Specify Color) Nickel plated
NET .90	NET .75

QUANTITY DISC. CODE (A)

NEW

LOW THERMAL EMF MINIATURIZED STANDARD TYPE

Copper Body and Thumb nut insert, GOLD FLASHED per MIL-G-45204. Excellent for use when Thermoelectric effects are a significant source of error. Gold flashed for high conductivity.

COLORS: Black Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

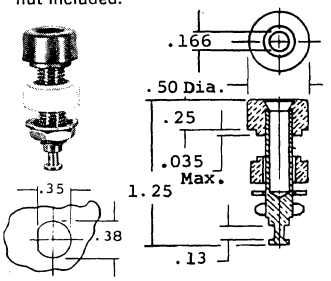
MODEL 3770 (Specify Color) QUANTITY DISC. CODE (A) **NET 1.25**

*LEXAN is a General Electric trademark

INSULATED BINDING POSTS BANANA JACKS & PIN TIP JACKS

INSULATED BANANA JACK ASSEMBLY SILVER PLATED

Used with standard banana plug. Body, one piece brass, silver plated. Head insulation molded of tough Polycarbonate thermoplastic. Heavy duty shouldered ceramic insulator. Nickel plated lockwasher and hex nut included.



FEATURES:
- Closed entry receptacle, .166 dia.
- Insulator head molded to body
- Mounts in 3/8" dia. hole, panels from .035" to .375" thick
- Solder turret terminal
- Rated: 2,500 WVDC

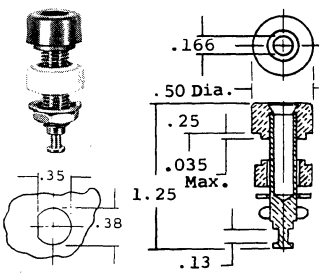
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

STD. PKG. 10 (per color) unassembled.

MODEL 1581 (Specify color) QUANTITY DISC. CODE (A) **NET .25 ea.**

INSULATED BANANA JACK ASSEMBLY GOLD PLATED

Used with standard banana plug. Body, one piece brass, gold plated. Head insulation and panel insulator are molded of tough Polycarbonate thermoplastic. Nickel plated lockwasher and hex nut included.



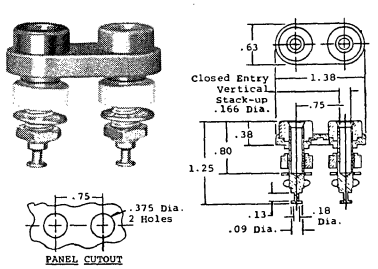
FEATURES:
- Closed entry receptacle, .166 dia.
- Insulator head molded to body
- Mounts in 3/8" dia. hole, panels from .035" to .375" thick
- Solder turret terminal
- Rated: 2,500 WVDC

COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

STD. PKG. 10 (per color) unassembled.

MODEL 2854 (Specify color) QUANTITY DISC. CODE (A) **NET .35 ea.**

INSULATED DOUBLE BANANA JACK ASSEMBLY SILVER PLATED



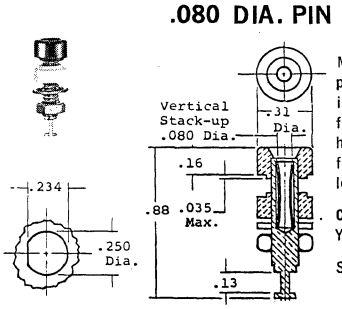
Double banana jack silver plated on 3/4" centers with one red and one black jack. Choice of Black or Red plate.

Mounts in panels from .035" to .275" thick.

MODEL 2269 Black Plate
MODEL 2269-2 Red Plate

MODEL 2269 (Specify color) QUANTITY DISC. CODE (A) **NET .75**

.080 DIA. PIN TIP JACK



Miniature jack accepts .080 dia. pin tip plugs. Polycarbonate Thermoplastic insulated head molded directly to gold flashed brass body. Contact spring, heat treated beryllium copper, gold flashed. Nickel plated hex nut and lockwasher included unassembled.

COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

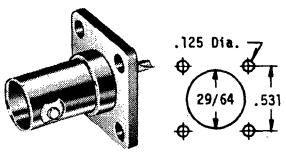
STD. PKG. 10 (per color)

MODEL 3542 (Specify color) QUANTITY DISC. CODE (A) **NET .25 ea.**

POMONA ELECTRONICS

PANEL RECEPTACLES TWINAX JACKS & PATCH CORDS

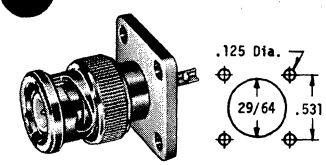
NEW BNC FEMALE PANEL RECEPTACLE



FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contact.
- Beryllium copper outer finger contact.
- Solder cup connection.

MODEL 2451 QUANTITY DISC. CODE (A) **NET 1.25**

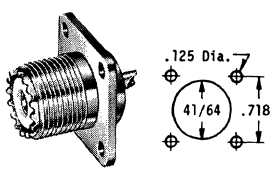
NEW BNC MALE PANEL RECEPTACLE



FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contact.
- Gold flashed male contact.
- Solder cup connection.

MODEL 2447 QUANTITY DISC. CODE (A) **NET 2.50**

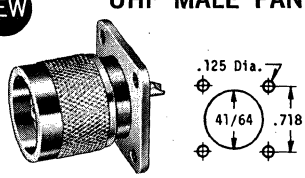
NEW UHF FEMALE PANEL RECEPTACLE



FEATURES:
- Non-Tarnish finish.
- Teflon insulation.
- Gold flashed phosphor bronze contact.
- Solder cup connection.

MODEL 2449 QUANTITY DISC. CODE (A) **NET 2.25**

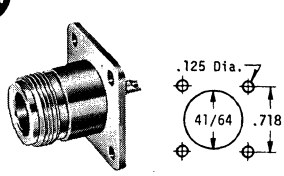
NEW UHF MALE PANEL RECEPTACLE



FEATURES:
- Non-Tarnish finish.
- Teflon insulation.
- Gold flashed male contact.
- Solder cup connection.

MODEL 2450 QUANTITY DISC. CODE (A) **NET 4.85**

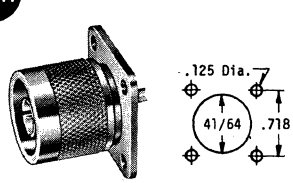
NEW TYPE "N" FEMALE PANEL RECEPTACLE



FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contact.
- Solder cup connection.

MODEL 2455 QUANTITY DISC. CODE (A) **NET 1.75**

NEW TYPE "N" MALE PANEL RECEPTACLE



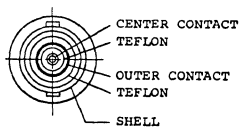
FEATURES:
- Non-Tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contact.
- Gold flashed male contact.
- Solder cup connection.

MODEL 2454 QUANTITY DISC. CODE (A) **NET 4.85**

TWINAX JACKS AND PATCH CORDS

Due to the ever increasing need for low level signal patching and balanced line applications, Pomona introduces Twinax Patch cords and jacks. For use with 2 conductor shielded cable.

These connectors feature a concentric design with a center contact, outer contact and outer shell (see dwg.). This concentric design does not require matching of halves such as the Polarized stepped insulator connectors.

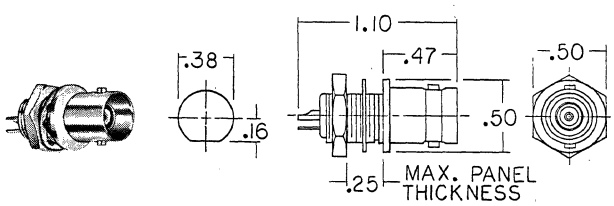


MATERIAL:
- Bodies and Fittings: Brass per QQ-B-626 Comp. 22 ½ hard.
- Insulators: Teflon per MIL-P-19468.
- Center Contacts:
  Female — Beryllium copper per QQ-C-530 Cond. H.
  Male — Brass per QQ-B-626, Comp. 22 ½ hard.
- Outer Contacts: Beryllium copper per QQ-C-530 Cond. H.

FINISH:
- Bodies and Fittings: Non-Tarnish.
- Center Contacts: Gold over copper plate.
- Outer Contacts: Gold over copper plate.

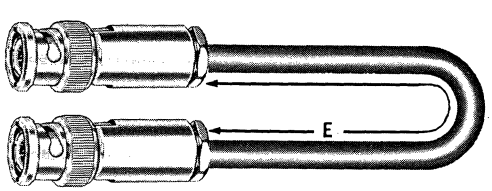
RATING:
- 500 VRMS

BULKHEAD RECEPTACLE



MODEL 3580 QUANTITY DISC. CODE (A) **NET 4.50**

TWINAX CABLE PLUG BOTH ENDS



CABLE DESCRIPTION:
- 2 Conductor shielded.
- Conductors—22 AWG (16 x 34) with polyethylene insulation
- Shield — Tinned copper, 87% coverage.
- Jacket — Gray vinyl, .231" O.D.
- Capacitance—Between conductors, 18 Pf/ft, nominal. Between one conductor and remaining conductor connected to shield, 33 Pf/ft, nominal.

MODEL	LENGTH	NET
3581-J-18	18"	14.85
3581-J-24	24"	14.85
3581-J-36	36"	14.85
3581-J-48	48"	14.85
3581-J-60	60"	14.85

QUANTITY DISC. CODE (B)

POMONA ELECTRONICS

HIGH VOLTAGE CONNECTORS

CORONA-FREE 30 KV CONNECTORS

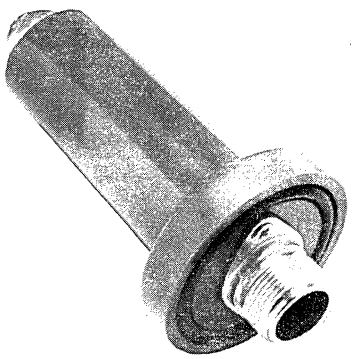
A series of Corona-Free 30 KV Connectors.

Ideal for use in X-ray, radar, laser, RF, pulse, power, and other military/industrial applications.

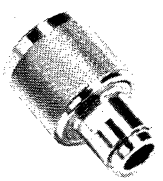
APPLICABLE SPECIFICATIONS: (All Models)
- Up to 30 KV continuous unmated.
- Up to 10,000 ft. and 90% humidity.

FEATURES:
- Couplers and bulkhead receptacle molded of high dielectric epoxy resin.
- Nickel plated brass connector bodies.
- Delrin insulation on cable plug.
- Couplers are fully shielded for greater safety, and reduction of electrostatic collection of dust.
- Recessed contacts eliminate danger of shock.
- Bulkhead receptacle includes corona ball, plus "O" ring for hermetic sealing.

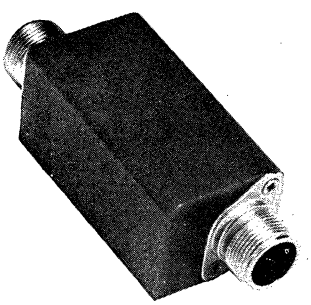
(Shown 1/3 actual size)



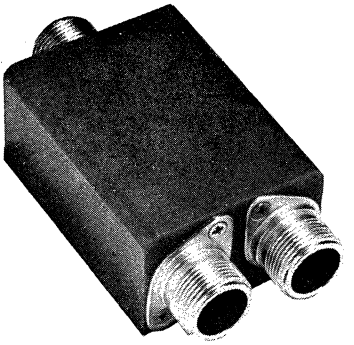
3730



3733



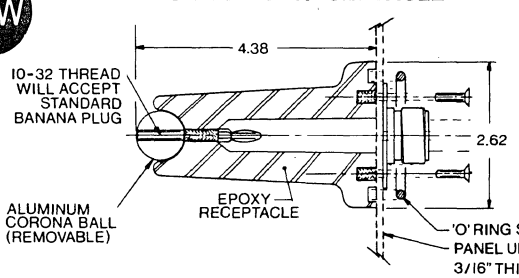
3731



3732

NEW

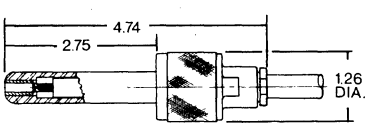
BULKHEAD RECEPTACLE



MODEL 3730 QUANTITY DISC. CODE (A) **NET 35.00**

CABLE PLUG*

NEW

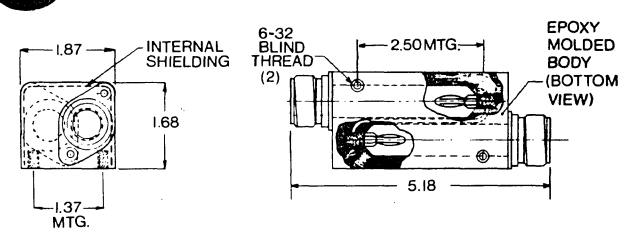


* Used with RG-8, 213/U cable or equivalent.

MODEL 3733 QUANTITY DISC. CODE (A) **NET 30.00**

NEW

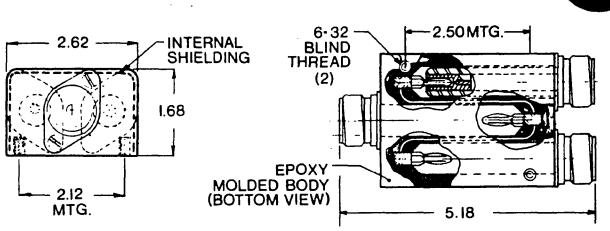
SHIELDED COUPLER



MODEL 3731 QUANTITY DISC. CODE (A) **NET 35.00**

SHIELDED TRI-COUPLER

NEW

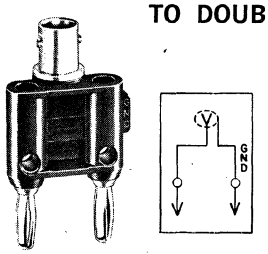


MODEL 3732 QUANTITY DISC. CODE (A) **NET 45.00**

POMONA ELECTRONICS

MISCELLANEOUS TEST ACCESSORIES

ADAPTER—MHV RECEPTACLE TO DOUBLE BANANA PLUG



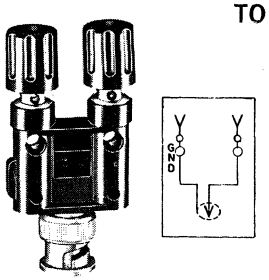
This adapter allows an MHV Plug to be used with equipment having ¾" spaced banana jacks.

UPPER: MHV receptacle.
LOWER: Double banana plug, on ¾" centers. Cross holes (.166 Dia.) in body provide side Stack-Up connections.

COLOR: Black.

MODEL 3290 QUANTITY DISC. CODE (A) **NET 5.85**

ADAPTER—BINDING POSTS TO MHV PLUG



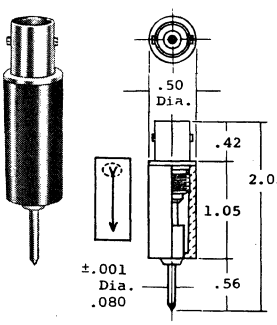
This adapter converts a MHV Receptacle to standard ¾" 5 way binding posts.

UPPER: Insulated binding posts on ¾" centers with (.166 dia.) banana jacks. Cross holes (.166 dia.) in body provide side Stack-Up connections.
LOWER: MHV plug.

COLOR: Black.

MODEL 3291 QUANTITY DISC. CODE (A) **NET 7.85**

ADAPTER — BNC RECEPTACLE TO SINGLE PIN TIP PLUG



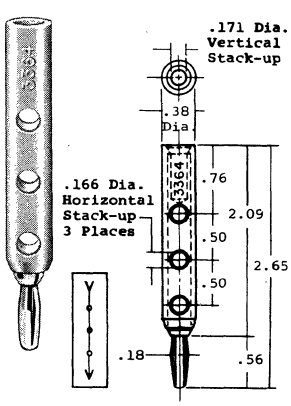
Permits BNC plug to be used with equipment having .080 dia. pin tip jacks. Inner conductor connected only. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.

UPPER: BNC receptacle, UG1094/U.
LOWER: Single Pin Tip Plug .080 dia.

COLOR: Black.

MODEL 3415 QUANTITY DISC. CODE (A) **NET 2.50**

QUAD STACKING PLUG



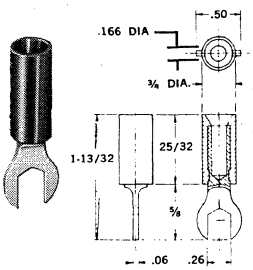
Features four parallel connectors to the same point. Excellent for use when many test points must be tied together.

UPPER: Banana jack, .166 dia. Brass, nickel plated.
CENTER: 3 Crossholes, .166 dia. in body provide side stack-up connection.
LOWER: Banana plug, one piece heat treated beryllium copper spring, nickel plated, for use with .166 dia. banana jack.

COLORS: Black, Red.

MODEL 3364 (Specify color) QUANTITY DISC. CODE (A) **NET .95**

INSULATED SPADE LUG ADAPTER

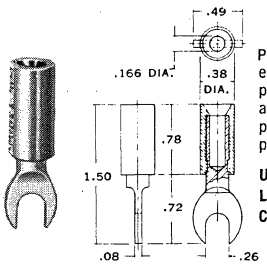


Permits single banana plug to be used with equipment having binding posts. Tough thermoplastic molded to body for maximum reliability and low shock hazard. Spade lug body, one piece machined brass, nickel plated.

UPPER: Banana jack, .166 dia.
LOWER: Spade lug, .26 opening.
COLORS: Black, Red.

MODEL 1614 (Specify color) QUANTITY DISC. CODE (A) **NET .35**

TELLURIUM COPPER INSULATED SPADE LUG ADAPTER

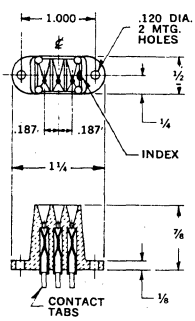


Permits single banana plug to be used with equipment having binding posts. Tough thermoplastic molded to body for maximum reliability and low shock hazard. Spade lug body, one piece machined tellurium copper, gold plated per MIL-G-45204, Type 11, Class 1.

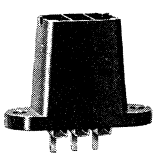
UPPER: Banana jack, .166 dia.
LOWER: Spade lug, .26 opening.
COLORS: Black, Red.

MODEL 2305 (Specify Color) QUANTITY DISC. CODE (A) **NET .95**

TRANSISTOR SOCKET



For use in testing 3 lead transistors with .017 dia. leads. Beryllium copper springs for long life. Ideal for aging racks, incoming inspection, life testing, etc.

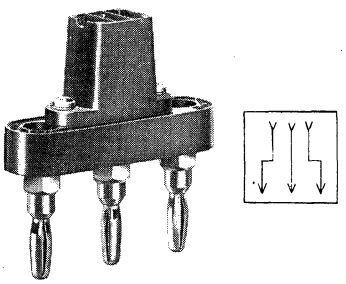


MODEL TS-187

QUANTITY DISC. CODE (A)

MODEL	TEMP. RANGE	INSULATION RESISTANCE	COLOR	NET
TS187	—100°C To +200°C.	1 x 10^5 Megohms Min. @ 500 V.D.C. @ 40% R.H., 24°C.	Black	1.75

ADAPTER — TRANSISTOR TEST SOCKET



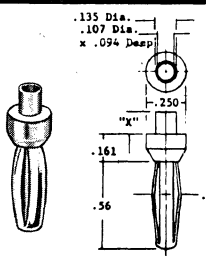
Permits the insertion of transistors with .017 dia. leads into equipment having banana jacks on ¾" centers. Ideal for incoming inspection. Transistor socket contact and banana spring made of beryllium copper. Heavy duty phenolic construction. Insulation resistance: 1 x 10^5 megohms min. @ 500 V.D.C., at 40% R.H., 24°C.

MODEL 1472 QUANTITY DISC. CODE (A) **NET 6.85**

POMONA ELECTRONICS

STANDARD AND MINIATURE BANANA PLUGS

RIVET TYPE BANANA PLUG



Excellent for riveting to panels or boards. Used with standard .166 dia. banana jacks.

- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Jack body, Brass Per QQ-B-626 comp. 22.
- Plating, Nickel per QQ-N-290, class 2.
- Rated, 15A. Cont., 30A. Int.

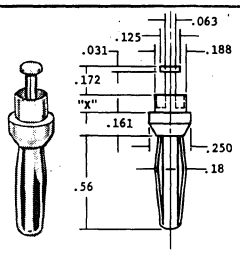
(Swaging Tool No. 3518 NET 9.50)

MODEL	"X" DIM.	PANEL
3257	.094	1/16"
3258	.125	3/32"
3259	.156	1/8"

Std. Pkg. 10

QUANTITY DISC. CODE (A) **NET .25 ea.**

RIVET TYPE BANANA PLUG WITH TURRET



Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires. Used with standard .166 dia. banana jacks.

- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Jack body, Brass Per QQ-B-626 comp. 22.
- Plating, Nickel per QQ-N-290, class 2.
- Rated, 15A. Cont., 30A. Int.

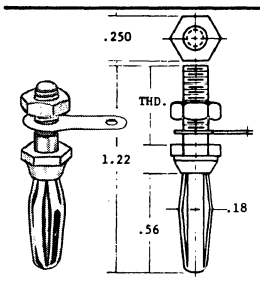
(Swaging Tool No. 3519 NET 9.50)

MODEL	"X" DIM.	PANEL
3260	.105	1/16"
3261	.135	3/32"
3262	.165	1/8"

Std. Pkg. 10

QUANTITY DISC. CODE (A) **NET .29 ea.**

BANANA PLUG WITH THREADED STUD



Threaded stud for rapid mounting. Used with standard .166 dia. banana jacks. Furnished with hex nut and solder lug.

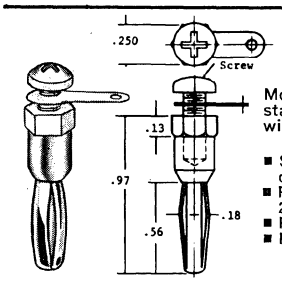
- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Plug body, Hex brass per QQ-B-626 comp. 22.
- Plating, Nickel per QQ-N-290, class 2.
- Rated, 15A. Cont., 30A. Int.

Standard Package 10
Unassembled

MODEL	THREAD
3263	6-32 x 1/2"
3264	8-32 x 1/2"

QUANTITY DISC. CODE (A) **NET .32 ea.**

BANANA PLUG WITH SCREW



Mounts to various size panels. Used with standard .166 dia. banana jacks. Furnished with screw and solder lug.

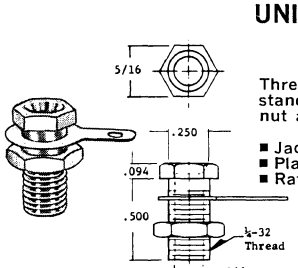
- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Plug body, Hex brass per QQ-B-626 comp. 22.
- Plating, Nickel per QQ-N-290, class 2.
- Rated, 15A. Cont., 30A. Int.

Standard Package 10
Unassembled

MODEL	SCREW
3265	6-32 x 1/4"
3266	8-32 x 1/4"

QUANTITY DISC. CODE (A) **NET .32 ea.**

UNINSULATED—BANANA JACK



Threaded for rapid mounting. Used with standard banana plugs. Furnished with hex nut and solder lug.

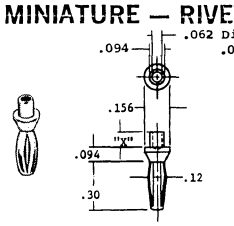
- Jack body, Brass per QQ-B-626 comp. 22.
- Plating, Nickel per QQ-N-290, class 2.
- Rated, 15A. Cont., 30A. Int.

Standard Package 10
Unassembled

MODEL 3267

QUANTITY DISC. CODE (A) **NET .15 ea.**

MINIATURE — RIVET TYPE BANANA PLUG



Excellent for riveting to panels or boards. Used with miniature .104 dia. banana jacks.

- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Plug body, Brass per QQ-B-626 comp. 22.
- Plating, Gold flashed per MIL-G-45204 Type II (.00002/.00003).
- Rated, 5A. Cont., 10A. Int.

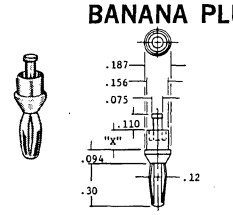
(Swaging Tool No. 3520 NET 9.50)

MODEL	"X" DIM.	PANEL
3268	.094	1/16"
3271	.125	3/32"
3272	.156	1/8"

Std. Pkg. 10

QUANTITY DISC. CODE (A) **NET .22 ea.**

MINIATURE — RIVET TYPE BANANA PLUG WITH TURRET



Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires. Used with miniature .104 dia. banana jacks.

- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Plug body, Brass per QQ-B-626 comp. 22.
- Plating, Gold flashed per MIL-G-45204 Type II (.00002/.00003).
- Rated, 5A. Cont., 10A. Int.

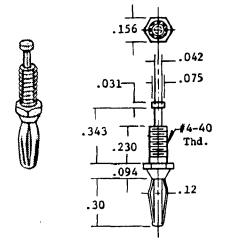
(Swaging Tool No. 3521 NET 9.50)

MODEL	"X" DIM.	PANEL
3273	.105	1/16"
3274	.135	3/32"
3275	.165	1/8"

Std. Pkg. 10

QUANTITY DISC. CODE (A) **NET .29 ea.**

MINIATURE — BANANA PLUG WITH THREADED STUD



Threaded stud for rapid mounting. Solder turret for attachment of wires. Used with .104 dia. miniature banana jacks.

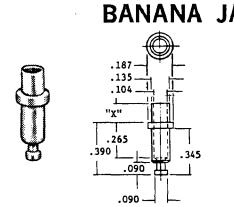
- Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.
- Plug body, Brass per QQ-B-626 comp. 22.
- Plating, Gold flashed per MIL-G-45204 Type II (.00002/.00003).
- Rated, 5A. Cont., 10A. Int.

Standard Package 10

MODEL 3276

QUANTITY DISC. CODE (A) **NET .25 ea.**

MINIATURE — RIVET TYPE BANANA JACK WITH TURRET



Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires. .104 dia. jack accepts miniature banana plug.

- Jack body, Brass per QQ-B-626 comp. 22.
- Plating, Gold flashed per MIL-G-45204 Type II (.00002/.00003).
- Rated, 5A. Cont., 10A. Int.

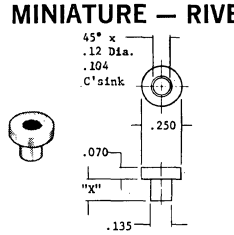
(Swaging Tool No. 3522 NET 9.50)

MODEL	"X" DIM.	PANEL
3277	.105	1/16"
3278	.135	3/32"
3279	.165	1/8"

Std. Pkg. 10

QUANTITY DISC. CODE (A) **NET .15 ea.**

MINIATURE — RIVET TYPE BANANA JACK



Excellent for riveting to panels or boards. .104 dia. jack accepts miniature banana plug.

- Jack body, Brass per QQ-B-626 comp. 22.
- Plating, Gold flashed per MIL-G-45204 Type II (.00002/.00003).
- Rated, 5A. Cont., 10A. Int.

(Swaging Tool No. 3523 NET 9.50)

MODEL	"X" DIM.	PANEL
3280	.105	1/16"
3281	.135	3/32"
3282	.165	1/8"

Std. Pkg. 10

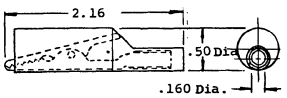
QUANTITY DISC. CODE (A) **NET .10 ea.**

POMONA ELECTRONICS

TEST CLIPS
½" SPACED PIN TIP PLUGS

INSULATED ALLIGATOR CLIP TO BANANA JACK

Clip, No. 60 Mueller, Steel, Cadmium Plated Vinyl insulators, No. 62 (5 Red, 5 Black). Unassembled.

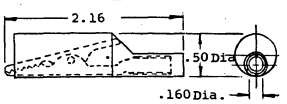


Standard Package of 10 clips and 10 insulators.

MODEL 2240 QUANTITY DISC. CODE (A) **NET .20 ea.**

GOLD PLATED—INSULATED ALLIGATOR CLIP TO BANANA JACK

Alligator Clip, solid Copper, Gold plated. Vinyl insulators (5 Red, 5 Black). Unassembled.

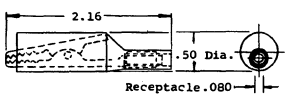


Standard Package of 10 clips and 10 insulators.

MODEL 3289 QUANTITY DISC. CODE (A) **NET .65 ea.**

INSULATED ALLIGATOR CLIP TO PIN TIP JACK

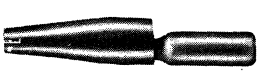
Alligator Clip, Steel, Cadmium Plated. Tip Jack, Beryllium Copper, Gold Flashed, accepts .080 dia. Pin tip plug. Vinyl insulators (5 Red, 5 Black). Unassembled.



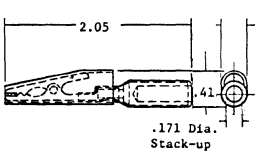
Standard Package of 10 clips and 10 insulators.

MODEL 1437 QUANTITY DISC. CODE (A) **NET .50 ea.**

INSULATED MINIGATOR CLIP TO BANANA JACK



This minigator clip accepts a standard banana plug in the rear. Clip is steel, cadmium plated. Banana jack, brass, nickel plated. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.

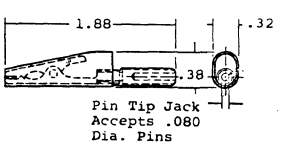


Standard Package of 10 clips and 10 insulators.

MODEL 3448 QUANTITY DISC. CODE (A) **NET .75 ea.**

INSULATED MINIGATOR CLIP TO PIN TIP JACK

This Minigator clip accepts a .080 dia. pin tip plug. Clip is steel, cadmium plated. Tip jack, Beryllium copper, gold flashed. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.



Standard Package of 10 clips and 10 insulators.

MODEL 3491 QUANTITY DISC. CODE (A) **NET .75 ea.**

½" SPACED MINIATURE PIN TIP PLUGS

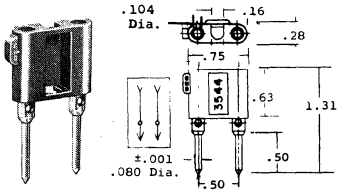
FEATURES:

- Fits .080 dia. pin tip jacks.
- Plug Bodies brass, Gold flashed per MIL-G-45204 Type 2 (.00002/.00003).
- Stack-up spring, beryllium copper alloy 170 per QQ-C-533, Gold flashed.
- Tough Thermoplastic molded directly to plug bodies.

RATINGS:

- Operating Temp.: −25°C to +85°C.
- Working Voltage: 2500 VDC.
- Current: 5 amps cont., 10 amps. int.

MINIATURE — DOUBLE PIN TIP PLUG WITH SET SCREWS

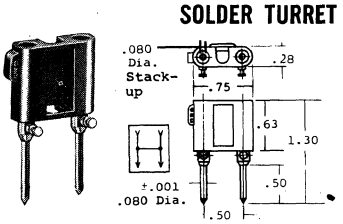


Miniature double pin tip plug on ½" centers. Set screws secure cable or component leads.
COLORS: Black, Red.

(Screwdriver No. 3736 NET .50)

MODEL 3544 (Specify color) QUANTITY DISC. CODE (A) **NET .85**

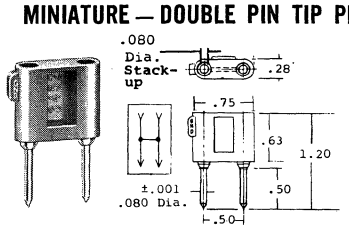
MINIATURE — DOUBLE PIN TIP PLUG WITH SOLDER TURRET TERMINALS



Miniature double Pin Tip plug on ½" centers. Gold flashed solder turret terminals for permanent noise-free connection of cables. .080 Tip jacks on ½" centers permit top stacking.
COLORS: Black, Red.

MODEL 3545 (Specify color) QUANTITY DISC. CODE (A) **NET 1.05**

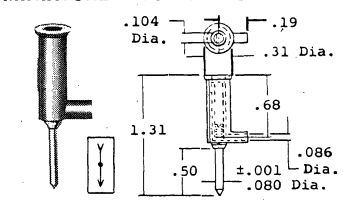
MINIATURE — DOUBLE PIN TIP PLUG WITH SHORTING BAR



Ideal as a connecting link for use with ½" spaced pin tip jacks. .080 dia. Tip jacks on ½" center permit top stacking. Banana plugs internally solder-bonded with #20 AWG wire. "Shorting Bar" stamped on plug.
COLORS: Black, Red.

MODEL 3452 (Specify color) QUANTITY DISC. CODE (A) **NET 1.25**

MINIATURE — SOLDERLESS PIN TIP PLUG WITH SAFETY COLLAR

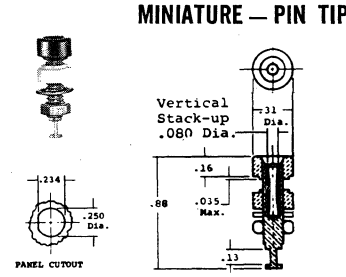


This integral collar insulates exposed wire leads and acts as a strain relief by preventing the flexing of the lead at the set screw. Wire firmly held in place with internal set screw, eliminating soldering.
COLORS: Black, Red.

(Screwdriver No. 3736 NET .50)

MODEL 3548 (Specify color) QUANTITY DISC. CODE (A) **NET .50**

MINIATURE — PIN TIP JACK .080 DIA.



Miniature jack accepts .080 dia. pin tip plugs. Polycarbonate Thermoplastic insulated head molded directly to gold flashed brass body. Contact spring, heat treated beryllium copper, gold flashed. Nickel plated hex nut and lockwasher included unassembled.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

Std. Pkg. (10 per color).

MODEL 3542 (Specify color) QUANTITY DISC. CODE (A) **NET .25 ea.**

POMONA ELECTRONICS

½" SPACED MINIATURE BANANA PLUGS AND ACCESSORIES

ONE-THIRD SMALLER Miniature Banana Plugs, a state-of-the-art development for the ever increasing demand for miniaturized test equipment.

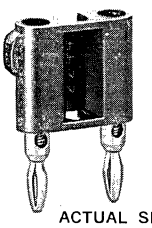
Banana plug springs are precision formed of one-piece beryllium copper, heat treated for maximum life and low contact resistance. Tough thermoplastic molded to plug bodies.

SPECIFICATIONS:

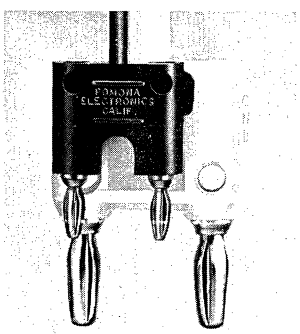
- Fits 0.104 dia. miniature banana jacks.
- Plug body brass, per QQ-B-626, Comp. #22.
- Gold flashed per MIL-G-45204 Type 11 (.00002/.00003).
- Spring, beryllium copper alloy 170 per QQ-C-533.

RATINGS:

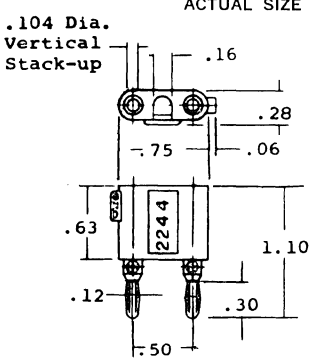
- Operating temp.: —25°C to +85°C.
- Working voltage: 2500 VDC.
- Current: 5 amps cont., 10 amps. int.



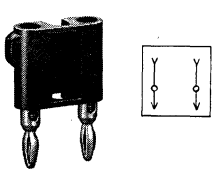
ACTUAL SIZE



ACTUAL SIZE



MINIATURE—DOUBLE BANANA PLUG WITH SET SCREWS



Miniature double banana plug on ½" centers. Internal set screws to secure cable or component leads. .104 dia. banana jacks on ½" centers permit top Stack-Up for multiple connections.

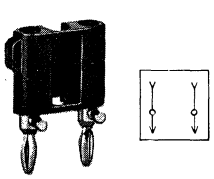
COLORS: Black, Red.

MODEL 2244 Black
MODEL 2244-2 Red

(Screwdriver No. 3736 NET .50)

MODEL 2244 QUANTITY DISC. CODE (A) **NET .95**

MINIATURE—DOUBLE BANANA PLUG WITH SOLDER TURRET TERMINALS



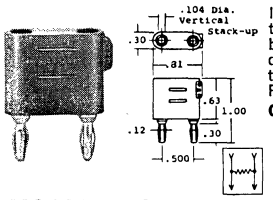
Miniature double banana plug on ½" centers. Solder turret terminals for permanent noise-free connections of cables or components. .104 dia. banana jacks on ½" centers permit top Stack-Up for multiple connections.

COLORS: Black, Red

MODEL 2245 Black
MODEL 2245-2 Red

MODEL 2245 QUANTITY DISC. CODE (A) **NET 1.05**

MINIATURE—DOUBLE BANANA PLUG WITH MOLDED PRECISION RESISTOR



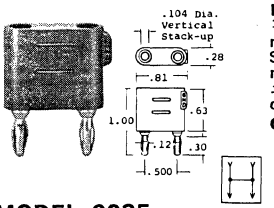
Ideal where rapid interchange of resistance values is required. Deposited carbon 1% ¼ watt, molded internally. .104 dia. banana jacks on ½" centers permit top Stack-Up for multiple connections. Resistance value stamped on plug.

COLOR: Blue

(OHMS)			
	50	10K	200K
	600	20K	250K
	1K	50K	500K
	5K	100K	1 MEG

MODEL 2246 (Specify Value) QUANTITY DISC. CODE (A) **NET 2.95**

MINIATURE—DOUBLE BANANA PLUG WITH SHORTING BAR



Ideal as a connecting link for use with ½" spaced banana jacks. .104 dia. banana jacks on ½" centers permit top Stack-Up for multiple connections. Banana plugs internally solder-bonded with #18 AWG wire. "Shorting Bar" stamped on plug.

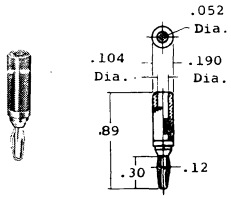
COLORS: Black, Red.

MODEL 2035 Black
MODEL 2035-2 Red

MODEL 2035 QUANTITY DISC. CODE (A) **NET 1.25**

MINIATURE SOLDER TYPE BANANA PLUG

NEW



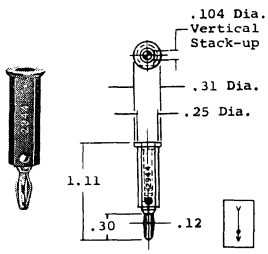
Miniature in line plug for use with miniature binding posts or banana jacks. Wire is soldered directly to the threaded plug. Nylon insulated handle.

COLORS: Black, Red.

MODEL 3690-0 Black
MODEL 3690-2 Red

MODEL 3690 QUANTITY DISC. CODE (A) **NET .40**

MINIATURE SOLDERLESS BANANA PLUG-STACK-UP



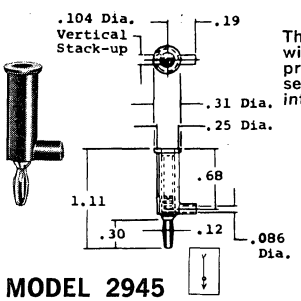
Miniature banana plug for rapid assembly of test leads. For use with miniature binding posts or banana jacks. Wire firmly held in place with internal set screw, eliminating soldering.

MODEL 2944-0 Black
MODEL 2944-2 Red

(Screwdriver No. 3736 NET .50)

MODEL 2944 QUANTITY DISC. CODE (A) **NET .50**

MINIATURE SOLDERLESS BANANA PLUG WITH SAFETY COLLAR-STACK-UP



This integral collar insulates exposed wire leads and acts as a strain relief by preventing the flexing of the lead at the set screw. Wire firmly held in place with internal set screw, eliminating soldering.

MODEL 2945-0 Black
MODEL 2945-2 Red

(Screwdriver No. 3736 NET .50)

MODEL 2945 QUANTITY DISC. CODE (A) **NET .50**

POMONA ELECTRONICS

MINIATURE BINDING POSTS MINIATURE BANANA JACKS

MINIATURE BINDING POSTS

A complete 5-way Binding Post in "Miniature." Captive Thumb Nut and Binding Post Body, machined brass; gold or nickel plated. Thumb Nut and Mounting Base molded of High Impact Polycarbonate Thermoplastic. Heavy Duty Shouldered Ceramic Insulator. Lockwasher and hex nut included, unassembled, nickel plated.

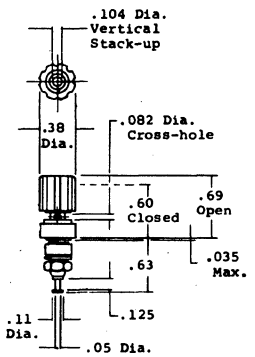
SPECIFICATIONS:

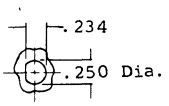
■ 5-way Binding Post ■ Mounts ¼" dia. "D" hole ■ Panels up to 3/16" thick ■ Captive Thumb Nut ■ .082 dia. Cross hole ■ Thumb Nut and Binding Post Body — Gold Flashed per MIL-G-45204 Type 2 OR Nickel Plated per QQ-N-290 Class 2.

RATINGS:

- Operating Temp.: —65°C to +150°C.
- Working Voltage: 1500 VDC.
- Current: 5 Amps Cont., 10 Amps Int.

MINIATURE—INSULATED BINDING POST





Panel Cutout

QUANTITY DISC. CODE (A)

MODEL 2382-* *(Specify Color) Gold Flashed Assembly **NET .90**

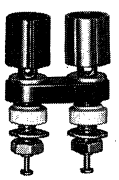
MODEL 2439-* *(Specify Color) Nickel Plated Assembly **NET .75**

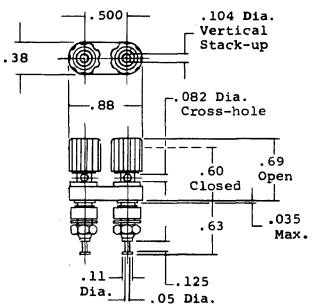
(*) COLORS

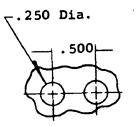
-0 Black	-5 Green
-1 Brown	-6 Blue
-2 Red	-7 Violet
-3 Orange	-8 Gray
-4 Yellow	-9 White

MINIATURE—INSULATED DOUBLE BINDING POST

Double binding post body on ½" centers with one Red and one Black binding post. Choice of Black or Red plate.







Panel Cutout

MODEL 2383-* *(Specify Color) Gold Flashed Assembly **NET 1.80**

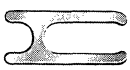
MODEL 2440-* *(Specify Color) Nickel Plated Assembly **NET 1.50**

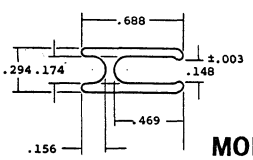
QUANTITY DISC. CODE (A)

(*) COLORS

-0 Black Plate
-2 Red Plate

BINDING POSTS SHORTING LINK





Shorting Link for miniature Binding Posts on ½" centers. A snap-on feature holds Link on post when short not needed. **MATERIAL:** Brass .031 thick. **FINISH:** Nickel Plated per QQ-N-290 class 2 or Gold Flashed per MIL-G-45204 Type 2.

QUANTITY DISC. CODE (A)

Std. Pkg. 10

MODEL 3478 (Gold Flashed) **NET .22 ea.** **MODEL 3479** (Nickel Plated) **NET .15 ea.**

MINIATURE BANANA JACKS

Developed by the need for miniaturization of test equipment and test panels. The new generation of test jacks. Built to Pomona Electronics high standard of quality.

Wide selection of colors available.

Molded of High Impact Polycarbonate Thermoplastic. Banana Jack body, one piece machined brass, gold flashed. Heavy duty shouldered ceramic insulator. Lockwasher and hex nut included, unassembled, nickel plated.

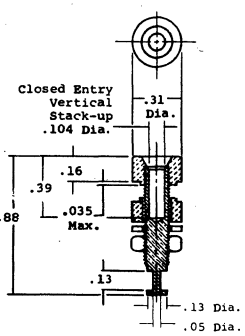
SPECIFICATIONS:

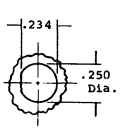
■ Closed entry jack .104 dia. ■ Insulator head molded to body. ■ Mounts in ¼" dia. hole. Model 2142, Panels up to ¼" thick. Model 2143, Panels up to 3/16" thick. ■ Solder turret terminal.

RATINGS:

- Operating Temp.: —65°C to +150°C.
- Working Voltage: 1500 VDC.
- Current: 5 Amps Cont., 10 Amps Int.

MINIATURE—INSULATED BANANA JACK





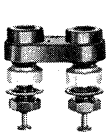
PANEL CUTOUT

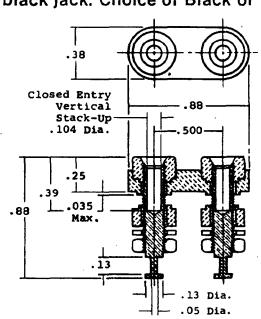
2142 —BLACK
2142-1—BROWN
2142-2—RED
2142-3—ORANGE
2142-4—YELLOW
2142-5—GREEN
2142-6—BLUE
2142-7—VIOLET
2142-8—GRAY
2142-9—WHITE

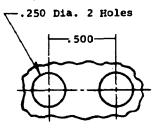
MODEL 2142 Standard Package: 10 (per color) QUANTITY DISC. CODE (A) **NET .25 ea.**

MINIATURE—INSULATED DOUBLE BANANA JACK

Double banana jack on ½" centers with one red and one black jack. Choice of Black or Red plate.







PANEL CUTOUT

MODEL 2143 (Black Plate)

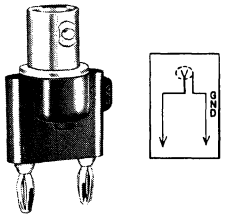
MODEL 2143-2 (Red Plate)

MODEL 2143 QUANTITY DISC. CODE (A) **NET .75**

POMONA ELECTRONICS

½" SPACED MINIATURE BANANA PLUG ADAPTERS AND ACCESSORIES

ADAPTER — BNC RECEPTACLE TO MINIATURE DOUBLE BANANA PLUG



This adapter allows a BNC plug to be used with equipment having ½" spaced miniature .104 dia. banana jacks. Excellent for adapting test equipment to standard coaxial cables.

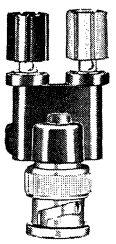
UPPER: BNC receptacle, UG 1094/U.

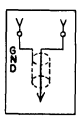
LOWER: Miniature double banana plug on ½" centers, for use with .104 dia. miniature jacks. Gold flashed one piece heat treated beryllium copper springs.

COLOR: Black.

MODEL 3269 QUANTITY DISC. CODE (A) **NET 3.25**

ADAPTER — MINIATURE BINDING POSTS TO BNC PLUG





This adapter converts a BNC receptacle to miniature ½" spaced 5 way binding posts.

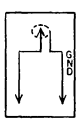
UPPER: Insulated, gold flashed miniature 5 way binding posts on ½" centers with .104 dia. miniature banana jacks.

LOWER: BNC plug.

COLOR: Black.

MODEL 3296 QUANTITY DISC. CODE (A) **NET 5.45**

ADAPTER — BNC PLUG TO MINIATURE DOUBLE BANANA PLUG



Allows a BNC cable jack to be used on equipment having ½" spaced .104 dia. banana jacks.

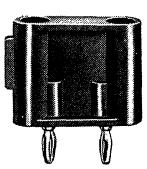
UPPER: BNC plug.

LOWER: Miniature double banana plug on ½" centers, for use with .104 dia. miniature jacks. Gold flashed one piece heat treated beryllium copper springs.

COLOR: Black.

MODEL 3270 QUANTITY DISC. CODE (A) **NET 4.50**

ADAPTER — STANDARD DOUBLE BANANA JACK TO MINIATURE DOUBLE BANANA PLUG



Permits standard double banana plug on ¾" centers to be used with equipment having miniature double banana jacks on ½" centers.

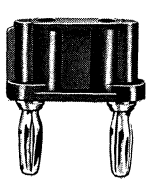
UPPER: Standard double banana jacks .166 dia. on ¾" centers. Brass, nickel plated.

LOWER: Miniature double banana plug on ½" centers. One piece nickel plated beryllium copper spring for use with .104 dia. miniature banana jacks.

COLOR: Black.

MODEL 2952 QUANTITY DISC. CODE (A) **NET 1.25**

ADAPTER — MINIATURE DOUBLE BANANA JACK TO STANDARD DOUBLE BANANA PLUG



Permits miniature double banana plug on ½" centers to be used with equipment having standard double banana jacks on ¾" centers.

UPPER: Miniature double banana jacks, .104 dia. on ½" centers. Brass, nickel plated.

LOWER: Standard double banana plug on ¾" centers. One piece nickel plated beryllium copper spring for use with .166 dia. standard banana jacks.

COLOR: Black.

MODEL 2943 QUANTITY DISC. CODE (A) **NET 1.25**

ADAPTER—STANDARD BANANA JACK TO MINIATURE BANANA PLUG

Permits standard banana plug to be used with equipment having miniature banana jacks.

UPPER: Banana jack, .166 dia.; Brass, nickel plated.

LOWER: Miniature banana plug, one piece nickel plated beryllium copper spring for use with .104 dia. miniature banana jacks.

COLORS: Black, Red.

MODEL 2138 2138-0 Black, 2138-2 Red **NET .50**

QUANTITY DISC. CODE (A)

ADAPTER—MINIATURE BANANA JACK TO STANDARD BANANA PLUG

Permits miniature banana plugs to be used with equipment having standard banana jacks.

UPPER: Miniature banana jack, .104 dia.; Brass, nickel plated.

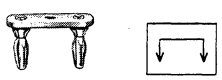
LOWER: Standard banana plug, one piece nickel plated beryllium copper spring for use with .166 dia. banana jacks.

COLORS: Black, Red.

MODEL 2477 2477-0 Black, 2477-2 Red **NET .50**

QUANTITY DISC. CODE (A)

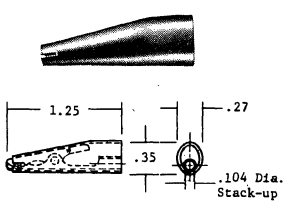
MINIATURE — METAL SHORTING BAR



Low profile, gold flashed, brass shorting bar. Miniature banana plugs on ½" centers swaged to 1/16" thick brass bar. Center hole accepts #4-40 screw for easy removal. Current rating 5 Amps. cont., 10 Amps INT.

MODEL 3030 QUANTITY DISC. CODE (A) **NET .85**

INSULATED MINIGATOR CLIP TO MINIATURE BANANA JACK

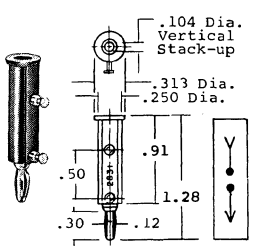


This Minigator clip accepts a miniature banana plug in the rear. Clip is steel, cadmium plated. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.

Standard Package of 10 clips and 10 insulators.

MODEL 3217 QUANTITY DISC. CODE (A) **NET .20 ea.**

MINIATURE — SINGLE BANANA PLUG ISOLATION



Provides two terminal isolation. Allows for addition of series components. Excellent for circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.

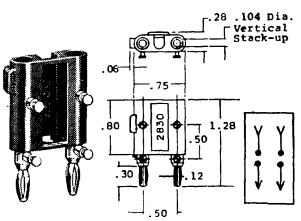
UPPER: Miniature banana jack, .104 dia. Brass, gold flashed.

LOWER: Miniature banana plug, one piece gold flashed beryllium copper spring.

COLOR: Black, Red.

MODEL 2831 (specify color) QUANTITY DISC. CODE (A) **NET 1.50**

MINIATURE — DOUBLE BANANA PLUG — 4 TERMINAL ISOLATION



Provides four terminal isolation. Top Stack-up receptacles isolated from lower plugs. Ideal for insertion of matching networks in computer boards, circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Miniature double banana jack, .104 dia. Brass, gold flashed.

LOWER: Miniature double banana plug on ½" centers. Gold flashed one piece beryllium copper spring.

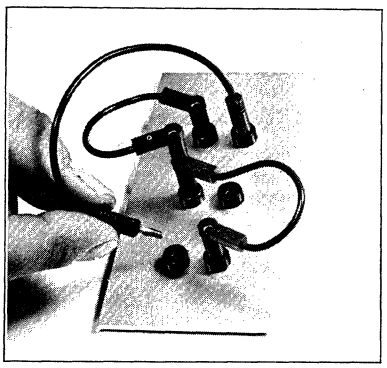
COLOR: Red.

MODEL 2830 QUANTITY DISC. CODE (A) **NET 3.85**

POMONA ELECTRONICS — MINIATURE PATCH CORDS

Miniature patch cords for use with .104 dia. miniature banana jacks. Excellent for miniaturization of test equipment and high density packaging for patch systems.

Banana plug springs precision formed of one piece beryllium copper, heat treated for maximum life and low contact resistance. Tough thermoplastic molded to plug body and wire.



FEATURES:

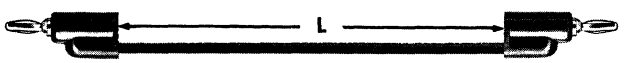
■ Fits .104 dia. miniature banana jacks ■ Plug body brass, per QQ-B-626, Comp. #22 ■ Gold flashed per MIL-G-45204 Type II (.00002/.00003) ■ Spring, one piece heat treated beryllium copper, alloy 170 per QQ-C-533.

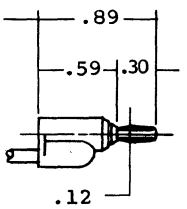
SPECIFICATIONS:

■ WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation .087" O.D. ■ RATED: 5 A. Cont., 10 A. Int., 5,000 V.D.C. ■ OPERATING TEMP.: —0°C to +105 C°

MINIATURE—BANANA PLUG STACK-UP PATCH CORD

MODEL	LENGTH	NET
1081-4	4"	1.50
1081-8	8"	1.50
1081-12	12"	1.50
1081-18	18"	1.50
1081-24	24"	1.50
1081-36	36"	1.50
1081-48	48"	1.55
1081-60	60"	1.60



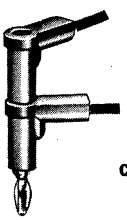


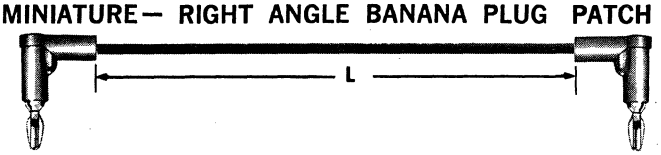
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

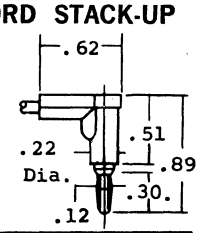
MODEL 1081 (Specify Color) ★QUANTITY DISC. CODE (A)

MINIATURE— RIGHT ANGLE BANANA PLUG PATCH CORD STACK-UP

MODEL	LENGTH	NET
2860-4	4"	1.50
2860-8	8"	1.50
2860-12	12"	1.50
2860-18	18"	1.50
2860-24	24"	1.50
2860-36	36"	1.50
2860-48	48"	1.55
2860-60	60"	1.60





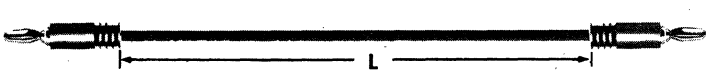


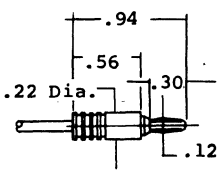
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 2860 (Specify Color) ★QUANTITY DISC. CODE (A)

MINIATURE—BANANA PLUG PATCH CORD

MODEL	LENGTH	NET
2842-4	4"	1.10
2842-8	8"	1.10
2842-12	12"	1.10
2842-18	18"	1.10
2842-24	24"	1.10
2842-36	36"	1.10
2842-48	48"	1.15
2842-60	60"	1.20



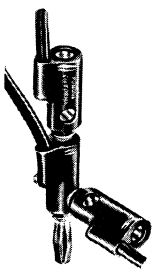


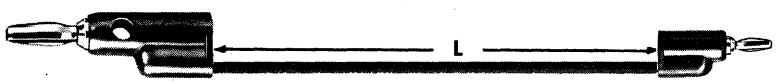
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 2842 (Specify Color) ★QUANTITY DISC. CODE (A)

STANDARD BANANA PLUG TO MINIATURE BANANA PLUG PATCH CORD

MODEL	LENGTH	NET
3014-4	4"	1.50
3014-8	8"	1.50
3014-12	12"	1.50
3014-18	18"	1.50
3014-24	24"	1.50
3014-36	36"	1.50
3014-48	48"	1.55
3014-60	60"	1.60





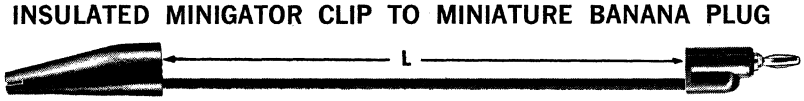
A patch cord for rapid interconnection of equipment having standard and miniature banana jacks. Both plugs have a stack-up feature.
STANDARD BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.
WIRE: 20 AWG, Strand. 41 x 36 T.C. extra flexible polyvinyl insulation .087" O.D.

MINIATURE BANANA PLUG: Spring, one piece beryllium copper, heat treated, gold flashed. Tough thermoplastic molded to plug body and wire.
RATED: 5 A. Cont., 10 A Int. 5,000 W.V.D.C.
OPERATING TEMP.: —25° C to +105° C.
COLORS: Black, Red.

MODEL 3014 (Specify Color) ★QUANTITY DISC. CODE (A)

INSULATED MINIGATOR CLIP TO MINIATURE BANANA PLUG

MODEL	LENGTH	NET
3222-4	4"	1.10
3222-8	8"	1.10
3222-12	12"	1.10
3222-18	18"	1.10
3222-24	24"	1.10
3222-36	36"	1.10
3222-48	48"	1.15
3222-60	60"	1.20



Adapts to equipment using miniature banana jacks.
CLIP: Minigator, Steel, cadmium plated.
MINIATURE BANANA PLUG: Spring, one piece beryllium copper, heat treated, gold flashed. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on black wire.
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, .087" O.D.
OPERATING TEMP.: —25° C to +105° C.
COLORS: Black, Red

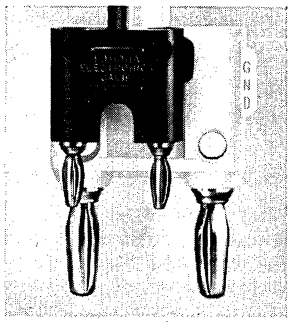
MODEL 3222 (Specify Color) ★QUANTITY DISC. CODE (A)

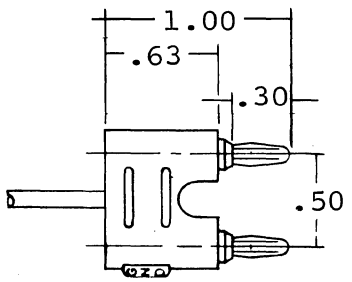
POMONA ELECTRONICS

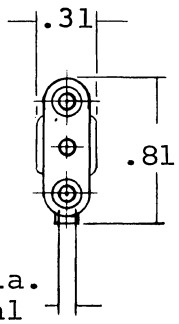
½" SPACED MINIATURE DOUBLE BANANA PLUG PATCH CORDS

MOLDED MINIATURE DOUBLE BANANA PLUG PATCH CORDS

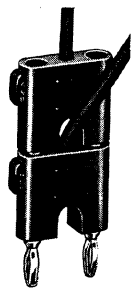
ACTUAL SIZE







.104 Dia.
Vertical
Stack-up



STACK-UP

⅓ smaller...

A miniature double banana plug on ½" centers. This patch cord enables miniaturization of test equipment and high density packaging for patch systems.
Banana plug springs precision formed of one piece beryllium copper, heat treated for maximum life and low contact resistance.

FEATURES...

- One piece beryllium copper heat treated spring for long life.
- Rounded spring design results in maximum contact area.
- GND., clearly molded on plug body and shell.
- Solder-bonded noise-free connections.

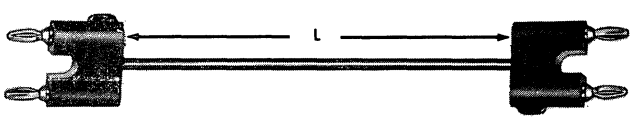
SPECIFICATIONS . . .

- Fits standard 0.104 dia. banana jacks, on ½" centers.
- Spring beryllium copper alloy 170 per QQ-C-533.
- Plug body brass per QQ-B-626, Comp. 22.
- Gold flashed per MIL-G-45204, type II.

CABLE DESCRIPTION:
Shielded coax., RG174/U. Polyethylene insulation, Vinyl jacket. Nom. cap. 29.5 pf/ft. Nom. Imp. 50 Ohms. Nom. O.D. .100". **Color: Black.**

NOTE: Molded double plug matches color of cable.

MINIATURE — DOUBLE BANANA PLUG BOTH ENDS

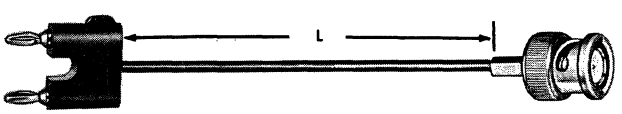


CONN: 1st END Miniature Double Banana plug on ½" centers.
CABLE: Shielded Coax., RG174/U.
CONN: 2nd END Miniature double banana plug on ½" centers.

MODEL	LENGTH
2247-K-12	12"
2247-K-24	24"
2247-K-36	36"
2247-K-48	48"
2247-K-60	60"

MODEL 2247 QUANTITY DISC. CODE (B) **NET 4.95**

MINIATURE–DOUBLE BANANA PLUG TO BNC MALE

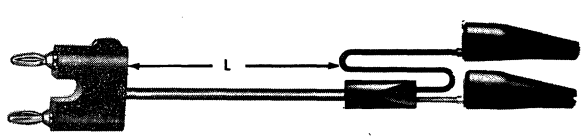


CONN: 1st END Miniature Double Banana Plug on ½" centers
CABLE: Shielded Coax., RG174/U
CONN: 2nd END Male BNC

MODEL	LENGTH
2248-K-12	12"
2248-K-24	24"
2248-K-36	36"
2248-K-48	48"
2248-K-60	60"

MODEL 2248 QUANTITY DISC. CODE (B) **NET 5.95**

MINIATURE — DOUBLE BANANA PLUG TO MINIGATOR CLIPS

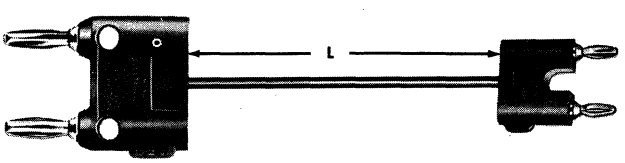


CONN: 1st END Miniature Double Banana plug on ½" centers.
CABLE: Shielded Coax., RG174/U.
CONN: 2nd END Minigator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

MODEL	LENGTH
3027-K-12	12"
3027-K-24	24"
3027-K-36	36"
3027-K-48	48"
3027-K-60	60"

MODEL 3027 QUANTITY DISC. CODE (B) **NET 5.95**

DOUBLE BANANA PLUG TO MINIATURE DOUBLE BANANA PLUG



CONN: 1st END Double Banana Plug, on ¾" Centers.
CABLE: Shielded Coax., RG174/U.
CONN: 2nd END Miniature double banana plug on ½" Centers.

MODEL	LENGTH
2443-K-12	12"
2443-K-24	24"
2443-K-36	36"
2443-K-48	48"
2443-K-60	60"

MODEL 2443 QUANTITY DISC. CODE (B) **NET 4.95**

POMONA ELECTRONICS

"BLACK BOXES"

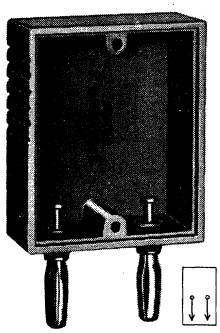
CREATE passive and active networks, voltage dividers, isolation networks or attenuators with these units. Solder turret terminals for permanent noise-free connection of components, etc. Entire unit may be potted or encapsulated.

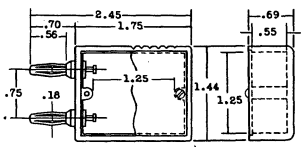
Housing molded of thermosetting electrical grade phenolic. Cover, punched XXP laminated paper base phenolic. Color, housing and cover, BLACK. Cover plate and 2 each #2-56 cover screws included.

APPLICABLE SPECIFICATIONS:

Operating Temp: —25°C to +125°C. Working Voltage: 5000 VDC. Current: 15 Amps Cont., 30 Amps Int.

COMPONENT MOUNTING—ACROSS BANANA PLUGS



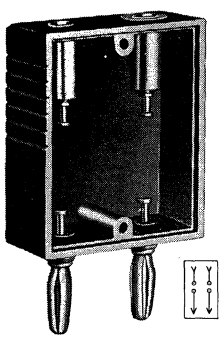


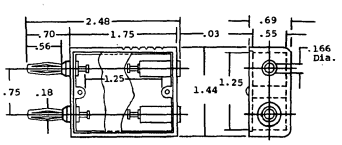
UPPER: No Connection.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 2096 QUANTITY DISC. CODE (A) **NET 1.95**

COMPONENT MOUNTING—BANANA JACKS TO DOUBLE BANANA PLUG—JUNIOR SIZE



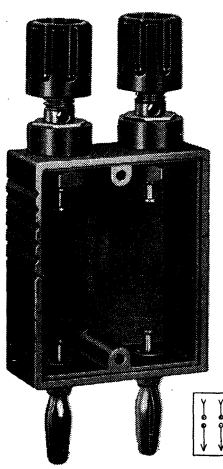


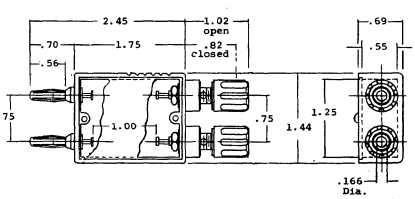
UPPER: Banana jacks, .166" dia. and solder turret terminals on ¾" centers. Brass, nickel plated. Polarity indicator on top, color, RED.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 2098 QUANTITY DISC. CODE (A) **NET 3.45**

COMPONENT MOUNTING—BINDING POSTS TO DOUBLE BANANA PLUG—JUNIOR SIZE

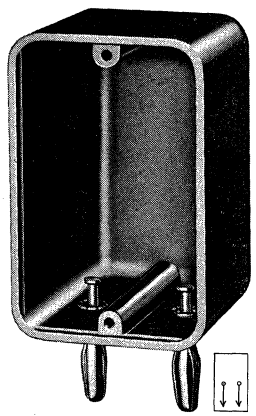




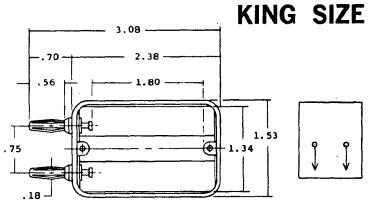
UPPER: Banana jack binding posts with solder turret terminals, on ¾" centers. Red and Black.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 2259 QUANTITY DISC. CODE (A) **NET 4.85**



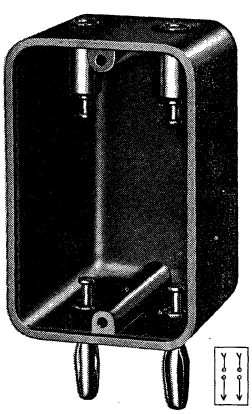
COMPONENT MOUNTING—ACROSS BANANA PLUGS—KING SIZE



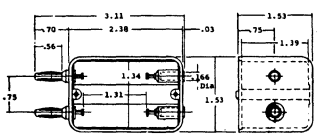
UPPER: No Connection.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 1177 QUANTITY DISC. CODE (A) **NET 1.95**



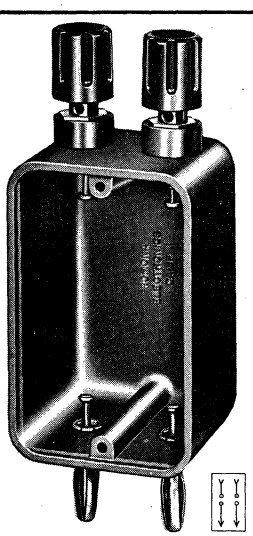
COMPONENT MOUNTING—BANANA JACKS TO DOUBLE BANANA PLUG—KING SIZE



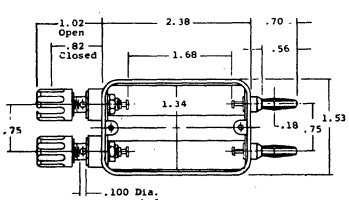
UPPER: Banana jacks, .166" dia. and solder turret terminals on ¾" centers. Brass, nickel plated. Polarity indicator on top, color, RED.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 2224 QUANTITY DISC. CODE (A) **NET 3.45**



COMPONENT MOUNTING—BINDING POSTS TO DOUBLE BANANA PLUG—KING SIZE



UPPER: Banana jack binding posts with solder turret terminals, on ¾" centers. Red and Black.

LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

MODEL 2262 QUANTITY DISC. CODE (A) **NET 4.85**

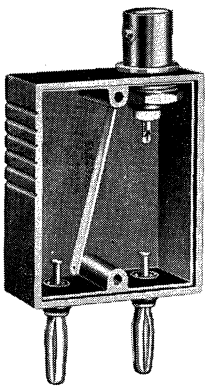
POMONA ELECTRONICS

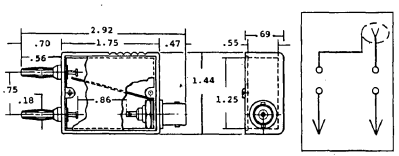
"BLACK BOXES"

CREATE passive and active networks, voltage dividers, isolation networks or attenuators with these units. Solder turret terminals for permanent noise-free connection of components, etc. Entire unit may be potted or encapsulated.

Housing molded of thermosetting electrical grade phenolic. Cover, punched XXP laminated paper base phenolic. Color, housing and cover, BLACK. Cover plate and 2 each #2-56 cover screws included.

COMPONENT MOUNTING—BNC RECEPTACLE TO DOUBLE BANANA PLUG





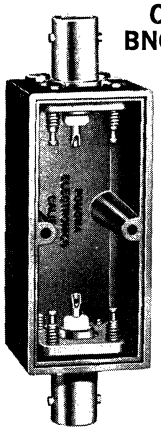
UPPER: BNC Receptacle UG1094/U

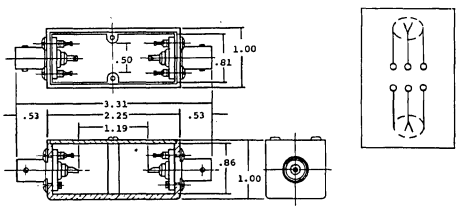
LOWER: Banana plugs on ¾" centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 500 V Peak.

MODEL 2097 QUANTITY DISC. CODE (A) **NET 3.85**

COMPONENT MOUNTING—BNC RECEPTACLE BOTH ENDS





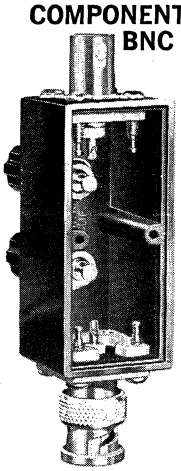
UPPER: BNC Receptacle UG290A/U

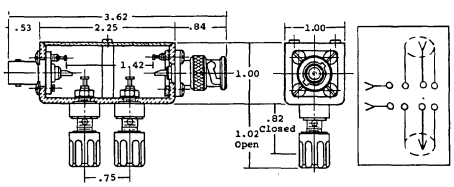
LOWER: BNC Receptacle UG290A/U

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 500 V Peak.

MODEL 2101 QUANTITY DISC. CODE (A) **NET 5.85**

COMPONENT MOUNTING—BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS





UPPER: BNC Receptacle UG290A/U

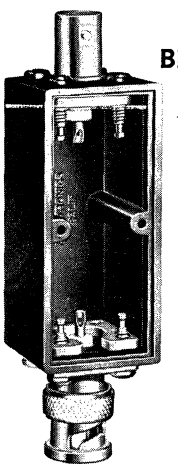
CENTER: Banana jack binding posts with solder turret terminals. Red and Black.

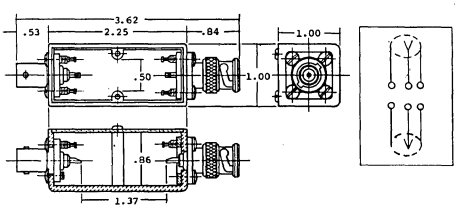
LOWER: BNC Plug. UG1104A/U.

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 500 V Peak.

MODEL 2100 QUANTITY DISC. CODE (A) **NET 10.85**

COMPONENT MOUNTING—BNC RECEPTACLE TO BNC PLUG





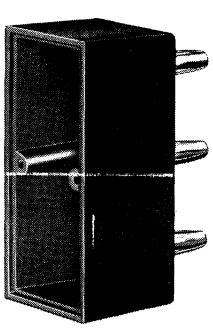
UPPER: BNC Receptacle UG290A/U

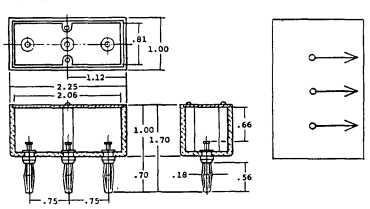
LOWER: BNC Plug UG1104A/U

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 500 V Peak.

MODEL 2099 QUANTITY DISC. CODE (A) **NET 7.50**

COMPONENT MOUNTING—(3) ¾" SPACED BANANA PLUGS



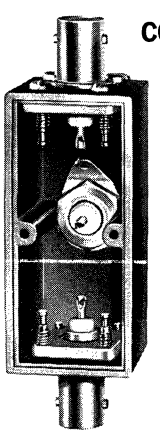


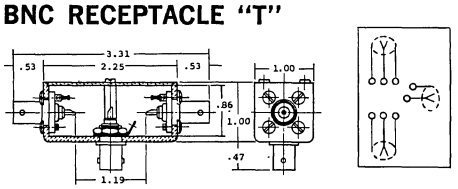
Three-in-line ¾" Spaced Banana Plugs.
One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 5000 VDC.
Current: 15 Amps Cont., 30 Amps Int.

MODEL 2095 QUANTITY DISC. CODE (A) **NET 2.75**

COMPONENT MOUNTING—BNC RECEPTACLE "T"





UPPER: BNC Receptacle UG290A/U

CENTER: BNC Receptacle UG1094/U

LOWER: BNC Receptacle UG290A/U

APPLICABLE SPECIFICATIONS:
Operating Temp: −25°C to +125°C.
Working Voltage: 500 V Peak.

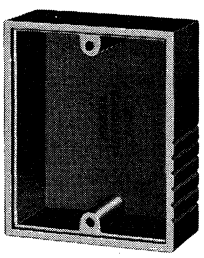
MODEL 2102 QUANTITY DISC. CODE (A) **NET 8.50**

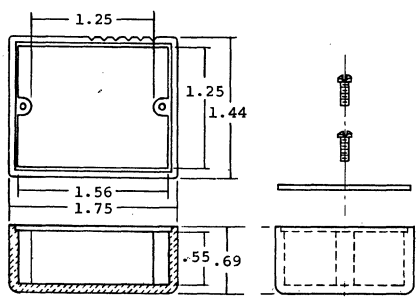
POMONA ELECTRONICS — "BLACK BOXES"

Boxes of unlimited uses for packaging of components and circuitry. Also ideal for potting and encapsulating. Available in three sizes as shown below. Housing molded of thermosetting electrical grade phenolic. Cover, punched XXP laminated paper base phenolic. Color, Housing: Black, Red or Green (specify). Cover, Black. Cover plate and 2 each #2-56 cover screws included.

Operating Temperature: —25°C to +125°C.

BLACK BOX—JUNIOR SIZE

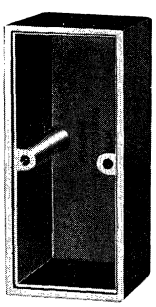


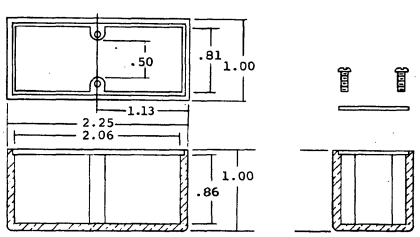


MODEL	COLOR
2105	Black
NEW 3720	Red
NEW 3721	Green

QUANTITY DISC. CODE (A) **NET .85**

BLACK BOX—QUEEN SIZE

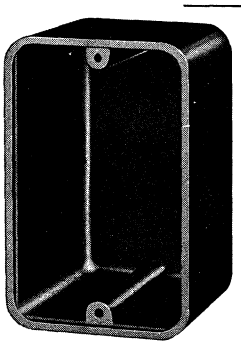


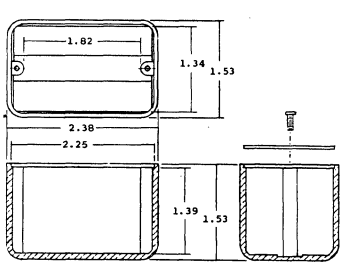


MODEL	COLOR
2103	Black
NEW 3722	Red
NEW 3723	Green

QUANTITY DISC. CODE (A) **NET .85**

BLACK BOX—KING SIZE





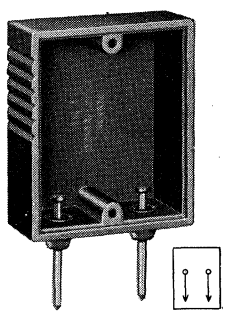
MODEL	COLOR
2104	Black
NEW 3724	Red
NEW 3725	Green

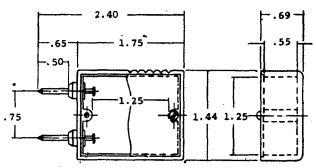
QUANTITY DISC. CODE (A) **NET .85**

CREATE passive and active networks, voltage dividers, isolation networks or attenuators with these units. Solder turret terminals for permanent noise-free connection of components, etc. Entire unit may be potted or encapsulated.

Housing molded of thermosetting electrical grade phenolic. Cover, punched XXP laminated paper base phenolic. Color, housing and cover, BLACK. Cover plate and 2 each #2-56 cover screws included.

COMPONENT MOUNTING—ACROSS PIN TIP PLUGS



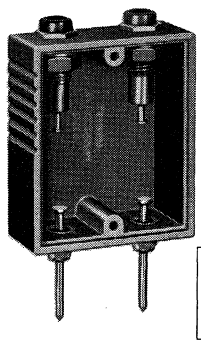


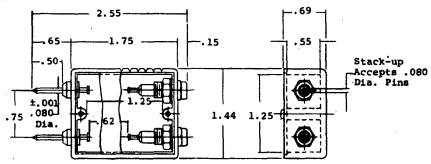
UPPER: No Connection.
LOWER: Pin tip plugs, .080 dia. on ¾" centers. Plug bodies and solder turret terminals, brass, nickel plated.

APPLICABLE SPECIFICATIONS:
Operating Temp.: —25°C to +125°C.
Working Voltage: 5000 VDC.
Current: 5 Amps Cont., 10 Amps Int.

MODEL 2268 QUANTITY DISC. CODE (A) **NET 1.95**

COMPONENT MOUNTING—PIN TIP JACKS TO DOUBLE PIN TIP PLUG—JUNIOR SIZE



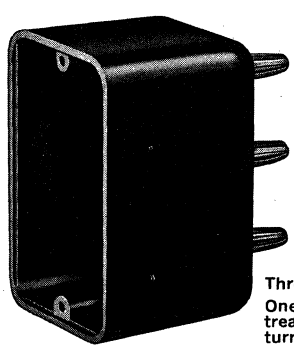


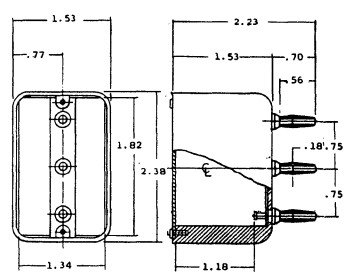
UPPER: Tip jacks, on ¾" centers, per MS-16108. One Red, one Black.
LOWER: Pin tip plugs, .080 dia. on ¾" centers. Plug bodies and solder turret terminals, brass, nickel plated.

APPLICABLE SPECIFICATIONS:
Operating Temp.: —25°C to +125°C.
Working Voltage: 5000 VDC.
Current: 5 Amps Cont., 10 Amps Int.

MODEL 2260 QUANTITY DISC. CODE (A) **NET 4.85**

COMPONENT MOUNTING — (3) ¾" SPACED BANANA PLUGS — KING SIZE





Three-in-line ¾" Spaced Banana Plugs.

One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard .166" dia. banana jacks.

APPLICABLE SPECIFICATIONS:
Operating Temp: —25°C to +125°C.
Working Voltage: 5000 VDC.
Current: 15 Amps Cont., 30 Amps In.

MODEL 1943 QUANTITY DISC. CODE (A) **NET 3.25**

POMONA ELECTRONICS

SHIELDED "BLACK BOXES" MINIATURE SIZE

NOW AVAILABLE, *SHIELDED* "BLACK BOXES." Boxes that fulfill the requirement for RF applications.

Ideal for compact packaging, eg., voltage dividers, isolation networks, impedance matching networks, and other varied uses.

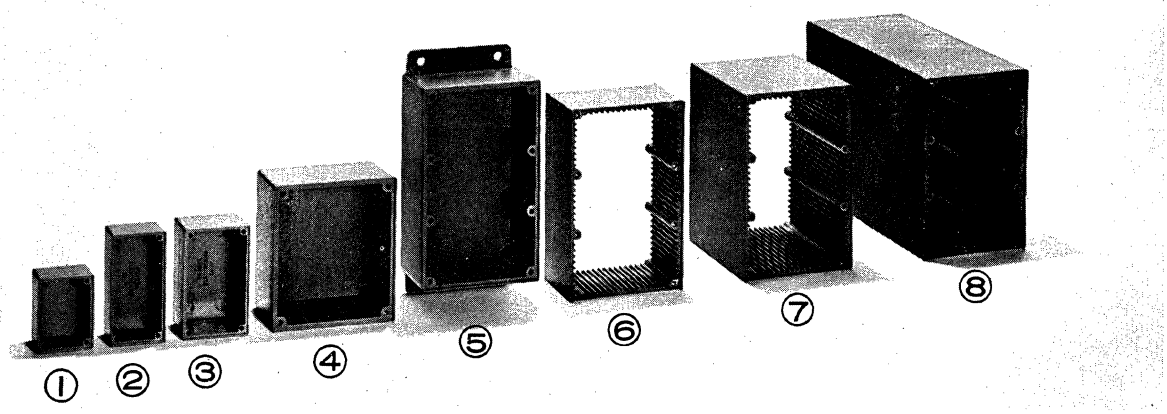
Cover and self-tapping screws included.

APPLICABLE SPECIFICATIONS: (ALL MODELS)

Operating Temp.: −55°C to +150°C.
Working Voltage: 500 V Peak (Model 2415, 1500 V Peak).
Noise Rejection: Greater than 70DB.

FEATURES:

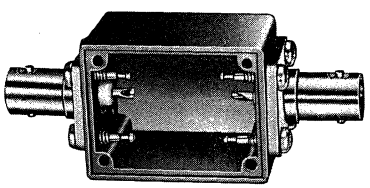
- SHIELDED HOUSING; Die Cast Aluminum. FINISH: BLUE baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- COVER; .040 Thick Aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- Four screws secure cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.



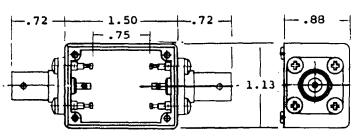
① MINIATURE SIZE—**Page 31** ② SIZE "A"—**Pages 32 & 41** ③ SIZE "B"—**Pages 33, 34, 35 & 41** ④ SIZE "D"—**Page 37** ⑤ SIZE "C"—**Page 36** ⑥ CARD GUIDE 1½" Deep—**Pages 38 & 39** ⑦ CARD GUIDE 3" Deep—**Page 40** ⑧ CARD GUIDE 6" Deep—**Page 40**

NEW

COMPONENT MOUNTING— BNC RECEPTACLE BOTH ENDS



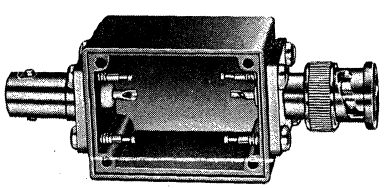
CONN: 1st END } BNC Receptacle Jack, UG290A/U.
CONN: 2nd END } BNC Receptacle Jack, UG290A/U.



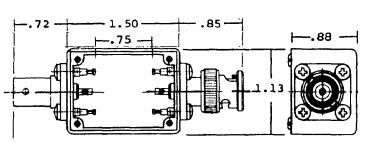
MODEL 3751 QUANTITY DISC. CODE (A) **NET 6.85**

NEW

COMPONENT MOUNTING— BNC RECEPTACLE TO BNC PLUG



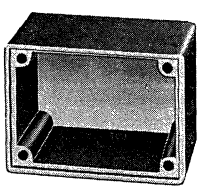
CONN: 1st END } BNC Receptacle Jack, UG290A/U.
CONN: 2nd END } BNC Receptacle Plug, UG1104A/U.



MODEL 3752 QUANTITY DISC. CODE (A) **NET 7.85**

EMPTY — SHIELDED "BLACK BOX"

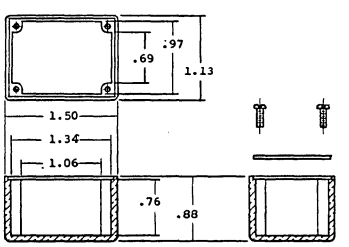
NEW



MINIATURE SIZE

MODEL 3753
FINISH: Blue Baked Enamel.
Includes cover with part number on cover and four cover screws.

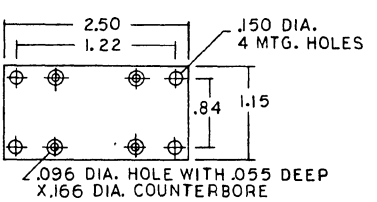
MODEL 3754
FINISH: None
Includes unmarked cover and four cover screws.



MODEL 3753
MODEL 3754
QUANTITY DISC. CODE (A) **NET 1.50**

LARGER COVER PLATE FOR MOUNTING MINIATURE SIZE BOXES

NEW



This larger plate, when attached to the box, provides flanges for mounting.

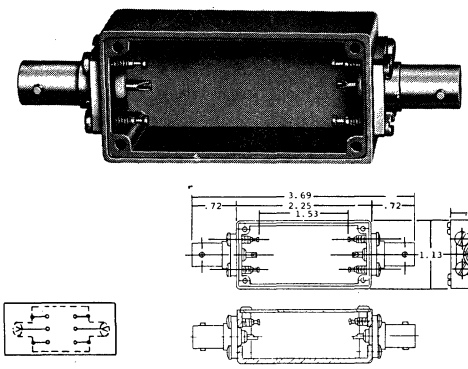
MATERIAL: .080 Aluminum #6061-T6, clear anodized per MIL-A-8625A.

MODEL 3729 (plate only) QUANTITY DISC. CODE (A) **NET .75**

POMONA ELECTRONICS

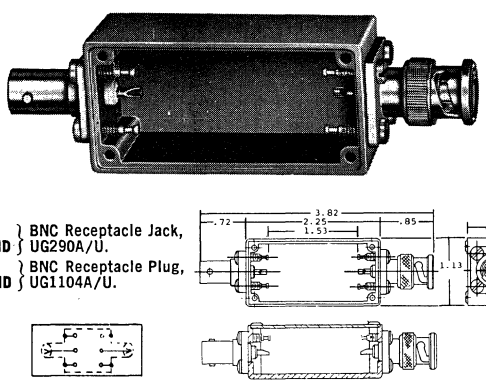
SHIELDED "BLACK BOXES" SIZE "A"

COMPONENT MOUNTING— BNC RECEPTACLE BOTH ENDS



MODEL 2390 QUANTITY DISC. CODE (A) **NET 6.85**

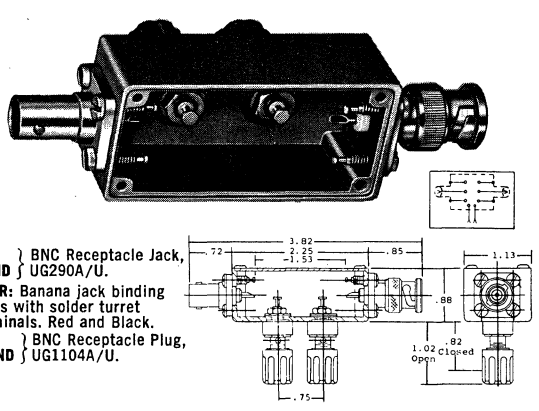
COMPONENT MOUNTING— BNC RECEPTACLE TO BNC PLUG



CONN: } BNC Receptacle Jack, **1st END** { UG290A/U.
CONN: } BNC Receptacle Plug, **2nd END** { UG1104A/U.

MODEL 2391 QUANTITY DISC. CODE (A) **NET 7.85**

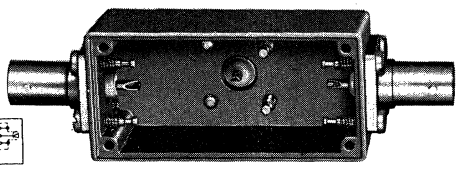
COMPONENT MOUNTING— BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS



CONN: } BNC Receptacle Jack, **1st END** { UG290A/U.
CENTER: Banana jack binding posts with solder turret terminals. Red and Black.
CONN: } BNC Receptacle Plug, **2nd END** { UG1104A/U.

MODEL 2393 QUANTITY DISC. CODE (A) **NET 10.85**

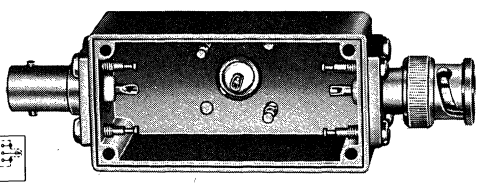
COMPONENT MOUNTING— BNC RECEPTACLE "T"



CONN: } BNC Receptacle Jack, **1st END** { UG290A/U.
CENTER: BNC Receptacle Jack, UG290A/U.
CONN: } BNC Receptacle Jack, **2nd END** { UG290A/U.

MODEL 2392 QUANTITY DISC. CODE (A) **NET 9.50**

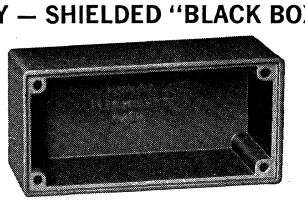
COMPONENT MOUNTING — "T" TWO BNC RECEPTACLES TO BNC PLUG



CONN: } BNC Receptacle Jack, **1st. END** { UG290A/U.
CENTER: BNC Receptacle Jack, UG290A/U.
CONN: } BNC Receptacle Plug, **2nd END** { UG1104A/U.

MODEL 2401 QUANTITY DISC. CODE (A) **NET 10.85**

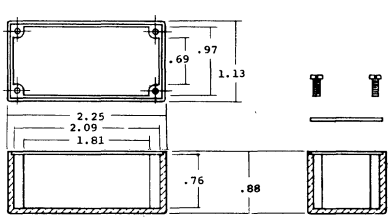
EMPTY — SHIELDED "BLACK BOX"



SIZE "A"

MODEL 2397
FINISH: Blue Baked Enamel. Includes cover with part number on cover and four cover screws.

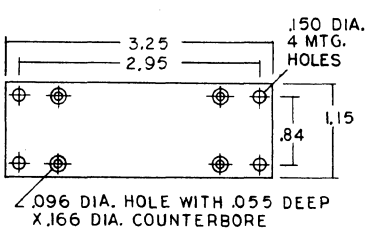
MODEL 2400
FINISH: None Includes unmarked cover and four cover screws.



MODEL 2397
MODEL 2400
QUANTITY DISC. CODE (A) **NET 1.50**

LARGER COVER PLATE FOR MOUNTING SIZE "A" BOXES

NEW



This larger plate, when attached to the box, provides flanges for mounting.

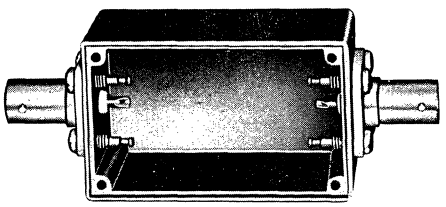
MATERIAL: .080 Aluminum #6061-T6, clear anodized per MIL-A-8625A.

MODEL 3728 (plate only) QUANTITY DISC. CODE (A) **NET .75**

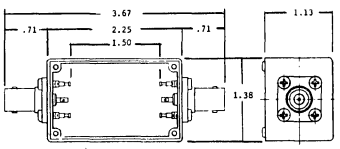
POMONA ELECTRONICS

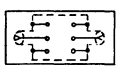
SHIELDED "BLACK BOXES" SIZE "B"

COMPONENT MOUNTING — BNC RECEPTACLE BOTH ENDS



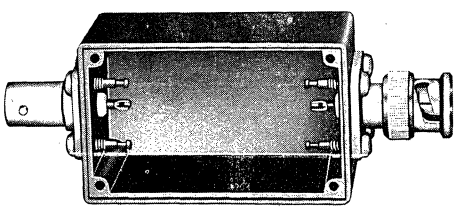
CONN: } BNC Receptacle Jack,
1st END } UG290A/U.
CONN: } BNC Receptacle Jack,
2nd END } UG290A/U.



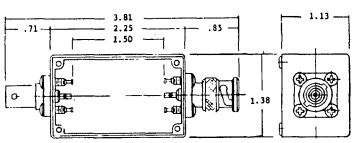


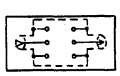
MODEL 3230 QUANTITY DISC. CODE (A) **NET 6.85**

COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG



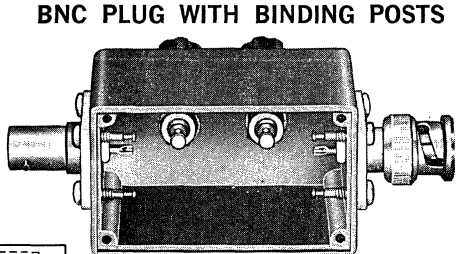
CONN: } BNC Receptacle Jack,
1st END } UG290A/U.
CONN: } BNC Receptacle Plug,
2nd END } UG1104A/U.

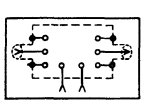




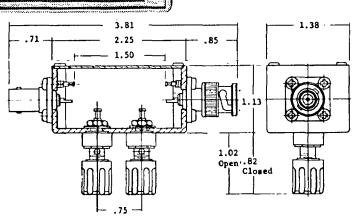
MODEL 3231 QUANTITY DISC. CODE (A) **NET 7.85**

COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS



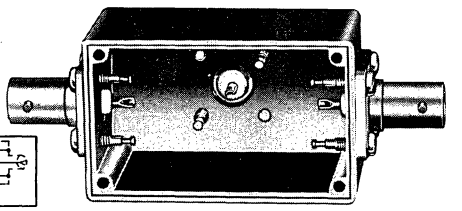


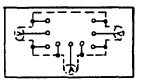
CONN. } BNC Receptacle Jack,
1st. END } UG290A/U.
CENTER: Banana jack binding posts with solder turret terminals. Red and Black.
CONN: } BNC Receptacle Plug,
2nd END } UG1104A/U.



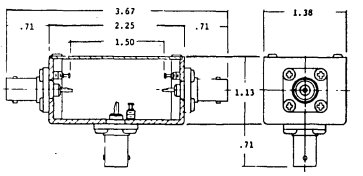
MODEL 3233 QUANTITY DISC. CODE (A) **NET 10.85**

COMPONENT MOUNTING — BNC RECEPTACLE "T"



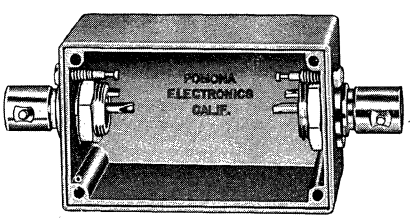


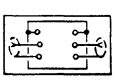
CONN: } BNC Receptacle Jack,
1st. END } UG290A/U.
CENTER: BNC Receptacle Jack, UG290A/U.
CONN: } BNC Receptacle Jack,
2nd END } UG290A/U.



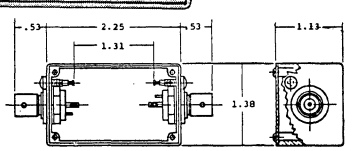
MODEL 3232 QUANTITY DISC. CODE (A) **NET 9.50**

COMPONENT MOUNTING — ISOLATED BNC RECEPTACLE BOTH ENDS



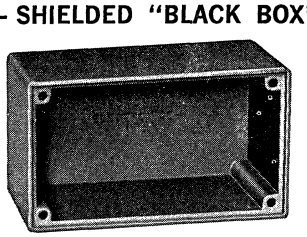


CONN: } *Isolated* BNC
1st END } Receptacle Jack
CONN: } *Isolated* BNC
2nd END } Receptacle Jack



MODEL 3239 QUANTITY DISC. CODE (A) **NET 13.85**

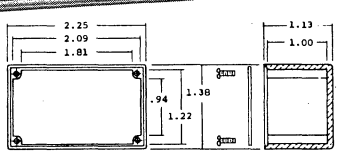
EMPTY — SHIELDED "BLACK BOX"



SIZE "B"

MODEL 2417
FINISH: Blue Baked Enamel.
Includes cover with part number on cover and four cover screws.

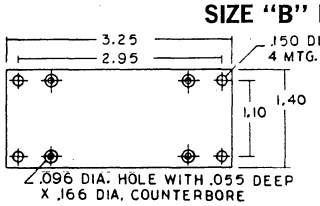
MODEL 2428
FINISH: None
Includes unmarked cover and four cover screws.



MODEL 2417
MODEL 2428
QUANTITY DISC. CODE (A) **NET 1.50**

LARGER COVER PLATE FOR MOUNTING SIZE "B" BOXES

NEW



This larger plate, when attached to the box, provides flanges for mounting.

MATERIAL: .080 Aluminum #6061-T6, clear anodized per MIL-A-8625A.

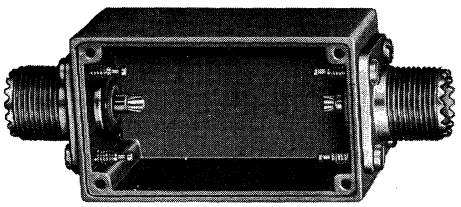
MODEL 3719 (plate only) QUANTITY DISC. CODE (A) **NET .85**

SHIELDED "BLACK BOXES" CONTINUED ►

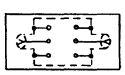
POMONA ELECTRONICS

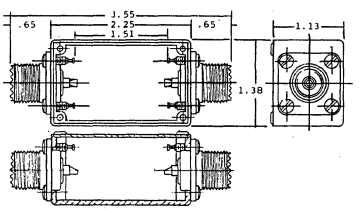
SHIELDED "BLACK" BOXES SIZE "B"

COMPONENT MOUNTING— UHF RECEPTACLE BOTH ENDS



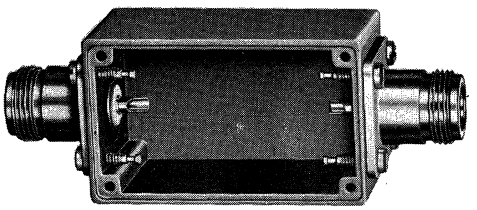
CONN: 1st END } UHF Receptacle Jack.
CONN: 2nd END } UHF Receptacle Jack.



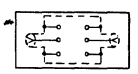


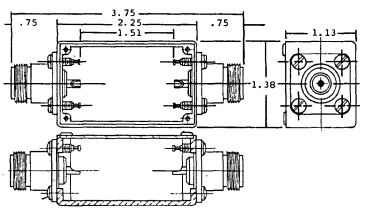
MODEL 2412 QUANTITY DISC. CODE (A) **NET 7.85**

COMPONENT MOUNTING— TYPE "N" RECEPTACLE BOTH ENDS



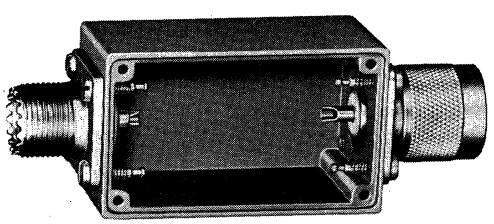
CONN: 1st END } Type "N" Receptacle Jack, UG58A/U.
CONN: 2nd END } Type "N" Receptacle Jack, UG58A/U.



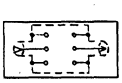


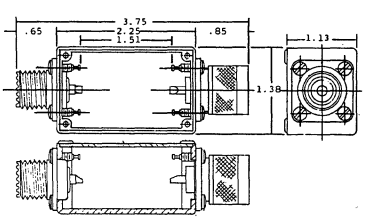
MODEL 2410 QUANTITY DISC. CODE (A) **NET 6.85**

COMPONENT MOUNTING— UHF RECEPTACLE TO UHF PLUG



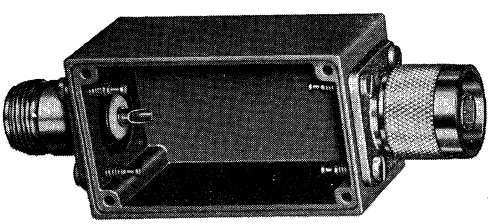
CONN: 1st END } UHF Receptacle Jack.
CONN: 2nd END } UHF Receptacle Plug.



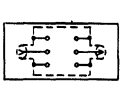


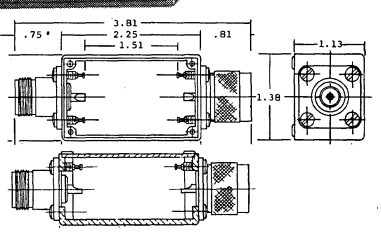
MODEL 2413 QUANTITY DISC. CODE (A) **NET 10.85**

COMPONENT MOUNTING— TYPE "N" RECEPTACLE TO TYPE "N" PLUG



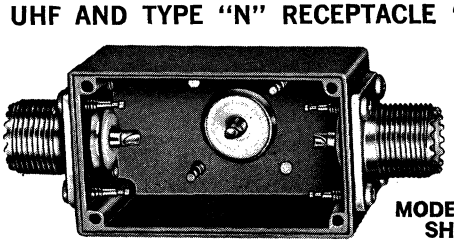
CONN: 1st END } Type "N" Receptacle Jack, UG58A/U.
CONN: 2nd END } Type "N" Receptacle Plug.



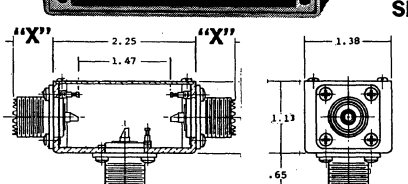


MODEL 2411 QUANTITY DISC. CODE (A) **NET 9.85**

COMPONENT MOUNTING — UHF AND TYPE "N" RECEPTACLE "T"

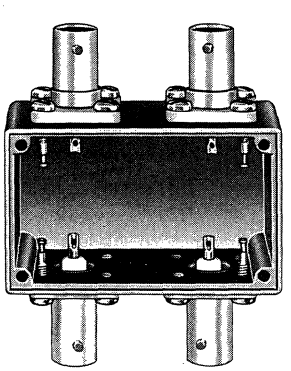


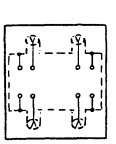
MODEL 2418 SHOWN

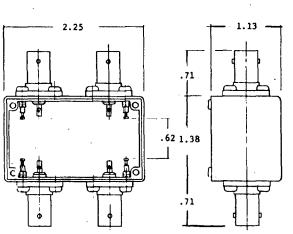


MODEL	CONNECTORS	"X" DIM.	Quantity Disc. Code	NET
2418	(3) UHF Receptacle Jacks.	.65	(A)	10.85
2419	(3) Type "N" Receptacle Jacks, UG58A/U.	.75	(A)	9.50

COMPONENT MOUNTING — CROSS CONNECTIONS







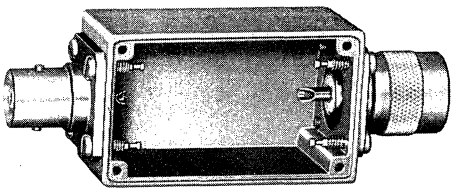
CONN: 4 each BNC Receptacle Jacks, UG290A/U.

MODEL 3234 QUANTITY DISC. CODE (A) **NET 11.75**

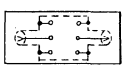
POMONA ELECTRONICS

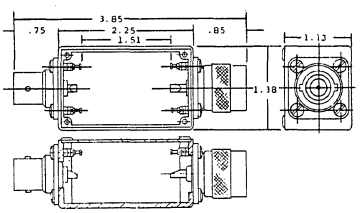
SHIELDED "BLACK BOXES" SIZE "B"

COMPONENT MOUNTING — TYPE "C" RECEPTACLE TO TYPE "C" PLUG



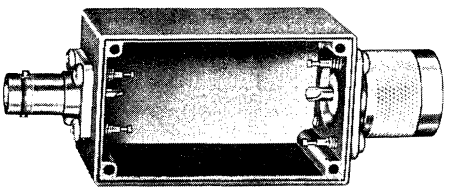
CONN: 1st END } Type "C" Receptacle Jack, UG568/U.
CONN: 2nd END } Type "C" Receptacle Plug.



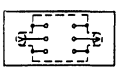


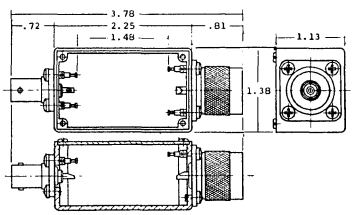
MODEL 2415 QUANTITY DISC. CODE (A) **NET 11.75**

COMPONENT MOUNTING — BNC RECEPTACLE TO TYPE "N" PLUG



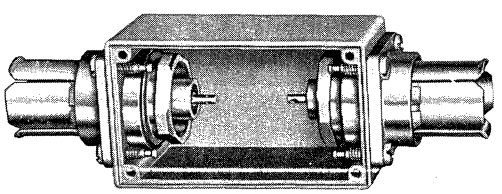
CONN: 1st END } BNC Receptacle Jack, UG290A/U.
CONN: 2nd END } Type "N" Receptacle Plug.



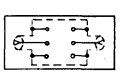


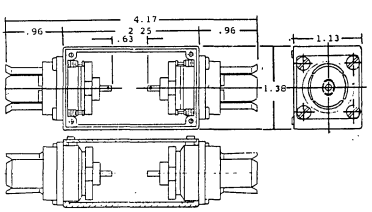
MODEL 2420 QUANTITY DISC. CODE (A) **NET 9.85**

COMPONENT MOUNTING — GR-874 CONNECTOR BOTH ENDS



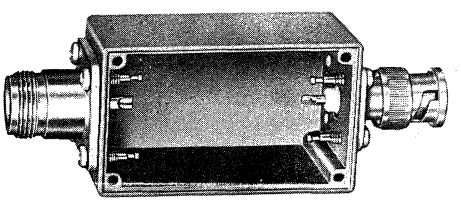
CONN: 1st END } Type GR-874 Connector.
CONN: 2nd END } Type GR-874 Connector.



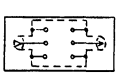


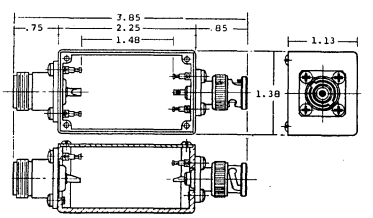
MODEL 2416 QUANTITY DISC. CODE (A) **NET 24.75**

COMPONENT MOUNTING — TYPE "N" RECEPTACLE TO BNC PLUG



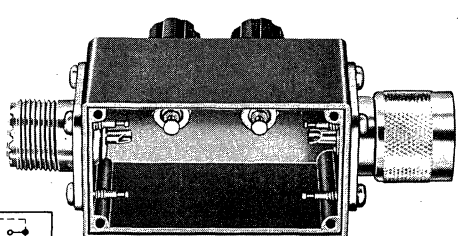
CONN: 1st END } Type "N" Receptacle Jack, UG58A/U.
CONN: 2nd END } BNC Receptacle Plug, UG1104A/U.

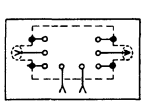




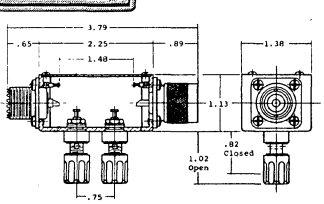
MODEL 2421 QUANTITY DISC. CODE (A) **NET 7.85**

COMPONENT MOUNTING — UHF RECEPTACLE TO UHF PLUG WITH BINDING POSTS



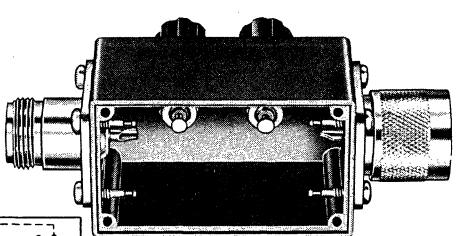


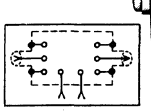
CONN: 1st END } UHF Receptacle Jack.
CENTER: Banana jack binding posts with solder turret terminals. Red and Black.
CONN: 2nd END } UHF Receptacle Plug.



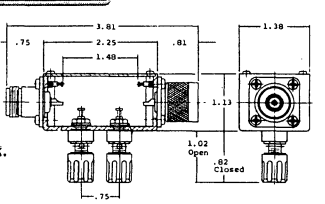
MODEL 2422 QUANTITY DISC. CODE (A) **NET 13.85**

COMPONENT MOUNTING TYPE "N" RECEPTACLE TO TYPE "N" PLUG WITH BINDING POSTS





CONN: 1st END } Type "N" Receptacle Jack, UG58A/U.
CENTER: Banana jack binding posts with solder turret terminals. Red and Black.
CONN: 2nd END } Type "N" Receptacle Plug.

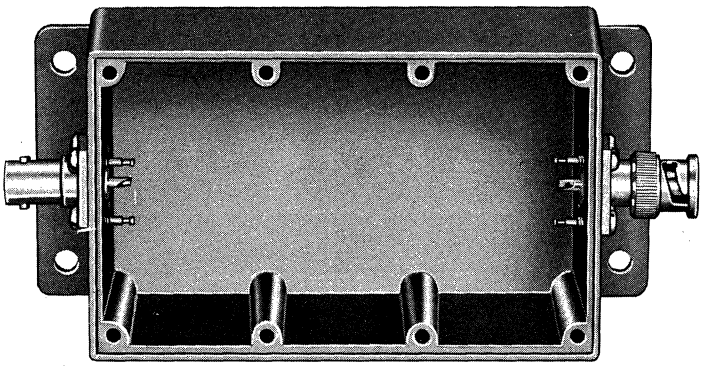


MODEL 2423 QUANTITY DISC. CODE (A) **NET 12.85**

SHIELDED "BLACK BOXES" CONTINUED ►

POMONA ELECTRONICS

LARGER SHIELDED "BLACK BOXES" SIZE "C"



MODEL 2903

(Shown 2/3 actual size)

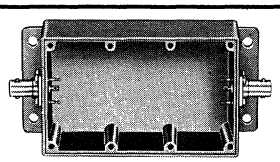
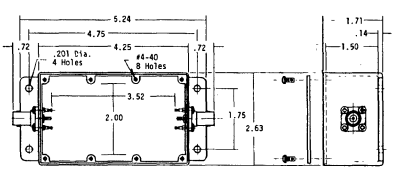
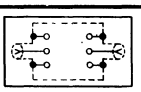
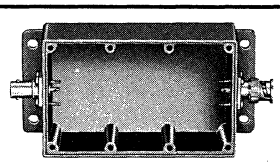
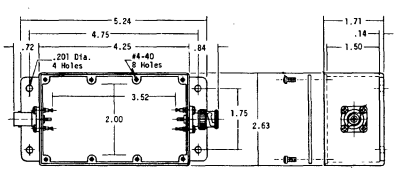
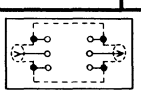
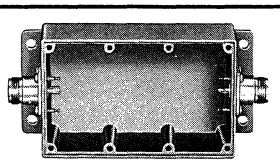
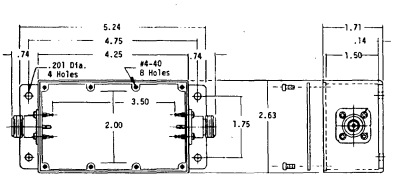
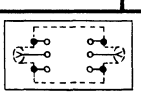
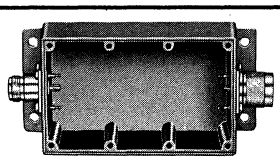
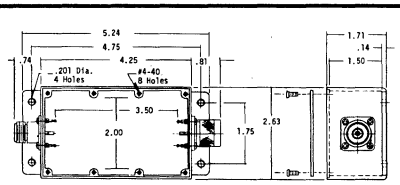
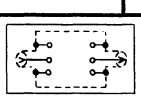
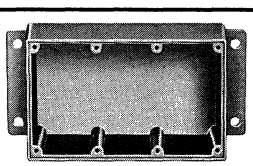
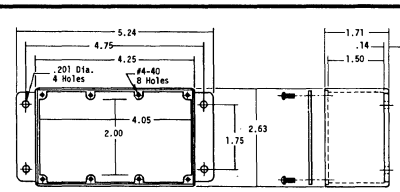
A **NEW** Series of **LARGER** shielded "BLACK BOXES."

These larger boxes are excellent for compact packaging of voltage dividers, isolation networks and many other applications.

APPLICABLE SPECIFICATIONS: (All Models)
Operating Temp.: —55°C to +150°C.
Working Voltage: 500 Peak.
Noise Rejection: Greater than 70DB

FEATURES:

- SHIELDED HOUSING; Die Cast Aluminum, Alloy #A380, FINISH: BLUE baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- COVER: .080 Thick Aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- 8 ea. #4-40 x ¼" screws secure cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.
- 2 flanges for easy mounting of box.

MODEL	CONN. 1st END	CONN. 2nd END			
 **MODEL 2902**	BNC Receptacle Jack UG290A/U	BNC Receptacle Jack UG290A/U			QUANTITY DISC. CODE (A) NET 9.85
 **MODEL 2903**	BNC Receptacle Jack UG290A/U	BNC Receptacle Plug UG1104A/U			QUANTITY DISC. CODE (A) NET 10.85
 **MODEL 2904**	TYPE "N" Receptacle Jack UG58A/U	TYPE "N" Receptacle Jack UG58A/U			QUANTITY DISC. CODE (A) NET 9.85
 **MODEL 2905**	TYPE "N" Receptacle Jack UG58A/U	TYPE "N" Receptacle Plug			QUANTITY DISC. CODE (A) NET 12.85
 **MODEL 2901**	NONE	NONE			QUANTITY DISC. CODE (A) NET 5.85
MODEL 2906 SEE 2901	NONE	NONE	Same as Model 2901 except box is unpainted and cover is unmarked.		QUANTITY DISC. CODE (A) NET 5 .85

POMONA ELECTRONICS

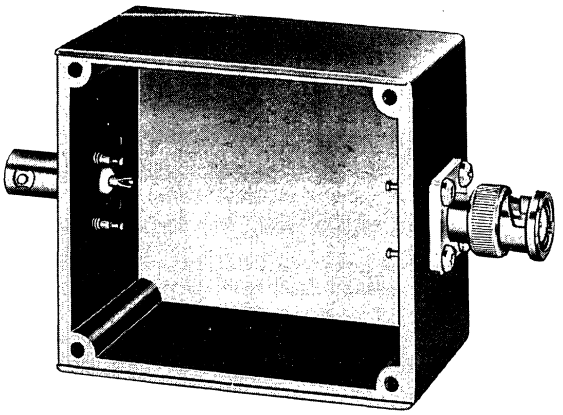
SHIELDED "BLACK BOXES" SIZE "D"

Another **new** series of shielded "Black Boxes." These boxes fill the need between the size "B" and "C" boxes. These boxes are excellent for compact packaging of voltage dividers, isolation networks and many other applications.

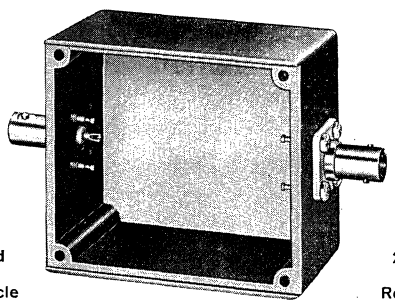
APPLICABLE SPECIFICATIONS: (All Models)
Operating Temp.: —55°C to +150°C.
Working Voltage: 500 Peak.
Noise Rejection: Greater than 70DB

FEATURES:

- **SHIELDED HOUSING:** Die Cast Aluminum, Alloy #A380, FINISH: BLUE baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- **COVER:** .063 Thick Aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- 4 ea. #4-40 x 1/4" screws secure cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.



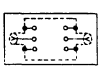
MODEL 3603 (Shown 2/3 actual size)

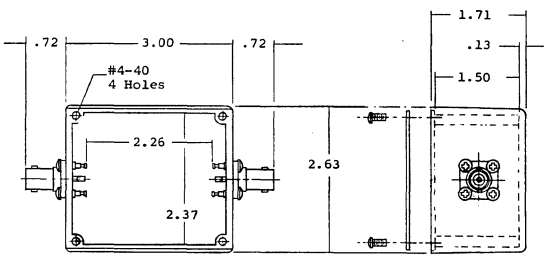


CONN: 1st End BNC Receptacle Jack UG290A/U

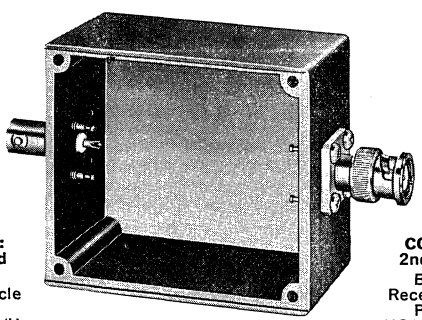
CONN: 2nd End BNC Receptacle Jack UG290A/U

MODEL 3602





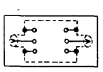
QUANTITY DISC. CODE (A) **NET 8.85**

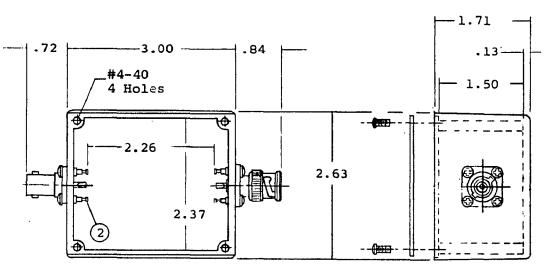


CONN: 1st End BNC Receptacle Jack UG290A/U

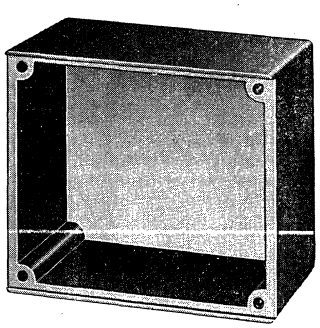
CONN: 2nd End BNC Receptacle Plug UG1104A/U

MODEL 3603





QUANTITY DISC. CODE (A) **NET 9.85**



CONN: 1st End None

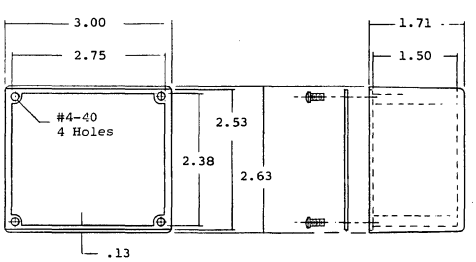
CONN: 2nd End None

MODEL 3601

FINISH: Blue Baked Enamel. Includes cover with part number on cover and four cover screws.

MODEL 3606

FINISH: None. Includes unmarked cover and four cover screws.



QUANTITY DISC. CODE (A) **NET 3.85**

SHIELDED "BLACK BOXES" CONTINUED ►

POMONA ELECTRONICS

SHIELDED "BLACK BOXES" WITH CARD GUIDES — 1½" DEEP

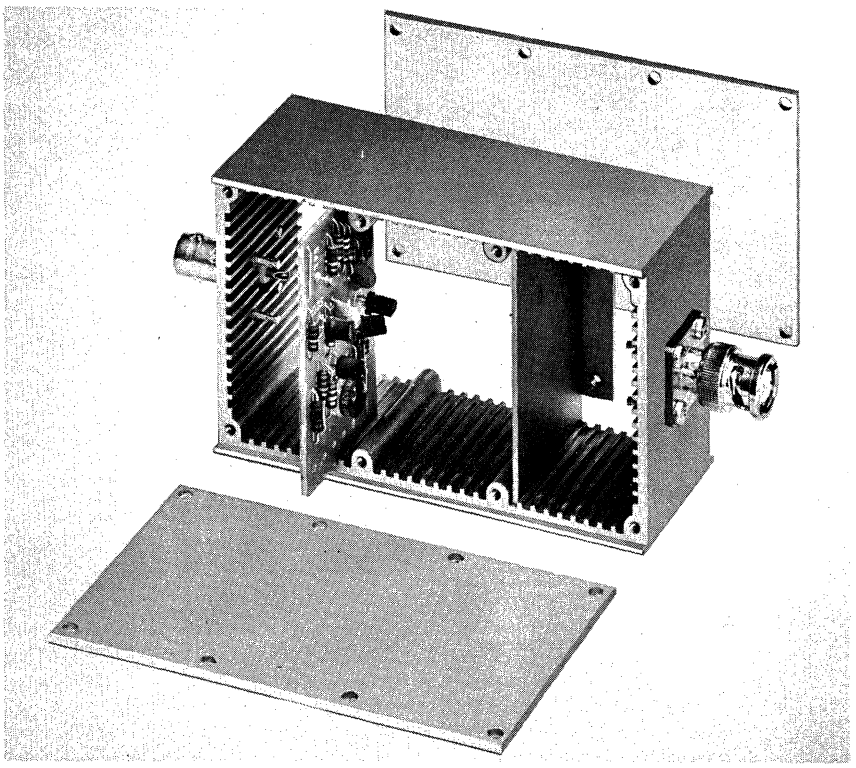
SHIELDED "BLACK BOXES" WITH CARD GUIDES

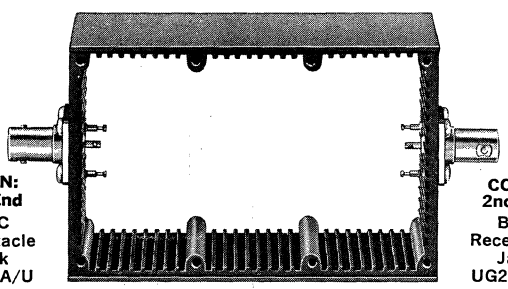
Aluminum boxes, slotted to accept 1/16" circuit boards and shielding dividers. Excellent for packaging electronic circuitry. Boxes have removable top and bottom covers. Useable inside space: 4" x 2" x 1½".

APPLICABLE SPECIFICATIONS:
(All Models)
Operating Temp.: —55°C to +150°C.
Working Voltage: 500 Peak.
Noise Rejection: Greater than 70DB

FEATURES:

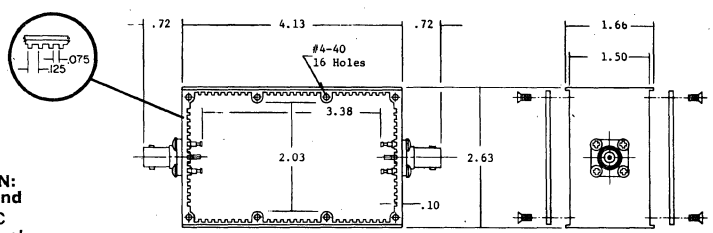
- **SHIELDED HOUSING:** Extruded Aluminum, Alloy #6061-T6. FINISH: BLUE baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- **COVERS:** Top and bottom, .080 thick Aluminum #6061-T6 with clear anodized Finish per MIL-A-8625A.
- **COVER SCREWS:** 16 EA #4-40x1/4" screws secure top and bottom cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.



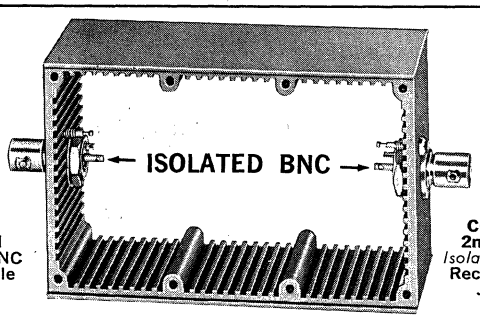


CONN: 1st End BNC Receptacle Jack UG290A/U

CONN: 2nd End BNC Receptacle Jack UG290A/U

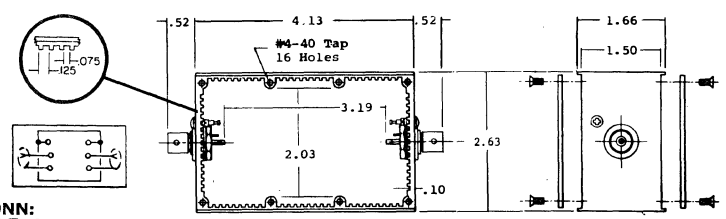


MODEL 3302 QUANTITY DISC. CODE (A) **NET 10.85**

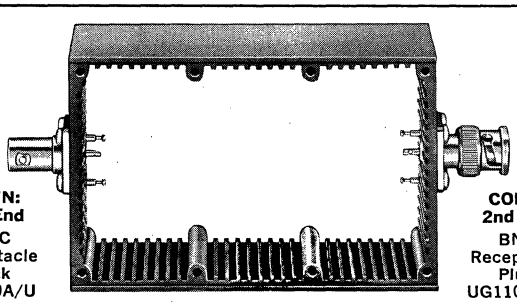


CONN: 1st End *Isolated* BNC Receptacle Jack

CONN: 2nd End *Isolated* BNC Receptacle Jack

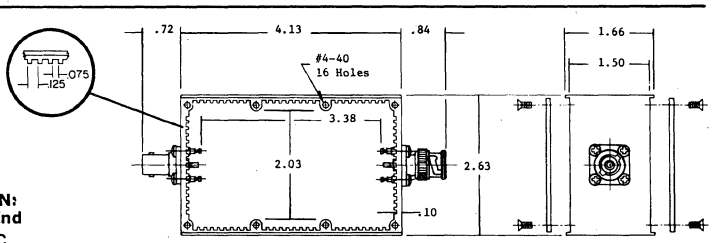


MODEL 3307 QUANTITY DISC. CODE (A) **NET 19.95**



CONN: 1st End BNC Receptacle Jack UG290A/U

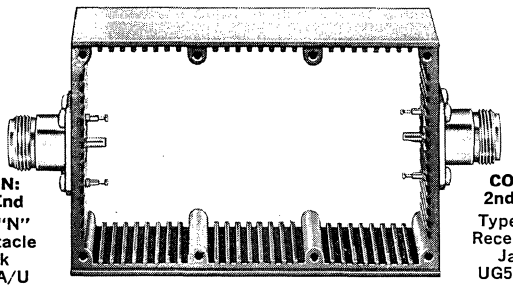
CONN: 2nd End BNC Receptacle Plug UG1104A/U



MODEL 3303 QUANTITY DISC. CODE (A) **NET 11.85**

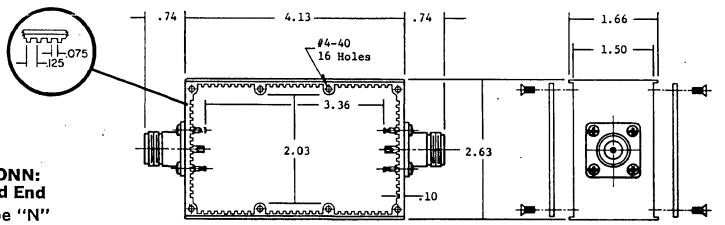
POMONA ELECTRONICS

SHIELDED "BLACK BOXES" WITH CARD GUIDES – 1½" DEEP

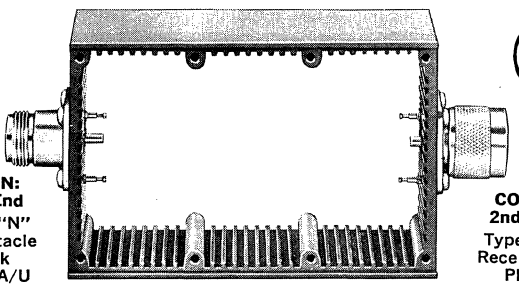


CONN: 1st End
Type "N" Receptacle Jack UG58A/U

CONN: 2nd End
Type "N" Receptacle Jack UG58A/U

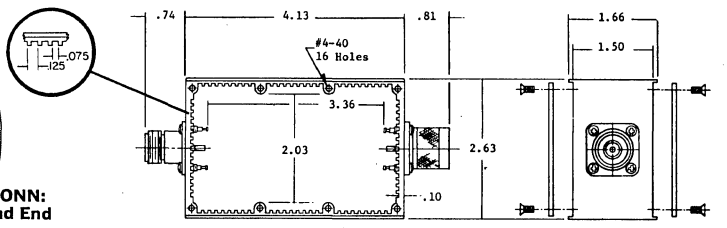


MODEL 3304 QUANTITY DISC. CODE (A) **NET 11.85**

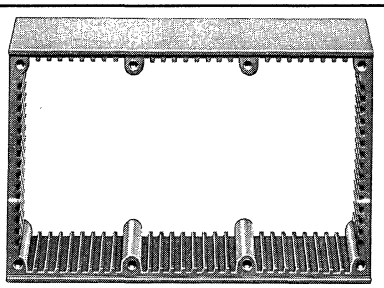


CONN: 1st End
Type "N" Receptacle Jack UG58A/U

CONN: 2nd End
Type "N" Receptacle Plug

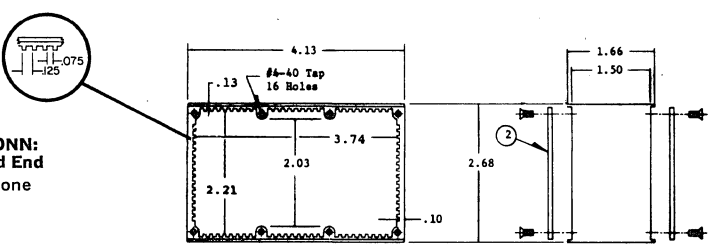


MODEL 3305 QUANTITY DISC. CODE (A) **NET 14.85**



CONN: 1st End
None

CONN: 2nd End
None



MODEL 3301

FINISH: Blue Baked Enamel. Includes top and bottom covers with part number on one and 16 cover screws.

MODEL 3306

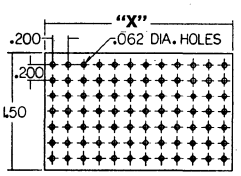
FINISH: None. Includes unmarked top and bottom covers with 16 cover screws.

QUANTITY DISC. CODE (A) **NET 6.85**

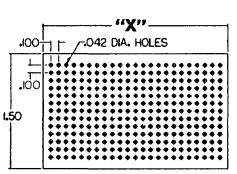
CIRCUIT MOUNTING BOARDS

Two sizes of various types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16" thick.

- Boards 1.50 x 2.39 used laterally.
- Boards 1.50 x 3.90 used lengthwise.



BOARD A

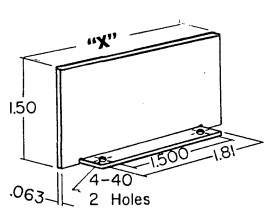


BOARD B

QUANTITY DISC. CODE (A)

BRD.	MODEL	NO. OF HOLES	"X" DIM.	MATERIAL	NET
A	3321	12 x 7	2.39	Paper-Epoxy (PEE)	.50
A	3322	NONE	2.39	Paper-Epoxy (PEE)	.35
A	3323	12 x 7	2.39	Glass-Epoxy (GEE)	.65
A	3324	NONE	2.39	Glass-Epoxy (GEE)	.45
A	3325	12 x 7	2.39	Glass-Epoxy (GEE) COP. CLAD 1 Side	.75
B	3326	24 x 15	2.39	Glass-Epoxy (GEE)	.85
A	3330	19 x 7	3.90	Paper-Epoxy (PEE)	.65
A	3331	19 x 7	3.90	Glass-Epoxy (GEE)	.85
A	3332	19 x 7	3.90	Glass-Epoxy (GEE) COP. CLAD 1 Side	1.35
B	3333	38 x 15	3.90	Glass-Epoxy (GEE)	1.10

SHIELDING DIVIDERS



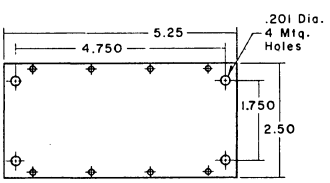
Two sizes of Aluminum dividers for dividing the box into shielded compartments. **MATERIAL:** .063 Aluminum, clear anodized per MIL-A-8625A.

- Divider 1.50 x 2.39 used laterally.
- Divider 1.50 x 3.90 used lengthwise.

MODEL	"X" DIM.	NET
3327	2.39	.85
3334	3.90	1.10

QUANTITY DISC. CODE (A)

LARGER BOTTOM PLATE FOR MOUNTING



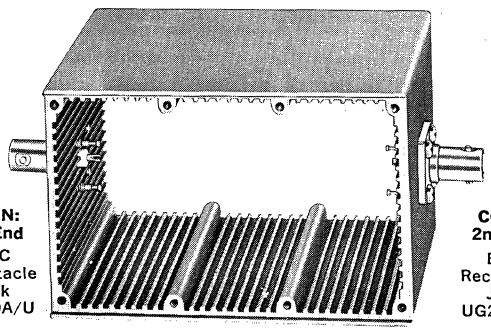
This larger plate, when attached to the box, provides flanges for mounting.

MATERIAL: .080 Aluminum #6061-T6, clear anodized per MIL-A-8625A.

MODEL 3328 (Plate only) QUANTITY DISC. CODE (A) **NET 1.25**

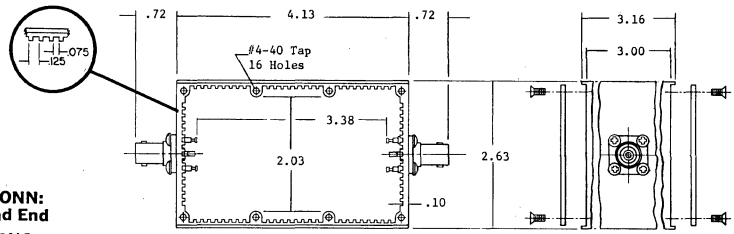
POMONA ELECTRONICS

SHIELDED "BLACK BOXES" WITH CARD GUIDES – 3" & 6" DEEP

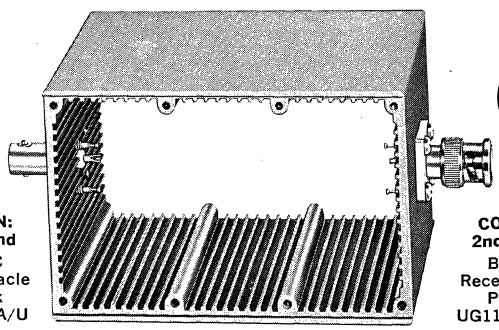


CONN: 1st End BNC Receptacle Jack UG290A/U

CONN: 2nd End BNC Receptacle Jack UG290A/U

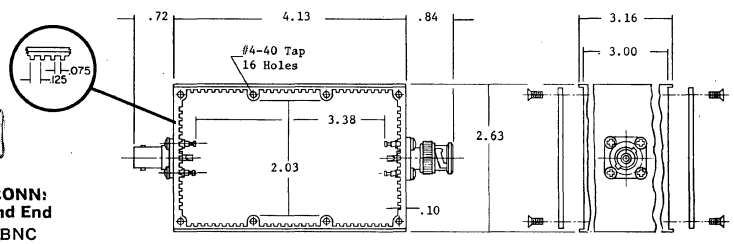


MODEL 3312 QUANTITY DISC. CODE (A) **NET 12.85**

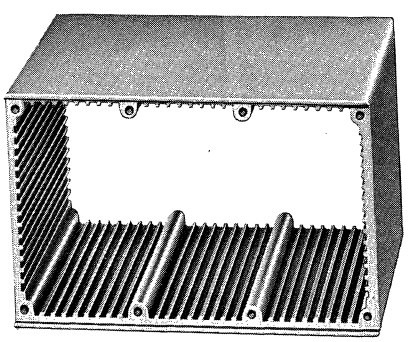


CONN: 1st End BNC Receptacle Jack UG290A/U

CONN: 2nd End BNC Receptacle Plug UG1104A/U

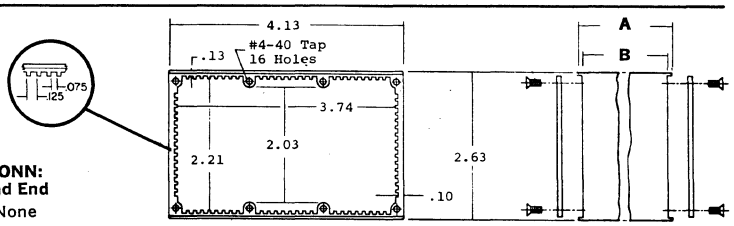


MODEL 3313 QUANTITY DISC. CODE (A) **NET 13.85**



CONN: 1st End None

CONN: 2nd End None

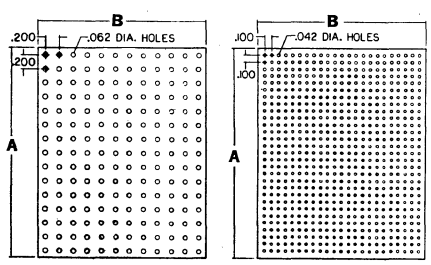


MODEL 3311 & 3742
FINISH: Blue baked enamel. Includes top and bottom cover with part no. on one.

MODEL 3316 & 3743
FINISH: None. Unmarked covers.

QUANTITY DISC. CODE (A)

MODEL	DIM. A	DIM. B	NET	
3311	3.16	3.00	8.85	
3316	3.16	3.00	8.85	
3742	6.16	6.00	10.85	NEW
3743	6.16	6.00	10.85	NEW



BOARD A

BOARD B

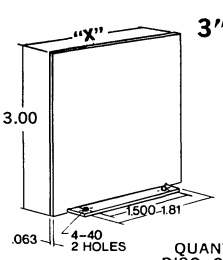
3" AND 6" BOX CIRCUIT MOUNTING BOARDS

Various sizes and types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16" thick.

- Boards 3.00 & 6.00 x 3.29 used laterally.
- Boards 3.00 & 6.00 x 3.90 used lengthwise.

QUANTITY DISC. CODE (A)

BRD.	MODEL	NO. OF HOLES	DIM. A	DIM. B	MATERIAL	NET	
A	3550	12 x 15	3.00	2.39	Paper Epoxy (PEE)	1.00	
A	3551	12 x 15	3.00	2.39	Glass-Epoxy (GEE)	1.50	
A	3552	12 x 15	3.00	2.39	Glass-Epoxy (GEE) COP. CLAD 1 Side	1.75	
B	3553	23 x 30	3.00	2.39	Glass-Epoxy (GEE)	1.75	
A	3554	19 x 15	3.00	3.90	Paper Epoxy (PEE)	1.00	
A	3555	19 x 15	3.00	3.90	Glass-Epoxy (GEE)	1.50	
A	3556	19 x 15	3.00	3.90	Glass-Epoxy (GEE) COP. CLAD 1 Side	1.75	
B	3557	39 x 30	3.00	3.90	Glass-Epoxy (GEE)	1.75	
B	3726	23 x 60	6.00	2.39	Glass-Epoxy (GEE)	2.75	NEW
B	3727	39 x 60	6.00	3.90	Glass-Epoxy (GEE)	2.95	NEW



3" BOX SHIELDING DIVIDERS

Two sizes of Aluminum dividers for dividing the box into shielded compartments. **MATERIAL:** .063 Aluminum, clear anodized per MIL-A-8625A.

- Divider 3.00 x 2.39 used laterally.
- Divider 3.00 x 3.90 used lengthwise.

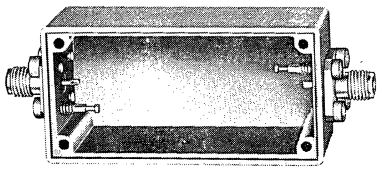
QUANTITY DISC. CODE (A)

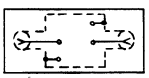
MODEL	"X" DIM.	NET
3558	2.39	1.10
3559	3.90	1.35

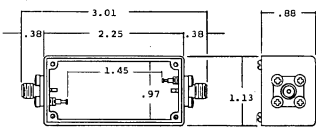
POMONA ELECTRONICS

SHIELDED "BLACK BOXES"

COMPONENT MOUNTING — OSM* RECEPTACLE BOTH ENDS



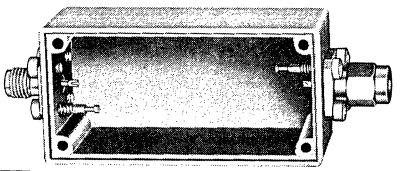


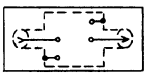


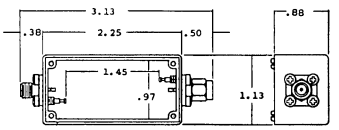
CONN: 1st END } OSM Receptacle Jack.
CONN: 2nd END } OSM Receptacle Jack.

MODEL 2399 QUANTITY DISC. CODE (A) **NET 17.95**

COMPONENT MOUNTING — OSM* RECEPTACLE TO OSM* PLUG



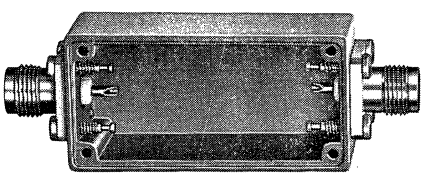




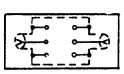
CONN: 1st END } OSM Receptacle Jack.
CONN: 2nd END } OSM Receptacle Plug.

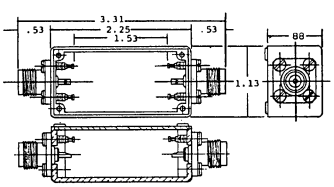
MODEL 2398 QUANTITY DISC. CODE (A) **NET 22.95**

COMPONENT MOUNTING— TNC RECEPTACLE BOTH ENDS



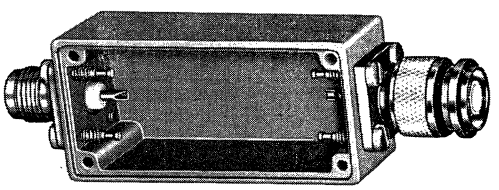
CONN: 1st END } TNC Receptacle Jack.
CONN: 2nd END } TNC Receptacle Jack.



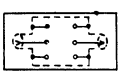


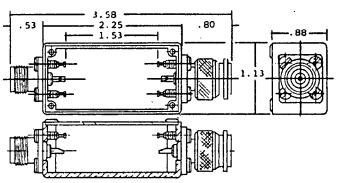
MODEL 2396 QUANTITY DISC. CODE (A) **NET 7.85**

COMPONENT MOUNTING— TNC RECEPTACLE TO TNC PLUG



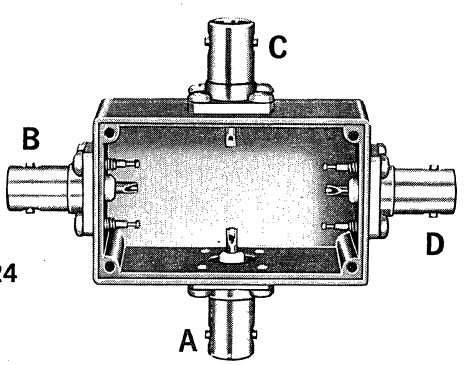
CONN: 1st END } TNC Receptacle Jack.
CONN: 2nd END } TNC Receptacle Plug.



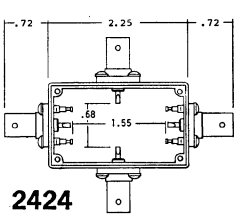


MODEL 2395 QUANTITY DISC. CODE (A) **NET 9.50**

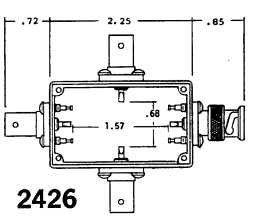
COMPONENT MOUNTING — CROSS CONNECTIONS



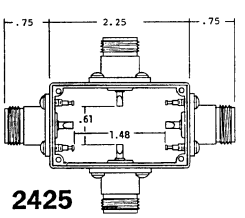
MODEL 2424



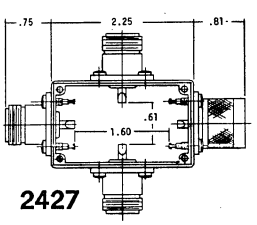
2424



2426

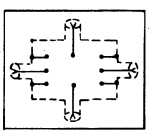


2425

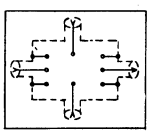


2427

MODEL	CONNECTION A, B AND C	CONNECTION D	Quantity Disc. Code	NET
2424	BNC Receptacle Jack, UG290A/U.	BNC Receptacle Jack, UG290A/U.	(A)	11.75
2425	Type "N" Receptacle Jack, UG58A/U.	Type "N" Receptacle Jack, UG58A/U.	(A)	11.75
2426	BNC Receptacle Jack, UG290A/U.	BNC Receptacle Plug, UG1104A/U.	(A)	12.85
2427	Type "N" Receptacle Jack, UG58A/U.	Type "N" Receptacle Plug.	(A)	12.85



2424, 2425



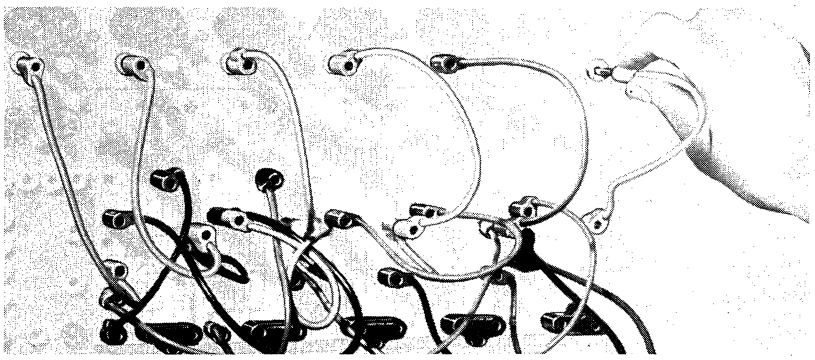
2426, 2427

POMONA ELECTRONICS

PATCH CORDS BANANA PLUGS

POMONA BANANA PLUG PATCH CORDS

Tough thermoplastic insulation molds the plug and leads into a strong moisture resistant integral unit. Excellent for computer board and test equipment applications. Used by leading industries in applications where extreme reliability is of prime importance.



FEATURES

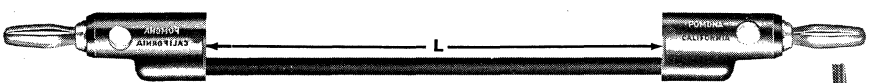
- One piece beryllium copper heat treated spring for maximum long life.
- Rounded spring design results in maximum contact area.
- Extra flexible polyvinyl insulation used on all leads.

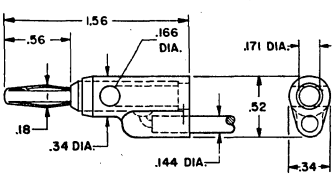
SPECIFICATIONS

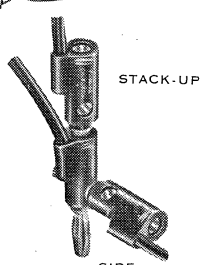
- Fits standard 0.166 dia. banana jacks.
- Spring, beryllium copper alloy 170 per QQ-C-533.
- Plug body, brass per QQ-B-626, Comp. 22.
- Nickel plated per QQ-N-290, Class 2.
- Contact resistance less than 0.001 ohms per banana plug.
- Operating Temp.: −0°C to +105°C.
- Wire, 18 AWG, stranding 65 x 36 T.C.
- Insulation, polyvinyl .144″ O.D.
- Ratings: 15 A. Cont., 30 A. Int. 10,000 W.V.D.C.

STACK-UP BANANA PLUG PATCH CORD

MODEL	LENGTH	NET
B-4	4″	1.50
B-8	8″	1.50
B-12	12″	1.50
B-18	18″	1.50
B-24	24″	1.50
B-36	36″	1.50
B-48	48″	1.55
B-60	60″	1.60





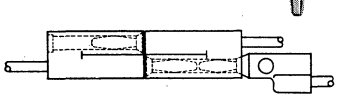


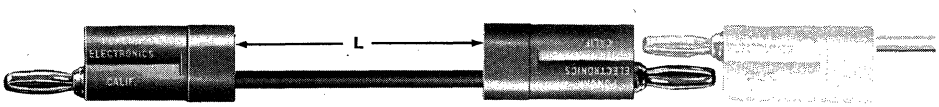
Multiple stacking feature accommodates the most complex stacking; keeps circuitry neater. Greatly simplifies circuit connections and changes. Reliable solder-bonded connections withstand pull test in excess of 50 lbs. Banana plugs both ends.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL B (Specify Color) QUANTITY DISC. CODE (A) ★

EXTENSION STACKING BANANA PLUG PATCH CORD

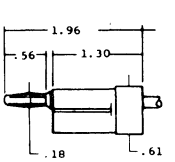
MODEL	LENGTH	NET
HB-4	4″	1.85
HB-8	8″	1.85
HB-12	12″	1.85
HB-18	18″	1.85
HB-24	24″	1.85
HB-36	36″	1.85
HB-48	48″	1.90
HB-60	60″	1.95





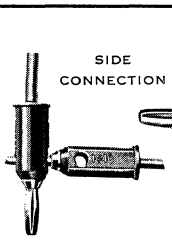
Dual purpose. Insulates all hot leads when used as an extension cord. Endless extension couplings possible with any banana plug patch cord. Provides vertical stacking from any jack. Reliable solder-bonded connections withstand pull test in excess of 50 lbs. Banana plugs both ends.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

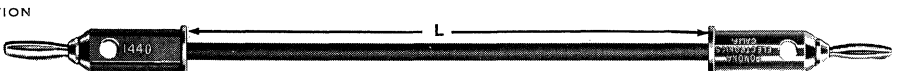
MODEL HB (Specify Color) QUANTITY DISC. CODE (A) ★



HORIZONTAL STACKING BANANA PLUG PATCH CORD

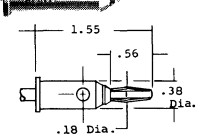
MODEL	LENGTH	NET
1440-4	4″	1.25
1440-8	8″	1.25
1440-12	12″	1.25
1440-18	18″	1.25
1440-24	24″	1.25
1440-36	36″	1.25
1440-48	48″	1.30
1440-60	60″	1.35





Ideal as an interconnecting lead between power supplies, test equipment, etc. Horizontal stacking feature. Banana plugs on both ends.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL 1440 (Specify Color) QUANTITY DISC. CODE (A) ★



★ Various lengths may be aggregated for best quantity price.

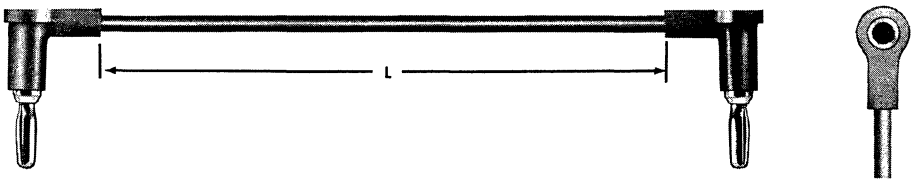
OTHER LENGTHS AVAILABLE TO ORDER

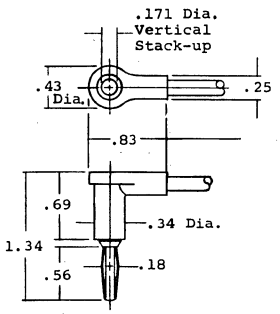
POMONA ELECTRONICS

PATCH CORDS BANANA PLUGS

STACK-UP RIGHT ANGLE BANANA PLUG PATCH CORD

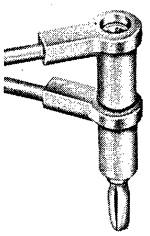
MODEL	LENGTH	NET
2864-4	4″	1.50
2864-8	8″	1.50
2864-12	12″	1.50
2864-18	18″	1.50
2864-24	24″	1.50
2864-36	36″	1.50
2864-48	48″	1.55
2864-60	60″	1.60





Vertical Stacking feature allows endless circuit connections and the right angle design keeps wires close to the chassis. An oversize shoulder allows easy connect and disconnect.

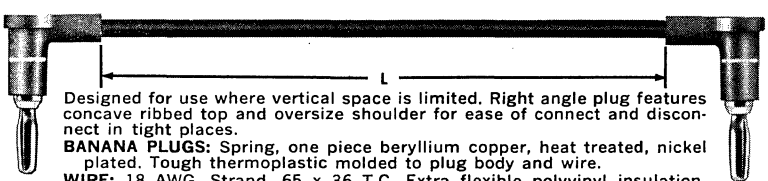
BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, .144″ O.D.
OPERATING TEMP.: —0°C to +105°C.
RATED: 15 A. Cont., 30 A. Int. 10,000 W.V.D.C.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.



MODEL 2864 (Specify Color) QUANTITY DISC. CODE (A) ★

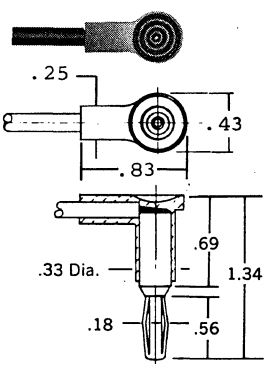
RIGHT ANGLE BANANA PLUG PATCH CORD

MODEL	LENGTH	NET
2700-4	4″	1.25
2700-8	8″	1.25
2700-12	12″	1.25
2700-18	18″	1.25
2700-24	24″	1.25
2700-36	36″	1.25
2700-48	48″	1.30
2700-60	60″	1.35



Designed for use where vertical space is limited. Right angle plug features concave ribbed top and oversize shoulder for ease of connect and disconnect in tight places.

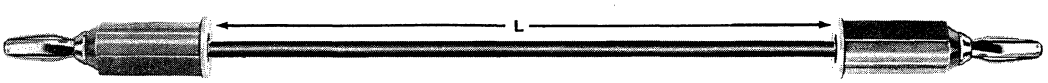
BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, .144″ O.D.
OPERATING TEMP.: —0°C to +105°C.
RATED: 15 A. Cont., 30 A. Int. 10,000 W.V.D.C.
COLORS: Black, Red



MODEL 2700 (Specify Color) QUANTITY DISC. CODE (A) ★

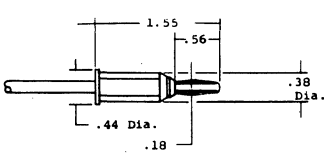
BANANA PLUG PATCH CORD

MODEL	LENGTH	NET
1985-4	4″	1.25
1985-8	8″	1.25
1985-12	12″	1.25
1985-18	18″	1.25
1985-24	24″	1.25
1985-36	36″	1.25
1985-48	48″	1.30
1985-60	60″	1.35



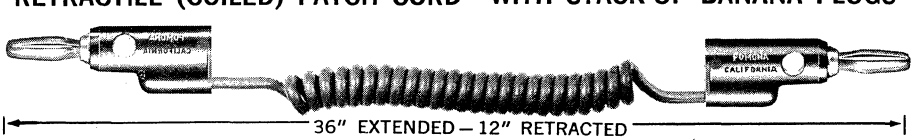
Excellent for general lab work. Permits interconnection between test instruments, etc. Banana plugs both ends.

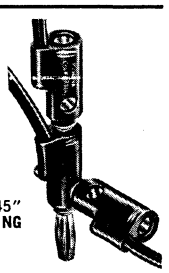
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.



MODEL 1985 (Specify Color) QUANTITY DISC. CODE (A) ★

RETRACTILE (COILED) PATCH CORD—WITH STACK-UP BANANA PLUGS





Permits the use of one size patch cord in place of many various lengths. **BANANA PLUGS:** Spring, one piece beryllium copper heat treated, nickel plated. Tough thermoplastic molded to body and wire. **WIRE:** 20 AWG; Stranding 41 x 36 tinned copper; rubber insulation .145″ O.D. **RATED:** 4 A. Cont., 10 A Int./5000 WVDC. **OPERATING TEMP.:** —20°C to +60°C. **COLOR:** Black, Red.

MODEL 2484-36 (Specify Color) QUANTITY DISC. CODE (A) **NET 2.95**

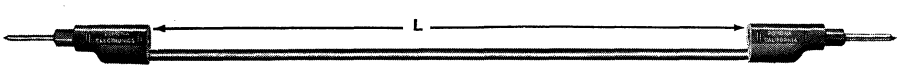
POMONA ELECTRONICS — PATCH CORDS .080 TIP

PIN TIP VERTICAL STACKING PATCH CORD

MODEL	LENGTH	NET
P-4	4″	1.75
P-8	8″	1.75
P-12	12″	1.75
P-18	18″	1.75
P-24	24″	1.75
P-36	36″	1.75
P-48	48″	1.80
P-60	60″	1.85

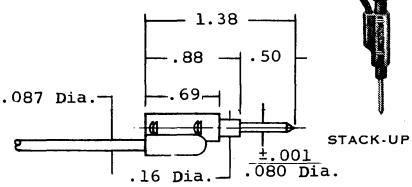
MODEL P
(Specify Color)

★QUANTITY DISC. CODE (A)



A must in circuit designing and testing, with instruments that utilize tip jacks.
PIN TIP: .080 dia., ½″ long, brass, gold flashed.
TIP JACK, STACK-UP: Beryllium copper, gold flashed. Accepts .080 dia. pin.

WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation .087″ O.D.
RATED: 5 A. Cont., 10 A. Int.
5,000 W.V.D.C.
OPERATING TEMP.: —0°C to +105°C.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

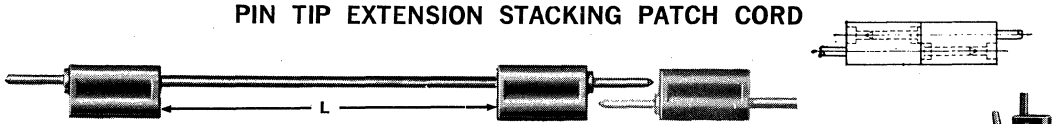


PIN TIP EXTENSION STACKING PATCH CORD

MODEL	LENGTH	NET
1727-4	4″	1.85
1727-8	8″	1.85
1727-12	12″	1.85
1727-18	18″	1.85
1727-24	24″	1.85
1727-36	36″	1.85
1727-48	48″	1.90
1727-60	60″	1.95

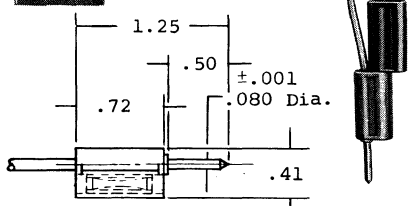
MODEL 1727
(Specify Color)

★ QUANTITY DISC. CODE (A)



Dual purpose, insulates exposed leads when used as an extension cord. Endless extension coupling possible. Also provides stacking from .080 jack.
PIN TIP: .080 dia., ½″ long, brass, gold flashed.
TIP JACK: Beryllium copper, gold flashed. Accepts .080 dia. pin.

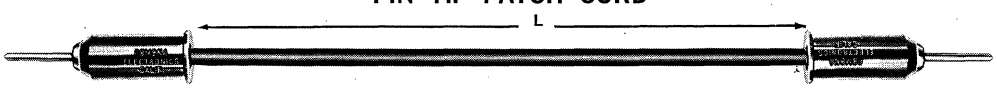
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation .087″ O.D.
RATED: 5 A. Cont., 10 A. Int.
5,000 W.V.D.C.
OPERATING TEMP.: —0°C to +105°C.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.



PIN TIP PATCH CORD

MODEL	LENGTH	NET
1990-4	4″	1.10
1990-8	8″	1.10
1990-12	12″	1.10
1990-18	18″	1.10
1990-24	24″	1.10
1990-36	36″	1.10
1990-48	48″	1.15
1990-60	60″	1.20

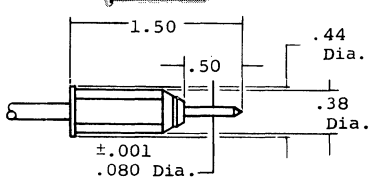
MODEL 1990
(Specify Color)



Heavy Duty patch cord. Excellent for general lab work. Permits interconnection between test instruments that utilize tip jacks.
PIN TIP: .080 dia., ½″ long, brass, nickel plated.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.

RATED: 5 A. Cont., 10 A. Int.
10,000 W.V.D.C.
OPERATING TEMP.: —0°C to +105°C.
COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

★ QUANTITY DISC. CODE (A)



PIN TIP PATCH CORD

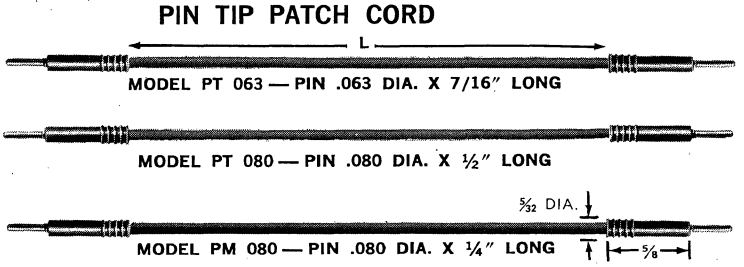
MODEL			LENGTH	NET
PT063-4	PT080-4	PM080-4	4″	.85
PT063-8	PT080-8	PM080-8	8″	.85
PT063-12	PT080-12	PM080-12	12″	.85
PT063-18	P8080-18	PM080-18	18″	.85
PT063-24	PT080-24	PM080-24	24″	.85
PT063-36	PT080-36	PM080-36	36″	.85
PT063-48	PT080-48	PM080-48	48″	.90
PT063-60	PT080-60	PM080-60	60″	.95

COLORS: PT063 and PM080—Red and Black only.
PT080 — Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

MODEL PT & PM
(Specify Color)

PIN TIP: Brass, gold flashed.
WIRE: 22 AWG, Strand. 19 x 34 T.C. Insulation, polyvinyl .064″ O.D.
RATED: 3 A. Cont., 7.5 A. Int.
1,000 W.V.D.C.
OPERATING TEMP.: —0°C to +105°C.

★QUANTITY DISC. CODE (A)



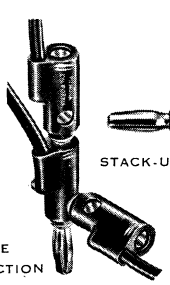
Small body style permits usage in equipment having receptacles spaced closely together. Three models shown.

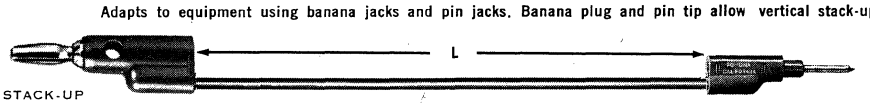
BANANA PLUG TO PIN TIP STACK-UP PATCH CORD

Adapts to equipment using banana jacks and pin jacks. Banana plug and pin tip allow vertical stack-up.

MODEL	LENGTH	NET
1126-4	4″	1.75
1126-8	8″	1.75
1126-12	12″	1.75
1126-18	18″	1.75
1126-24	24″	1.75
1126-36	36″	1.75
1126-48	48″	1.80
1126-60	60″	1.85

MODEL 1126
(Specify Color)





BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated.
PIN TIP: .080 dia. ½″ long, brass, gold flashed.

TIP JACK, STACK-UP: Beryllium copper, gold flashed. Accepts .080 Dia. pin.
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation .087″ O.D.
RATED: 5 A. Cont., 10 A. Int.
5,000 W.V.D.C.
OPERATING TEMP.: —0°C to +105°C.
COLORS: Black, Red.

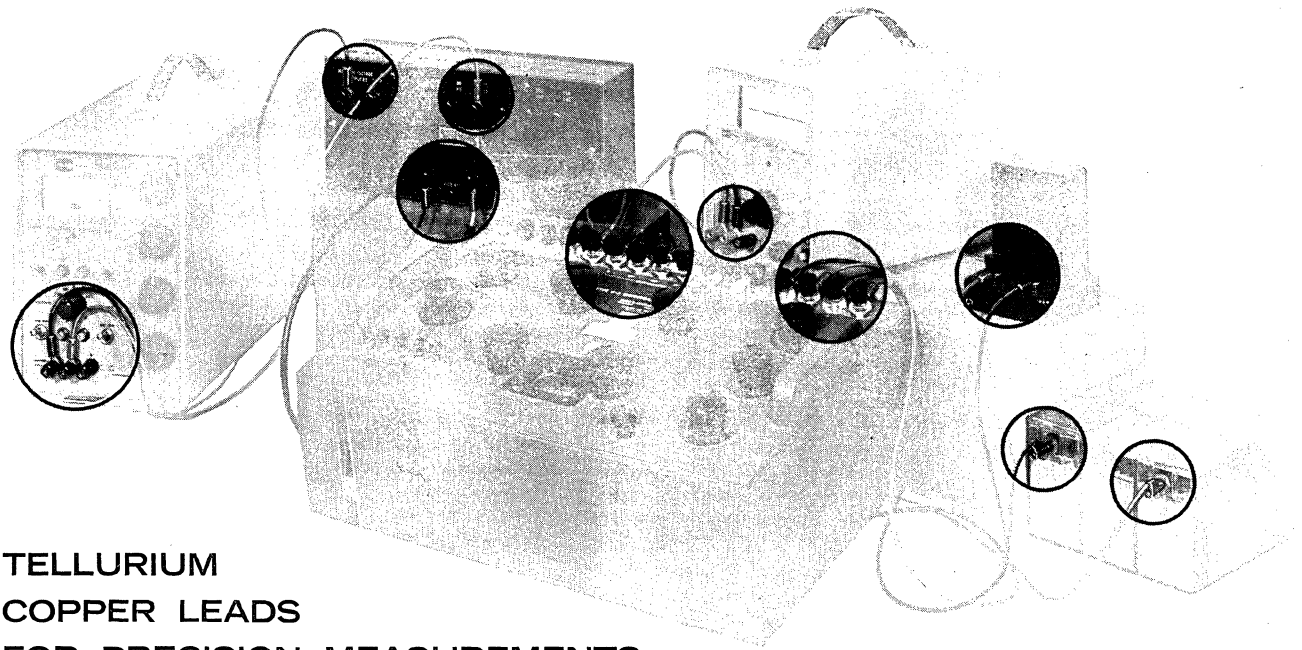
★QUANTITY DISC. CODE (A)

★ Various lengths may be aggregated for best quantity price.

OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

JUMPERS — LOW THERMAL E.M.F.



TELLURIUM COPPER LEADS FOR PRECISION MEASUREMENTS

POMONA ELECTRONICS has advanced the state of the art in measurements where Thermoelectric Effects are significant sources of error. Comparators designed for use with the Kelvin-Varley voltage divider and microvolt leads were tested with Primary Standards Laboratory equipment.

Thermoelectric voltages were not detected until the most sensitive galvanometer range was used.

THERMOELECTRIC PROPERTIES—Tellurium copper gold plated spade lugs cold-staked to multi-stranded 12 gauge COPPER wire minimize thermoelectric effects—an absolute necessity for low voltage, high precision measurements.

LOW RESISTANCE—12 gauge multi-stranded COPPER wire results in extremely low cable resistance. Spade lugs plated with 50 micro inches gold for minimum contact resistance and minimum thermal EMF when using copper binding posts. (Less than 0.01 μv/c°).

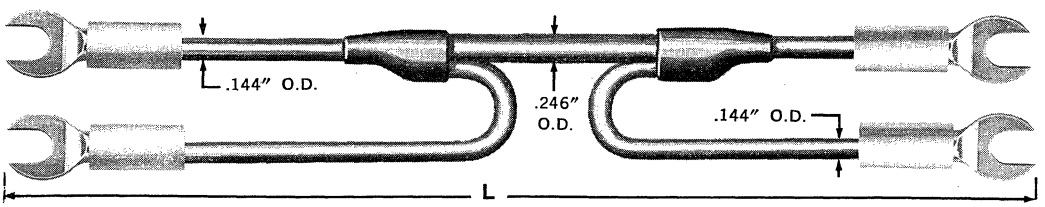
TELLURIUM COPPER SPADE LUGS, SHIELDED LEAD

MODEL	LENGTH
1756-24	24″
1756-48	48″

MODEL 1756
(Specify Length)

★ QUANTITY DISC. CODE (A)

NET 9.85

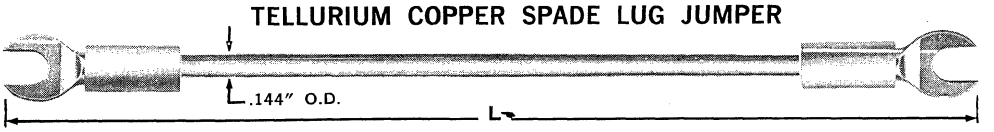


Designed for use with Kelvin Varley voltage dividers where extreme precision is required for low voltage measurements. Features guard shield to effectively reduce shunt resistance. Tough thermo-plastic molded to spade lug body, color; center conductor lug red, shield lug black. Tellurium copper heavy duty one piece machined spade lug gold plated per MIL-G-45204, Type II, Class I. Center conductor 12 AWG multi-stranded bare copper, shield lead wire, 18 AWG, stranded. Polyethylene primary insulation. Braided shield bare copper. Polyvinyl jacket, color black, per MIL-C-17C Type IIA.

TELLURIUM COPPER SPADE LUG JUMPER

MODEL	LENGTH	NET
1693-12	12″	2.75
1693-18	18″	2.75
1693-24	24″	2.75
1693-36	36″	2.75
1693-48	48″	2.75
1693-60	60″	2.75

MODEL 1693 (Specify Color) ★ QUANTITY DISC. CODE (A)



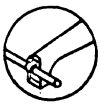
Single conductor tellurium copper spade lug jumper used in applications where guard shield is not required. Tough thermo-plastic molded to spade lug body. Color matches wire. Tellurium Copper heavy duty one piece machined spade lug gold plated per MIL-G-45204. Type II, Class I. Conductor, 12 AWG multi-stranded bare copper. Insulation polyvinyl, 105°C, .144″ O.D.
COLORS: Black, Red, Green.

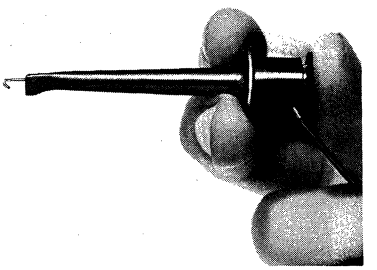
★ Various lengths may be aggregated for best quantity price.

POMONA ELECTRONICS

MINI-TEST CLIPS

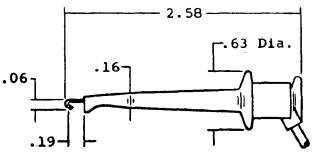
A miniature test clip for making rapid and reliable tests. Plunger type action gives fast positive contact. Conductor is gold plated beryllium copper. Nylon insulation molded directly onto clip and wire providing a strong, reliable integral unit. Clip is completely insulated to point of connection.





FEATURES:

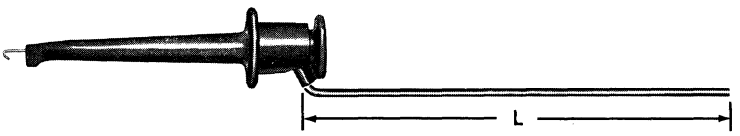
- Plunger type action between thumb and two fingers.
- Comfortable finger grip operation.
- Positive connection that won't pop off.
- No sharp teeth to damage or nick wires.
- Beryllium copper conductor alloy 170 per QQ-C-533; gold plated per MIL-G-45204 Type II.
- Stainless steel spring.
- Molded nylon insulator per MIL-P-20693.



MINI-TEST CLIP ONE END ONLY

NEW

MODEL	LENGTH	NET
3780-8	8″	.75
3780-12	12″	.75
3780-24	24″	.75
3780-36	36″	.75
3780-48	48″	.80
3780-60	60″	.85



Miniature Test Clip with wire connected one end only. No connector on opposite end allows connection of various components. Nylon insulation is molded directly onto clip and wire.

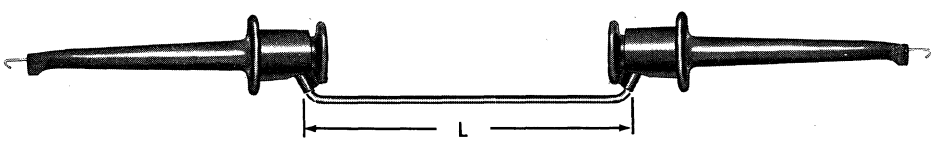
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.
WIRE: 22 AWG, stranded 105 x 42 T.C. Extra flexible polyvinyl insulation .052″ O.D.
OPERATING TEMP.: −25°C. to +105°C.
COLORS: Black, Red.

MODEL 3780 (Specify Color) QUANTITY DISC. CODE (A)★

MINI-TEST CLIP BOTH ENDS

NEW

MODEL	LENGTH	NET
3781-8	8″	1.50
3781-12	12″	1.50
3781-18	18″	1.50
3781-24	24″	1.50
3781-36	36″	1.50
3781-48	48″	1.55
3781-60	60″	1.60



Miniature test clip on both ends for rapid interconnection of test points. Connects quickly and gently to test points without damage from sharp teeth.

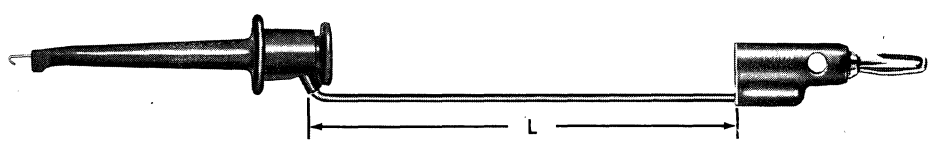
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.
WIRE: 22 AWG, stranded 105 x 42 T.C. Extra flexible polyvinyl insulation .052″ O.D.
OPERATING TEMP.: −25°C. to +105°C.
COLORS: Black, Red.

MODEL 3781 (Specify Color) QUANTITY DISC. CODE (A)★

MINI-TEST CLIP TO STACKING BANANA PLUG

NEW

MODEL	LENGTH	NET
3782-12	12″	1.25
3782-24	24″	1.25
3782-36	36″	1.25
3782-48	48″	1.30
3782-60	60″	1.35



Miniature Test Clip lead adapts to equipment using standard banana jacks.
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

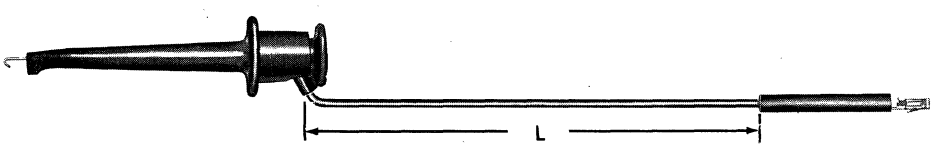
WIRE: 22 AWG, stranded 105 x 42 T.C. Extra flexible polyvinyl insulation .052″ O.D.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough Thermoplastic molded to plug body and wire.
OPERATING TEMP.: −25°C. to +105°C.
COLORS: Black, Red.

MODEL 3782 (Specify Color) QUANTITY DISC. CODE (A)★

MINI-TEST CLIP TO .025 SQUARE PIN RECEPTACLE

NEW

MODEL	LENGTH	NET
3783-12	12″	1.25
3783-24	24″	1.25
3783-36	36″	1.25
3783-48	48″	1.30
3783-60	60″	1.35



This miniature test clip lead has a .025 square pin receptacle which slides over .025 square pins.
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 22 AWG, stranded 105 x 42 T.C. Extra flexible polyvinyl insulation .052″ O.D.
.025 PIN RECEPTACLE: Gold plated phosphor bronze contact.
OPERATING TEMP.: −25°C. to +105°C.
COLORS: Black, Red.

MODEL 3783 (Specify Color) QUANTITY DISC. CODE (A)★

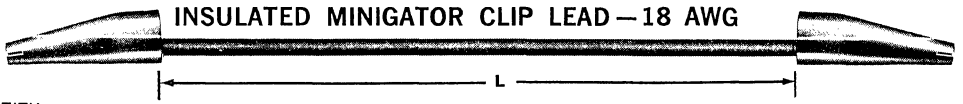
POMONA ELECTRONICS

JUMPERS – CLIP LEADS

INSULATED MINIGATOR CLIP LEAD—18 AWG

MODEL	LENGTH	NET
MG-B-4	4″	.95
MG-B-8	8″	.95
MG-B-12	12″	.95
MG-B-24	24″	.95
MG-B-36	36″	.95
MG-B-48	48″	1.00
MG-B-60	60″	1.05

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

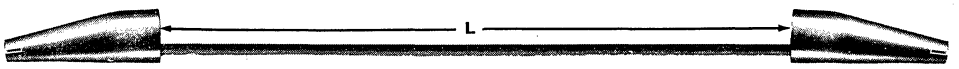
CLIP: Minigator, steel, cad plated.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.

INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red.

INSULATED MINIGATOR CLIP LEAD—20 AWG

MODEL	LENGTH	NET
1236-4	4″	.95
1236-8	8″	.95
1236-12	12″	.95
1236-24	24″	.95
1236-36	36″	.95
1236-48	48″	1.00
1236-60	60″	1.05

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

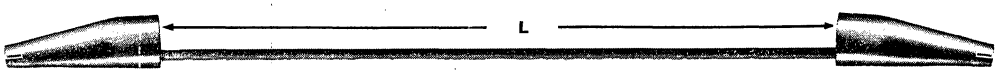
CLIP: Minigator, steel, cad. plated.
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, .087″ O.D.

INSULATOR: Red Vinyl with Red Wire. Black on all other colors.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red.

INSULATED MICROGATOR CLIP LEAD—20 AWG

MODEL	LENGTH	NET
1613-4	4″	.95
1613-8	8″	.95
1613-12	12″	.95
1613-24	24″	.95
1613-36	36″	.95
1613-48	48″	1.00
1613-60	60″	1.05

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

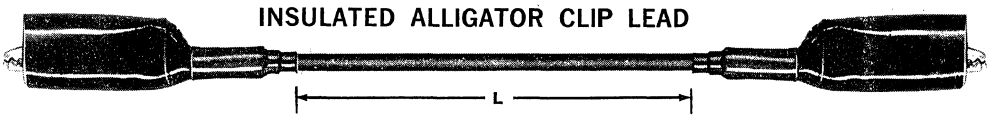
CLIP: Microgator, solid copper.
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, .087″ O.D.

INSULATOR: Red Vinyl with Red Wire. Black on all other colors.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red.

INSULATED ALLIGATOR CLIP LEAD

MODEL	LENGTH	NET
AL-B-4	4″	1.10
AL-B-8	8″	1.10
AL-B-12	12″	1.10
AL-B-24	24″	1.10
AL-B-36	36″	1.10
AL-B-48	48″	1.15
AL-B-60	60″	1.20

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

CLIP: Alligator, steel, cad plated.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.

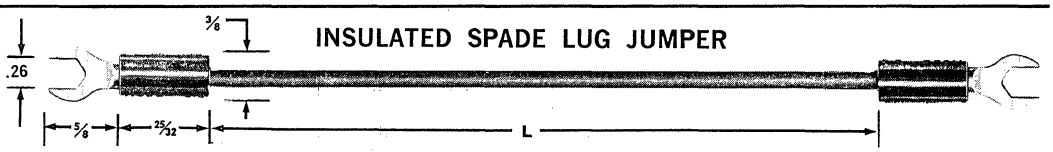
INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red.

INSULATED SPADE LUG JUMPER

MODEL	LENGTH	NET
1743-12	12″	1.25
1743-24	24″	1.25
1743-36	36″	1.25
1743-48	48″	1.30
1743-60	60″	1.35

(Typical Dimensions spade lug)

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

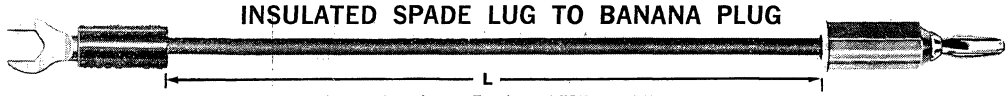
Spade lug heavy duty machined one piece brass. Tough thermo-plastic molded to spade lug body.
SPADE LUGS: Brass 1/16″ thick, nickel plated.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.

RATED: 15 A. Cont., 30 A Int. 10,000 W.V.D.C.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red, Green, White.

INSULATED SPADE LUG TO BANANA PLUG

MODEL	LENGTH	NET
1987-12	12″	1.25
1987-24	24″	1.25
1987-36	36″	1.25
1987-48	48″	1.30
1987-60	60″	1.35

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

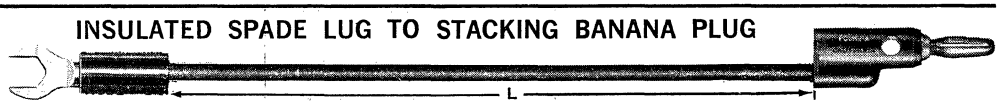
Spade lug, heavy duty machined one piece brass. Tough thermo-plastic molded to spade lug and banana plug body.
SPADE LUG: Brass 1/16″ thick, nickel plated.
BANANA PLUG: Spring one piece beryllium copper heat treated, nickel plated.

WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.
RATED: 15 A. Cont., 30 A. Int. 10,000 W.V.D.C.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red

INSULATED SPADE LUG TO STACKING BANANA PLUG

MODEL	LENGTH	NET
1370-12	12″	1.25
1370-24	24″	1.25
1370-36	36″	1.25
1370-48	48″	1.30
1370-60	60″	1.35

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

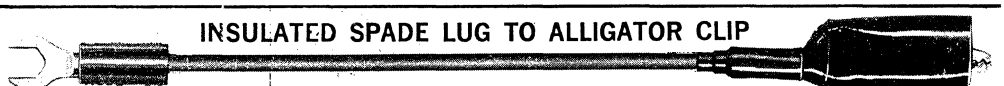
Spade lug, heavy duty machined one piece brass. Tough thermo-plastic molded to spade lug and banana plug body.
SPADE LUG: Brass 1/16″ thick, nickel plated.
BANANA PLUG: Spring one piece beryllium copper heat treated, nickel plated.

WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.
RATED: 15 A. Cont., 30 A. Int. 10,000 W.V.D.C.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red, Green, White.

INSULATED SPADE LUG TO ALLIGATOR CLIP

MODEL	LENGTH	NET
1960-12	12″	1.25
1960-24	24″	1.25
1960-36	36″	1.25
1960-48	48″	1.30
1960-60	60″	1.35

(Specify Color)



QUANTITY DISC. CODE Ⓐ ★

Spade lug, heavy duty machined one piece brass. Tough thermo-plastic molded to spade lug body.
SPADE LUG: Brass 1/16″ thick, nickel plated.
CLIP: Alligator, steel, cad plated.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.
OPERATING TEMP.: —25°C to +105°C.
COLORS: Black, Red

★ Various lengths may be aggregated for best quantity price.

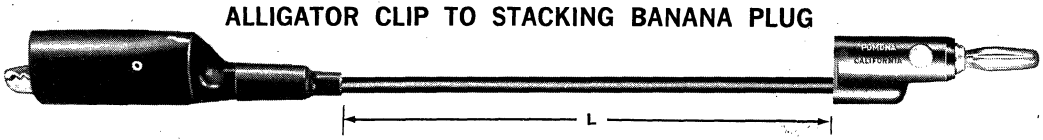
OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

CLIP LEADS TEST PROBES

ALLIGATOR CLIP TO STACKING BANANA PLUG

MODEL	LENGTH	NET
1166-4	4″	1.10
1166-8	8″	1.10
1166-12	12″	1.10
1166-24	24″	1.10
1166-36	36″	1.10
1166-48	48″	1.15
1166-60	60″	1.20



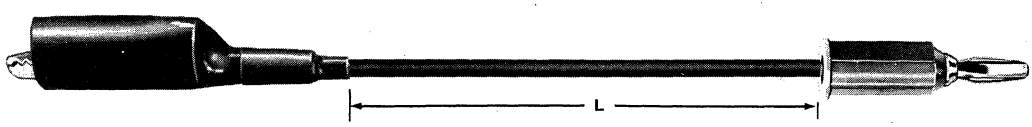
Adapts to equipment using standard banana jacks.
CLIP: Alligator, Steel, cadmium plated
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.
OPERATING TEMP.: −25°C to +105°C.
COLORS: Black, Red.

MODEL 1166 (Specify Color) QUANTITY DISC. CODE Ⓐ ★

ALLIGATOR CLIP LEAD TO BANANA PLUG

MODEL	LENGTH	NET
1959-4	4″	1.10
1959-8	8″	1.10
1959-12	12″	1.10
1959-24	24″	1.10
1959-36	36″	1.10
1959-48	48″	1.15
1959-60	60″	1.20



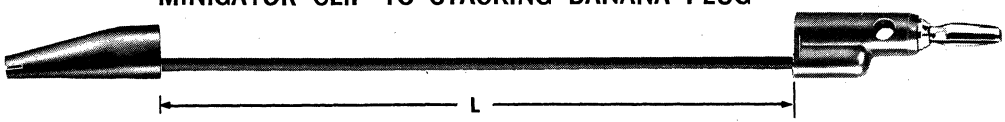
Adapts to equipment using standard banana jacks.
CLIP: Alligator, Steel, cadmium plated
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation .144″ O.D.
OPERATING TEMP.: −25°C to +105°C.
COLORS: Black, Red.

MODEL 1959 (Specify Color) QUANTITY DISC. CODE Ⓐ ★

MINIGATOR CLIP TO STACKING BANANA PLUG

MODEL	LENGTH	NET
3220-4	4″	1.00
3220-8	8″	1.00
3220-12	12″	1.00
3220-24	24″	1.00
3220-36	36″	1.00
3220-48	48″	1.05
3220-60	60″	1.10

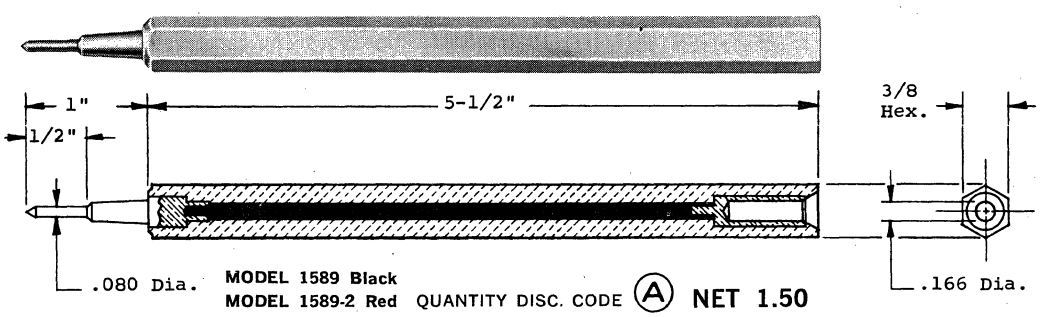


Adapts to equipment using standard banana jacks.
CLIP: Minigator, Steel, cadmium plated.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation .087″ O.D.
OPERATING TEMP.: −25°C to +105°C.
COLORS: Black, Red.

MODEL 3220 (Specify Color) QUANTITY DISC. CODE Ⓐ ★

TEST PROBE TO BANANA JACK



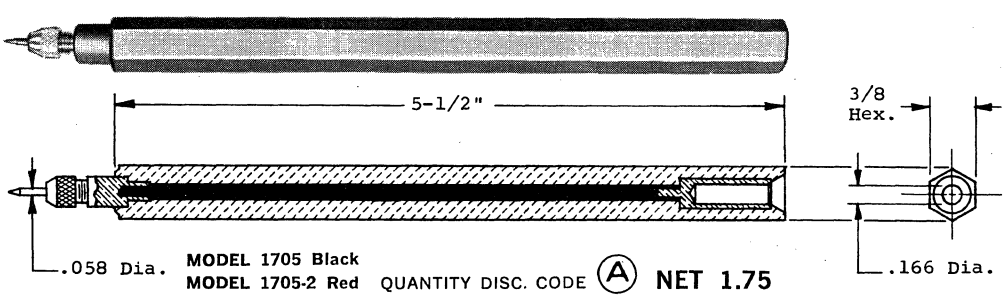
MODEL 1589 Black
MODEL 1589-2 Red QUANTITY DISC. CODE Ⓐ **NET 1.50**

Banana jack in handle connected to tip. Permits use of standard banana plugs for circuit testing as a test prod. Heavy duty insulated handle molded to banana jack and tip.

PIN TIP: .080 dia. x ½″ long, brass nickel plated.

BANANA JACK: .166 dia. Brass nickel plated. Accepts standard banana plug.

NEEDLE TIP PROBE TO BANANA JACK



MODEL 1705 Black
MODEL 1705-2 Red QUANTITY DISC. CODE Ⓐ **NET 1.75**

Sharp replaceable needle tip allows testing of encapsulated circuits. Banana jack in handle connected to tip. Permits use of standard banana plugs for circuit testing as a test prod. Heavy duty insulated handle molded to banana jack and tip.

PIN TIP: Replaceable needle tip, steel nickel plated.

BANANA JACK: .166 dia. Brass nickel plated. Accepts standard banana plug.

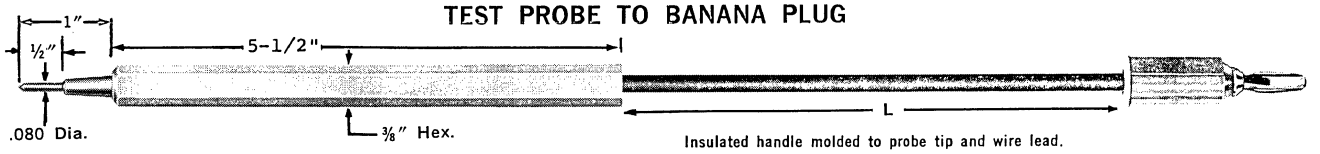
★ Various lengths may be aggregated for best quantity price.

OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

TEST PROBES

TEST PROBE TO BANANA PLUG

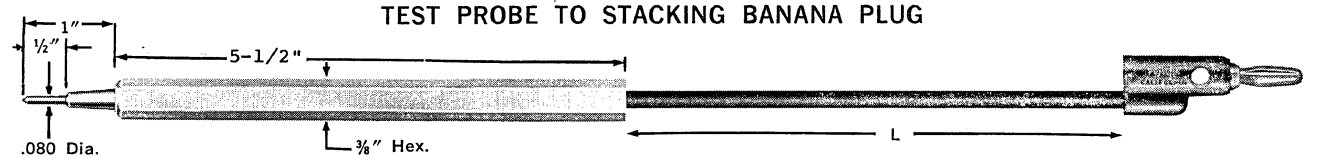


MODEL 1986-36-B	36" Long	Black	NET 1.95
MODEL 1986-36-R	36" Long	Red	NET 1.95
MODEL 1986-48-B	48" Long	Black	NET 1.95
MODEL 1986-48-R	48" Long	Red	NET 1.95

QUANTITY DISC. CODE (A)

Insulated handle molded to probe tip and wire lead.
PROBE PIN TIP: .080 dia. x ½" long. Brass nickel plated.
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, .144" O.D.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermo-plastic molded to body.
COLORS: Black, Red.

TEST PROBE TO STACKING BANANA PLUG

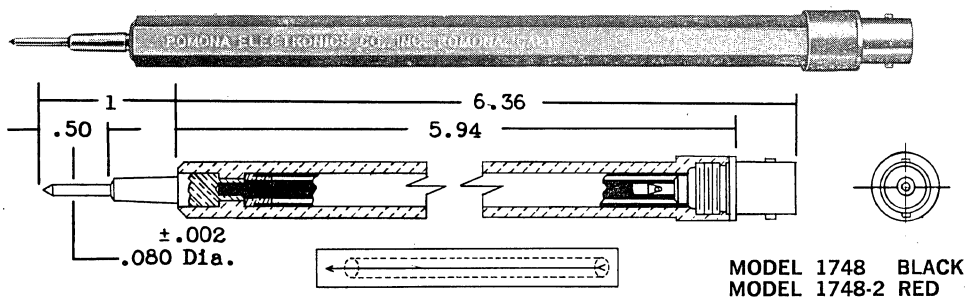


MODEL 1382-36-B	36" Long	Black	NET 1.95
MODEL 1382-36-R	36" Long	Red	NET 1.95
MODEL 1382-48-B	48" Long	Black	NET 1.95
MODEL 1382-48-R	48" Long	Red	NET 1.95

QUANTITY DISC. CODE (A)

Insulated handle molded to probe tip and wire lead.
PROBE PIN TIP: .080 dia. x ½" long. Brass nickel plated
WIRE: 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, .144" O.D.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermo-plastic molded to plug body and wire.
COLORS: Black, Red.

TEST PROBE TO BNC RECEPTACLE

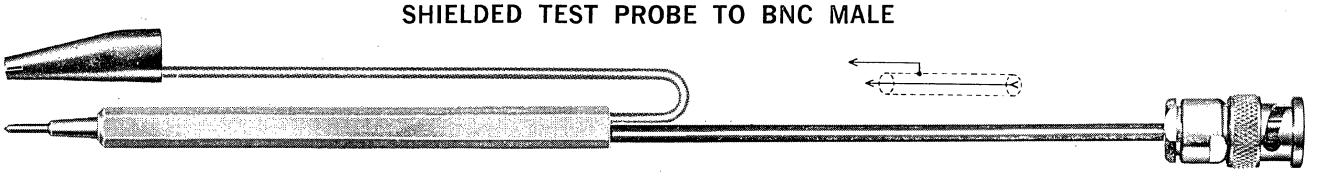


BNC receptacle in handle connected to tip. Permits the use of coaxial cables with BNC plug for circuit testing as a test prod. Tough thermoplastic molded to BNC receptable and tip. Shield extends to within 1½" of the probe tip end.
PIN TIP: .080" dia. x ½" long, brass, nickel plated.
RECEPTACLE: BNC, UG1094/U.

MODEL 1748 BLACK
MODEL 1748-2 RED

QUANTITY DISC. CODE (A) **NET 5.85**

SHIELDED TEST PROBE TO BNC MALE



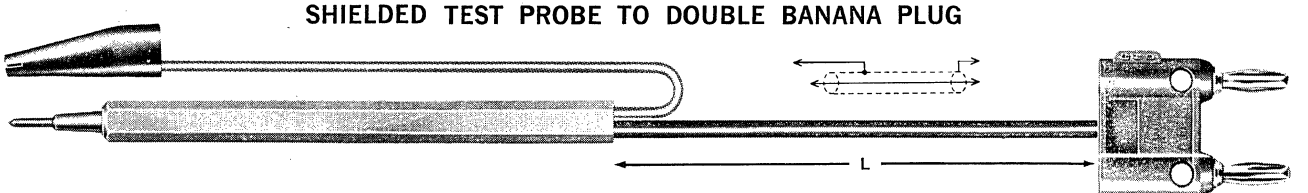
A shielded test probe with the shield extending to within 1½" of the probe tip end. One piece molded construction. Insulated handle molded to probe tip and cable. Insulated minigator clip connected to shield lead.
PROBE PIN TIP: .080 dia. x ½" long. Brass, nickel plated.
CONNECTOR: BNC Male, UG88E/U.

CLIP: Minigator, steel, cad. plated.
INSULATOR, VINYL: Color, Black.
CABLE: Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
HANDLE: Color, red, molded of tough thermo-plastic.

MODEL 2739-C-48 . . . . . **48" long**

QUANTITY DISC. CODE (B) **NET 6.85**

SHIELDED TEST PROBE TO DOUBLE BANANA PLUG



A shielded test probe with the shield extending to within 1½" of the probe tip end. One piece molded construction. Insulated handle molded to probe tip and cable. Insulated minigator clip connected to shield lead.

PROBE PIN TIP: .080 dia. x ½" long. Brass nickel plated.

DOUBLE BANANA PLUG: On ¾" centers. Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermo-plastic molded to double plug body. Color, Black.

CLIP: Minigator, steel, cad. plated.
INSULATOR, VINYL: Color, Black.
CABLE: Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
HANDLE: Color, red, molded of tough thermo-plastic.

MODEL 1569-C-48 . . . . . **48" long**

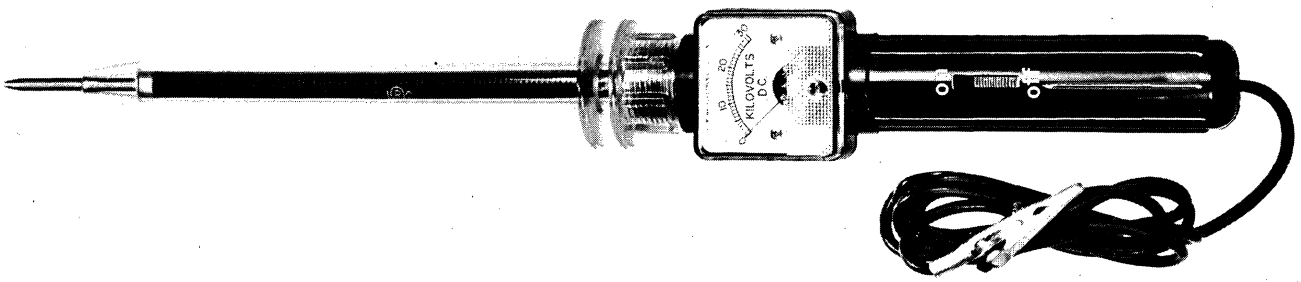
QUANTITY DISC. CODE (B) **NET 6.85**

OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

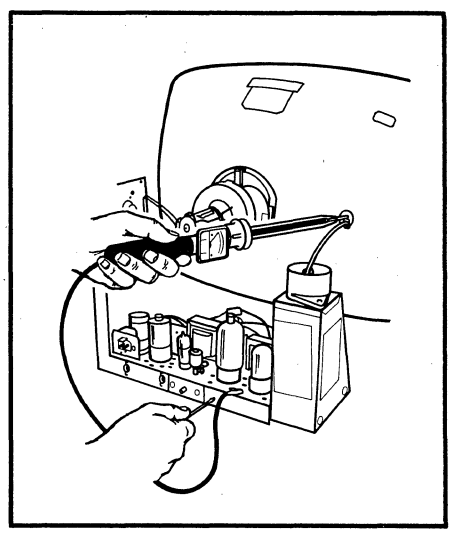
HIGH VOLTAGE TEST PROBES

DC HIGH VOLTAGE TEST PROBES WITH BUILT-IN METER



These High Voltage Test Probes built by Pomona Electronics are the most advanced instruments of their kind on the market; the only test probes featuring a built-in voltmeter. The Test Probes are self-contained, portable test instruments for rapid measurements of high voltages.

Easy to operate! Just ground the test probe instrument by attaching alligator clip to chassis, contact test probe tip to high voltage being measured and read voltage from the built-in meter. No warm-up time. No batteries.



PATENT PENDING

SPECIFICATIONS:

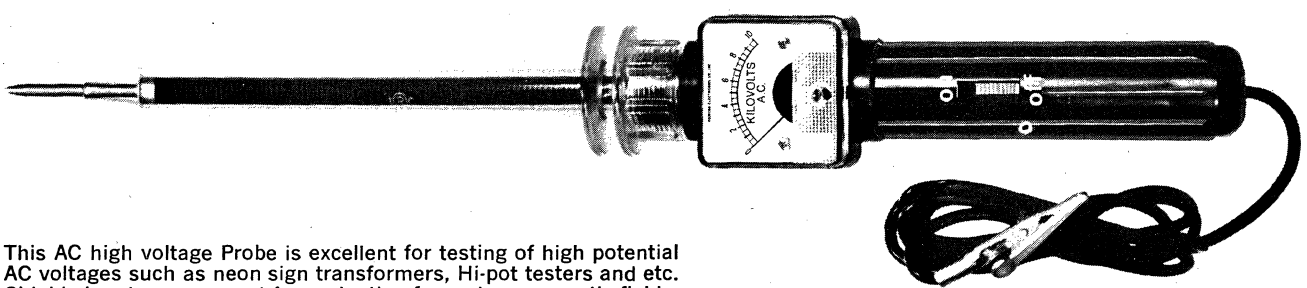
RANGE: See below. **SENSITIVITY:** 20,000 ohms/volt (50 ua) movement. **ACCURACY:** ± 3% full scale. **MULTIPLIER RESISTANCE:** See below. **MATERIAL:** Handle—high impact thermoplastic. Probe—high impact polystyrene. **LENGTH:** 14¾" overall. **WEIGHT:** 8 ounces.

MODEL	VOLTS Full Scale	MULTIPLIER RESISTANCE	NET
2900	30,000	600 Megohm	19.95
3157(*)	15,000	300 Megohm	29.95
3163(*)	6,000	120 Megohm	29.95

***Models 3157 and 3163 are supplied with Model 3295 carrying case.**

QUANTITY DISC. CODE Ⓒ

10 KV AC HIGH VOLTAGE TEST PROBE WITH BUILT-IN METER



This AC high voltage Probe is excellent for testing of high potential AC voltages such as neon sign transformers, Hi-pot testers and etc. Shielded meter movement for protection from stray magnetic fields. PROBE IS SUPPLIED WITH MODEL 3295 CARRYING CASE.

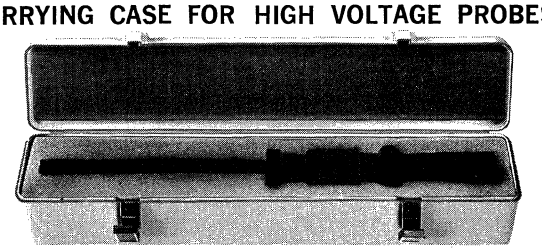
Easy to operate! Just ground the test probe instrument by attaching alligator clip to chassis, contact test probe tip to high voltage being measured and read voltage from the built-in meter. No warm-up time. No batteries.

SPECIFICATIONS:

RANGE: 10,000 Volts AC. **SENSITIVITY:** 2,000 Ohms/Volt (500 UA) movement. **ACCURACY:** ± 3% 30 cps to 1000 cps. **MULTIPLIER RESISTANCE:** 20 Megohm ± 2%. **MATERIAL:** Handle—high impact thermoplastic. Probe — high impact polystyrene. **LENGTH:** 14¾" overall. **WEIGHT:** 8 ounces.

MODEL 3200 QUANTITY DISC. CODE Ⓒ **NET 29.95**

CARRYING CASE FOR HIGH VOLTAGE PROBES



A quality built carrying case for protection of your high voltage probe. The case is made of tough thermoplastic. The inside is lined with soft, shock absorbing material.

MODEL 3295 QUANTITY DISC. CODE Ⓓ **NET 5.95**

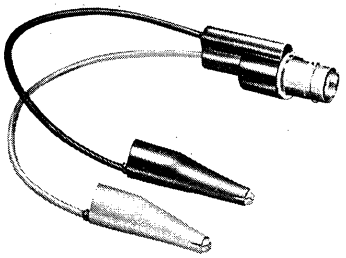
POMONA ELECTRONICS

MOLDED BREAKOUTS

A new series of "Breakouts", designed to convert standard coaxial cables to test cables.
By connecting proper Breakout receptacle or plug to corresponding cable plug or receptacle, any standard coaxial cable becomes a test cable equipped with clip leads.
All connections feature a non-tarnish finish, and tough molded thermoplastic insulation molded to connector and wire.

APPLICABLE SPECIFICATIONS:
Wire: (With Alligator Clips) 18 AWG, Strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, .144" O.D.
Wire: (With Minigator Clips) 20 AWG, Strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, .087" O.D.
Operating Temp.: —25°C to +85°C.
Working Voltage: 500 V Peak.

BNC RECEPTACLE TO TEST CLIPS

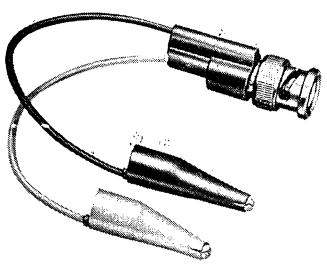


CONNECTOR: BNC Receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or Alligator, Steel, cad. plated. Insulators, Vinyl: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 2630 (ALLIGATOR CLIPS)
MODEL 2631 (MINIGATOR CLIPS) QUANTITY DISC. CODE (A) **NET 3.45**

BNC PLUG TO TEST CLIPS

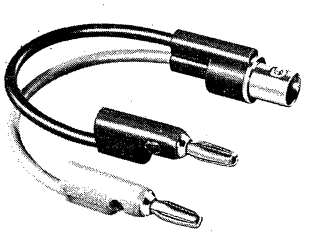


CONNECTOR: BNC Plug.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or Alligator, Steel, cad. plated. Insulators, Vinyl: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 2885 (ALLIGATOR CLIPS)
MODEL 2886 (MINIGATOR CLIPS) QUANTITY DISC. CODE (A) **NET 4.50**

BNC RECEPTACLE TO STACKING BANANA PLUGS

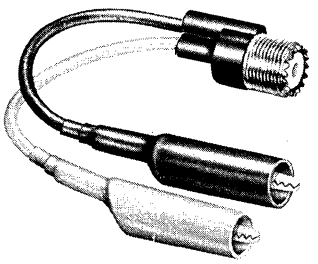


CONNECTOR: BNC Receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 18 AWG.
STACKING BANANA PLUGS: Spring, one piece heat-treated beryllium copper, nickel plated: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 3073 QUANTITY DISC. CODE (A) **NET 3.85**

UHF RECEPTACLE TO TEST CLIPS

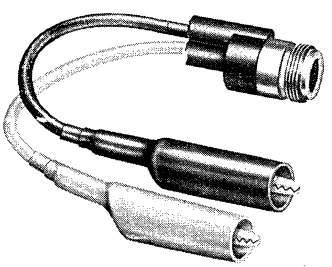


CONNECTOR: UHF Receptacle Jack.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or Alligator, Steel, cad. plated. Insulators, Vinyl: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 2632 (ALLIGATOR CLIPS)
MODEL 2633 (MINIGATOR CLIPS) QUANTITY DISC. CODE (A) **NET 3.85**

TYPE "N" RECEPTACLE TO TEST CLIPS

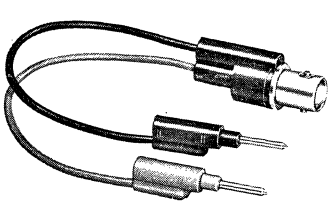


CONNECTOR: Type "N" Receptacle, UG58A/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or Alligator, Steel, cad. plated. Insulators, Vinyl: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 2636 (ALLIGATOR CLIPS)
MODEL 2637 (MINIGATOR CLIPS) QUANTITY DISC. CODE (A) **NET 4.50**

BNC RECEPTACLE TO STACKING PIN TIP PLUGS

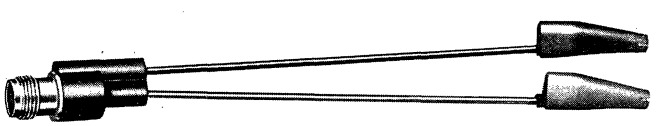


CONNECTOR: BNC Receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 20 AWG
STACKING PIN TIP PLUGS: 2 single plugs, .080 dia.: 1 Black, 1 Red.

OVERALL LENGTH 7"

MODEL 3221 QUANTITY DISC. CODE (A) **NET 3.85**

TNC RECEPTACLE TO TEST CLIPS



OVERALL LENGTH 7"

CONNECTOR: TNC Receptacle Jack.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or Alligator, Steel, cad. plated. Insulators, Vinyl: 1 Black, 1 Red.

MODEL 2634 (ALLIGATOR CLIPS)
MODEL 2635 (MINIGATOR CLIPS) QUANTITY DISC. CODE (A) **NET 3.45**

POMONA ELECTRONICS

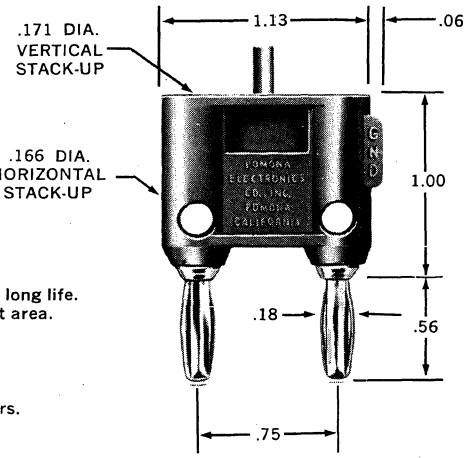
PATCH CORDS DOUBLE BANANA PLUGS

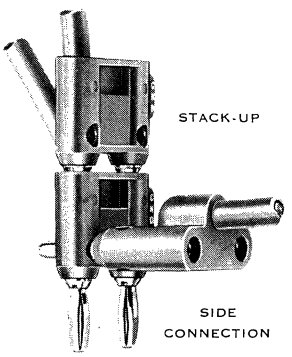
POMONA MOLDED DOUBLE BANANA PLUG PATCH CORDS AND TEST LEADS

. . . indispensable for bridge transformer connections, three terminal capacitor measurements and general hook-up for two wire systems. They are horizontally and vertically stackable in parallel.

Tough thermo-plastic material molded to plug body and cable insures maximum strength, moisture resistance and excellent insulative properties.

Used by leading industries in applications where extreme reliability is of prime importance.





FEATURES . . .

- One piece beryllium copper heat treated spring for long life.
- Rounded spring design results in maximum contact area.
- GND., clearly molded on plug body and shell.
- Solder-bonded noise-free connections.

SPECIFICATIONS . . .

- Fits standard 0.166 dia. banana jacks, on ¾" centers.
- Contact resistance less than 0.001 ohms per plug.
- Spring beryllium copper alloy 170 per QQ-C-533.
- Plug body brass per QQ-B-625, Comp. 22.
- Nickel plated per QQ-N-290, Class 2.

CABLE TYPE DESCRIPTION

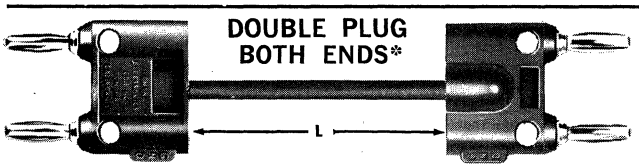
TWO COND. TWISTED PAIR
18 AWG, Strand. 65 x 36 T.C. Vinyl insulation. Vinyl jacket, .250" O.D. Nom. Cap. 30 pf/ft.
COLOR: Gray.

SHIELDED MICROPHONE CABLE
Polyethylene insulation. Vinyl jacket, .205" O.D. Nom. Cap. 25 pf/ft.
COLOR: Gray.

SHIELDED COAXIAL CABLE
Polyethylene insulation, Vinyl jacket

TYPES	RG58C/U	RG59B/U	RG62A/U
Color	Black	Black	Black
Nom. Imp.	50	75	93
CAP. pf./ft.	30	21	13.5
O.D.	.195	.242	.242

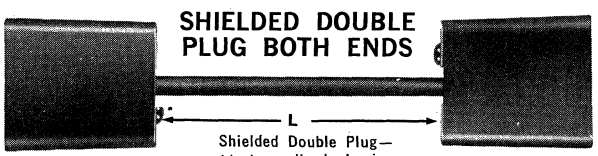
DOUBLE PLUG BOTH ENDS*



TWO COND. TWISTED PR.	SHIELDED MIC. CABLE	RG58C/U	RG59B/U	LENGTH	NET
2BA-18	2BB-18	2BC-18	2BE-18	18"	4.95
2BA-24	2BB-24	2BC-24	2BE-24	24"	4.95
2BA-30	2BB-30	2BC-30	2BE-30	30"	4.95
2BA-36	2BB-36	2BC-36	2BE-36	36"	4.95
2BA-48	2BB-48	2BC-48	2BE-48	48"	4.95
2BA-60	2BB-60	2BC-60	2BE-60	60"	4.95

★ QUANTITY DISC. CODE (B)

SHIELDED DOUBLE PLUG BOTH ENDS

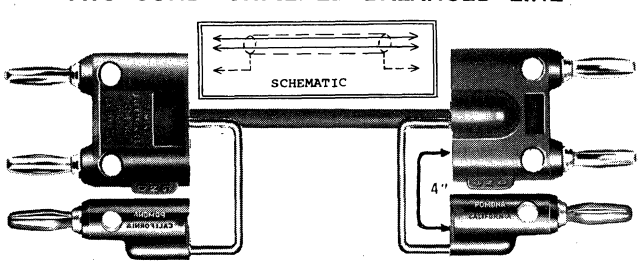


Shielded Double Plug—black anodized aluminum

SHIELDED COAX. CABLE	LENGTH	NET
1550-C-18	18"	7.50
1550-C-24	24"	7.50
1550-C-30	30"	7.50
1550-C-36	36"	7.50
1550-C-48	48"	7.50
1550-C-60	60"	7.50

★ QUANTITY DISC. CODE (B)

TWO COND. SHIELDED BALANCED LINE

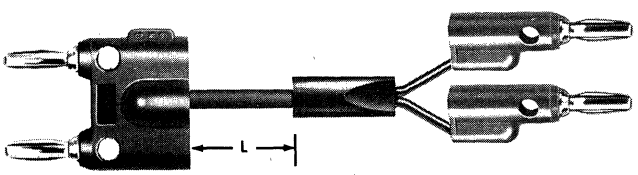


NOTE: For BNC type TWINAX Patch cords and jacks, see Page 18.

CABLE DESCRIPTION	MODEL	LENGTH	NET
2-Cond. shielded mic. cable. Polyethylene insulation. Vinyl jacket, .231" O.D. Nom. Cap. between cond. 18 pf./ft. Nom. Cap. between one cond. and remaining cond. connected to shield, 32 pf./ft. COLOR: Cable and double plug, Gray. Single ground plug, Green.	1167-18	18"	7.95
	1167-24	24"	7.95
	1167-30	30"	7.95
	1167-36	36"	7.95
	1167-48	48"	7.95
	1167-60	60"	7.95

★ QUANTITY DISC. CODE (B)

DOUBLE PLUG TO SINGLE BANANA PLUGS



CABLE DESCRIPTION		MODEL	LENGTH	NET
TWO COND. TWISTED PAIR	18 AWG, Strand. 65 x 36 T.C. Vinyl insulation. Vinyl jacket, .250" O.D. Nom. Cap. 30 pf/ft. **COLOR:** Double Plug: Gray Single Plugs: Red, Black	1368-A-18	18"	5.95
		1368-A-24	24"	5.95
		1368-A-30	30"	5.95
		1368-A-36	36"	5.95
		1368-A-48	48"	5.95
		1368-A-60	60"	5.95

★ QUANTITY DISC. CODE (B)

*NOTE: Molded double plug matches color of cable. Two cond. Twisted pair, GRAY. Shielded mic. cable, GRAY. Coaxial RG58C/U Cable, BLACK.

★ Various lengths may be aggregated for best quantity price.

1. Other cable colors available to order on the Two Cond. Twisted Pair and Shielded Mic. cable models with plug to match.
   COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.
2. Other lengths and cable types available to order.

POMONA ELECTRONICS

PATCH CORDS
BNC CONNECTING LEADS

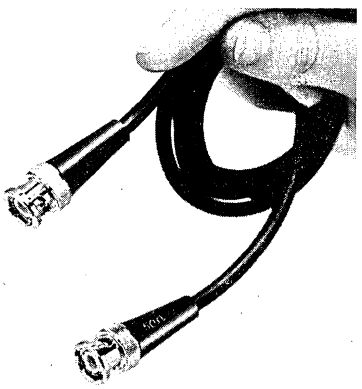
STRESS RELIEVED AND WEATHERPROOFED CRIMP BNC CABLE ASSEMBLIES

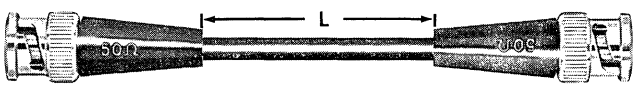
These new cable assemblies feature polyethylene collars which are injection molded directly onto cable jacket and connector body. The resulting encapsulation offers two outstanding advantages:

STRESS PROTECTION against failure from excess bending, flexing, twisting;

WEATHERPROOF SEAL between cable and connector.

Connectors have non-tarnish finish and conform to MIL-C-39012





CONN: 1st END { Crimp Male BNC (Comparable to UG88E/U) **CABLE:** Shielded Coax., RG58C/U. **CONN: 2nd END** { Crimp Male BNC (Comparable to UG88E/U)

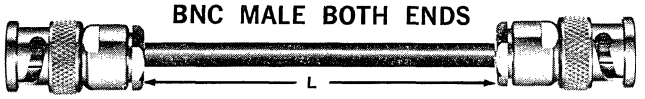
CONN: 1st END { Crimp Male BNC (Comparable to UG260B/U) **Cable:** Shielded Coax., RG59B/U or RG62A/U **CONN: 2nd END** { Crimp Male BNC (Comparable to UG260B/U)

CABLE TYPES

RG58C/U	RG59B/U	NET	RG62A/U	NET	LENGTH
2249-C-12	2249-E-12	4.85	2249-M-12	5.95	12″
2249-C-24	2249-E-24	4.85	2249-M-24	5.95	24″
2249-C-36	2249-E-36	4.85	2249-M-36	5.95	36″
2249-C-48	2249-E-48	4.85	2249-M-48	5.95	48″
2249-C-60	2249-E-60	4.85	2249-M-60	5.95	60″

★ QUANTITY DISC. CODE (B)

BNC MALE BOTH ENDS



CONN: 1st END { UG88E/U Male BNC **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** { UG88E/U Male BNC

CONN: 1st END { UG260B/U Male BNC **CABLE:** Shielded Coax., RG59B/U or RG62A/U **CONN: 2nd END** { UG260B/U Male BNC

CABLE TYPES

SHIELDED MIC. CABLE	RG58C/U	RG59B/U	NET	RG62A/U	NET	LENGTH
BNC-B-18	BNC-C-18	BNC-E-18	5.95	BNC-M-18	6.95	18″
BNC-B-24	BNC-C-24	BNC-E-24	5.95	BNC-M-24	6.95	24″
BNC-B-30	BNC-C-30	BNC-E-30	5.95	BNC-M-30	6.95	30″
BNC-B-36	BNC-C-36	BNC-E-36	5.95	BNC-M-36	6.95	36″
BNC-B-48	BNC-C-48	BNC-E-48	5.95	BNC-M-48	6.95	48″
BNC-B-60	BNC-C-60	BNC-E-60	5:95	BNC-M-60	6.95	60″

★QUANTITY DISC. CODE (B)

"PUSH ON" BNC MALE BOTH ENDS

CONN: 1st END { Crimp "PUSH ON" BNC, Male. **CABLE:** Shielded Coax., RG58C/U. **CONN: 2nd END** { Crimp "PUSH ON" BNC, Male.

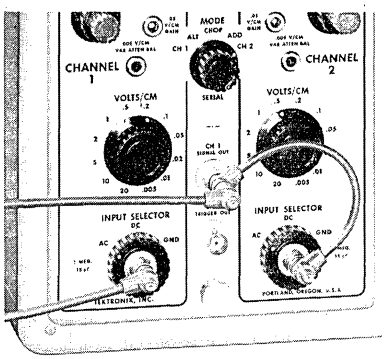
A test cable for rapid interconnection of equipment. Connector is pushed on and requires no twisting. Beryllium copper outer fingers maintain continuity of shield. Excellent for those hard to get at places.

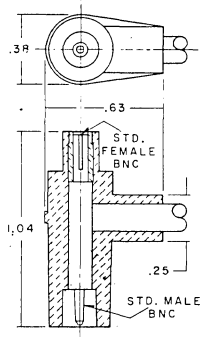
MODEL	LENGTH
3199-C-12	12″
3199-C-24	24″
3199-C-36	36″
3199-C-48	48″
3199-C-60	60″

MODEL 3199 ★ QUANTITY DISC. CODE (B) **NET 4.60**

"PUSH ON" STACKING BNC PATCH CORDS

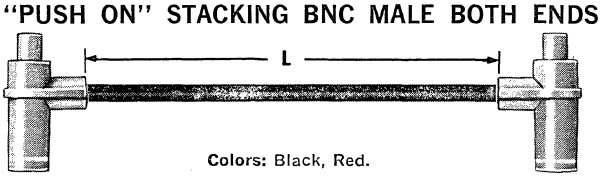
These multiple stacking patch cords connect the center conductors of BNC jacks having a common chassis. Excellent for use with instruments such as oscilloscopes. Stacking feature enables an endless number of connections to the same point.





FEATURES:
- **CONTACT:** Male and Female, one piece heat treated beryllium copper, gold flashed.
- **WIRE:** 18 AWG., stranded 65 x 36 T.C., polyvinyl insulation.
- **INSULATION:** Tough thermoplastic, polypropylene, molded around contact and wire.
- **OPERATING TEMP.:** —25° C to + 125° C.

"PUSH ON" STACKING BNC MALE BOTH ENDS



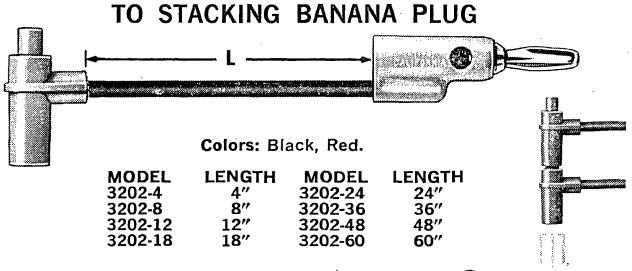
Colors: Black, Red.

MODEL	LENGTH	MODEL	LENGTH
3201-4	4″	3201-24	24″
3201-8	8″	3201-36	36″
3201-12	12″	3201-48	48″
3201-18	18″	3201-60	60″

★ QUANTITY DISC. CODE (B)

MODEL 3201 (Specify Color) **NET 1.95**

"PUSH ON" STACKING BNC MALE TO STACKING BANANA PLUG

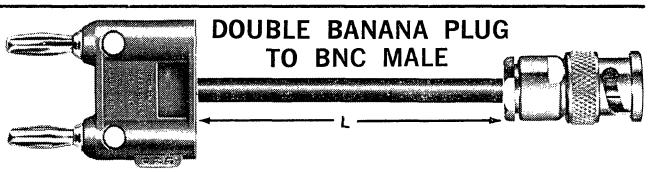


Colors: Black, Red.

MODEL	LENGTH	MODEL	LENGTH
3202-4	4″	3202-24	24″
3202-8	8″	3202-36	36″
3202-12	12″	3202-48	48″
3202-18	18″	3202-60	60″

MODEL 3202 (Specify Color) ★QUANTITY DISC. CODE (B) **NET 1.95**

DOUBLE BANANA PLUG TO BNC MALE



CONN.: 1ST END { Double Banana Plug, on ¾″ Centers. **CABLE:** Shielded coax., RG58C/U **CONN.: 2ND END** { UG88E/U, Male BNC

SHIELDED MIC. CABLE	SHIELDED COAX. CABLE	LENGTH	NET
2BB-BNC-18	2BC-BNC-18	18″	5.95
2BB-BNC-24	2BC-BNC-24	24″	5.95
2BB-BNC-30	2BC-BNC-30	30″	5.95
2BB-BNC-36	2BC-BNC-36	36″	5.95
2BB-BNC-48	2BC-BNC-48	48″	5.95
2BB-BNC-60	2BC-BNC-60	60″	5.95

★QUANTITY DISC. CODE (B)

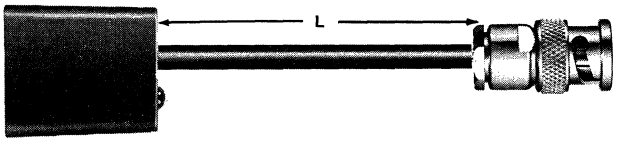
★ Various lengths may be aggregated for best quantity price.

OTHER LENGTHS AND CABLE TYPES AVAILABLE TO ORDER

POMONA ELECTRONICS

PATCH CORDS BNC CONNECTING LEADS

SHIELDED DOUBLE PLUG TO BNC MALE

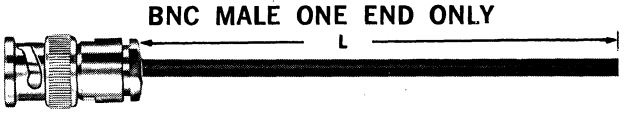


CONN.: Shielded Double plug, on ¾″ centers. Black anodized aluminum. **1ST END** | **CABLE:** Shielded coax., RG58C/U | **CONN.:** UG88E/U, **2ND END** Male BNC

SHIELDED COAX. CABLE	LENGTH	SHIELDED COAX. CABLE	LENGTH
1555-C-18	18″	1555-C-36	36″
1555-C-24	24″	1555-C-48	48″
1555-C-30	30″	1555-C-60	60″

MODEL 1555 ★QUANTITY DISC. CODE (B) **NET 6.95**

BNC MALE ONE END ONLY



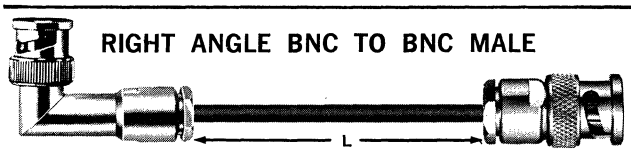
CONN: UG88E/U, Male BNC, **1st END** | **CABLE:** Shielded Coax., RG58C/U | **CONN:** **2nd END** None

CONN: UG260B/U, Male BNC, **1st END** | **Cable:** Shielded Coax., RG59B/U or RG62A/U | **CONN:** **2nd END** None

RG58C/U	RG59B/U	NET	RG62A/U	NET	LENGTH
1661-C-12	1661-E-12	3.95	1661-M-12	4.60	12″
1661-C-24	1661-E-24	3.95	1661-M-24	4.60	24″
1661-C-36	1661-E-36	3.95	1661-M-36	4.60	36″
1661-C-48	1661-E-48	3.95	1661-M-48	4.60	48″
1661-C-60	1661-E-60	3.95	1661-M-60	4.60	60″

(B) ★QUANTITY DISC. CODE

RIGHT ANGLE BNC TO BNC MALE

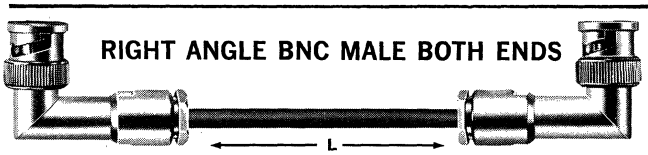


CONN.: UG913A/U, Angle Male BNC, **1ST END** | **CABLE:** Shielded Coax., RG58C/U | **CONN.:** UG88E/U, Male BNC, **2ND END**

SHIELDED COAX. CABLE	LENGTH	SHIELDED COAX. CABLE	LENGTH
1383-C-18	18″	1383-C-36	36″
1383-C-24	24″	1383-C-48	48″
1383-C-30	30″	1383-C-60	60″

MODEL 1383 ★QUANTITY DISC. CODE (B) **NET 7.95**

RIGHT ANGLE BNC MALE BOTH ENDS

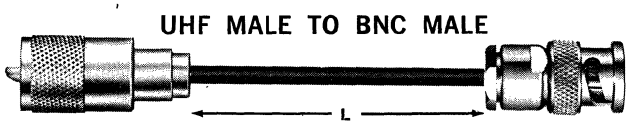


CONN.: UG913A/U, Angle Male BNC, **1ST END** | **CABLE:** Shielded Coax., RG58C/U | **CONN.:** UG913A/U, Angle Male BNC, **2ND END**

SHIELDED COAX. CABLE	LENGTH	SHIELDED COAX. CABLE	LENGTH
1155-C-18	18″	1155-C-36	36″
1155-C-24	24″	1155-C-48	48″
1155-C-30	30″	1155-C-60	60″

MODEL 1155 ★QUANTITY DISC. CODE (B) **NET 10.95**

UHF MALE TO BNC MALE

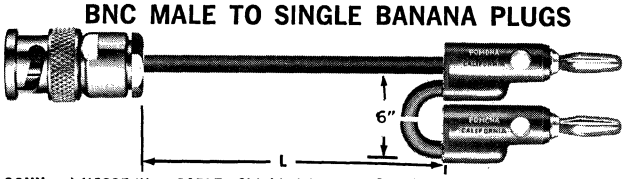


CONN.: PL259, UHF Male, **1ST END** | **CABLE:** Shielded Coax., RG58C/U. | **CONN.:** UG88E/U, Male BNC, **2ND END**

SHIELDED COAX. CABLE	LENGTH	SHIELDED COAX. CABLE	LENGTH
1367-C-18	18″	1367-C-36	36″
1367-C-24	24″	1367-C-48	48″
1367-C-30	30″	1367-C-60	60″

MODEL 1367 ★QUANTITY DISC. CODE (B) **NET 5.95**

BNC MALE TO SINGLE BANANA PLUGS



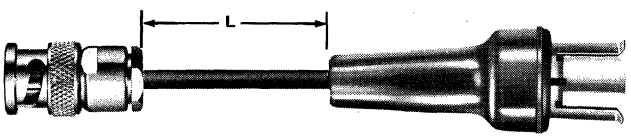
CONN: UG88E/U, Male BNC, **1st END** | **CABLE:** Shielded Coax., RG58C/U | **CONN:** Single Banana Plugs, Color: 1 Black, 1 Red. **2nd END**

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195″ O.D. Nom. Cap. 28.5 pf/ft.

★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
2241-C-18	18″	5.95
2241-C-24	24″	5.95
2241-C-36	36″	5.95
2241-C-48	48″	5.95

BNC MALE TO GR-874



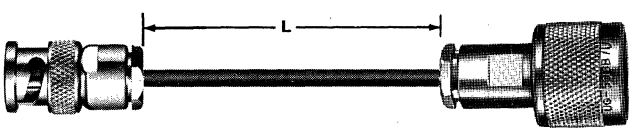
CONN: UG88E/U, Male BNC, **1st END** | **CABLE:** Shielded Coax., RG58C/U | **CONN:** GR-874, **2nd END**

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195″ O.D., Nom. Cap. 28.5 pf/ft.

★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
1703-C-24	24″	12.85
1703-C-36	36″	12.85
1703-C-48	48″	12.85

BNC MALE TO SERIES "N" MALE



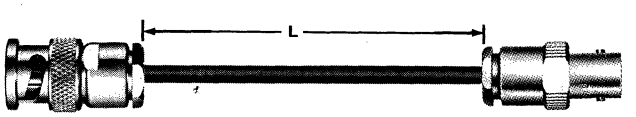
CONN: UG88E/U, Male BNC, **1st END** | **CABLE:** Shielded coax., RG58C/U | **CONN:** UG536B/U, "N" Male, **2nd END**

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195″ O.D., Nom. Cap. 28.5 pf/ft.

★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
1366-C-24	24″	6.95
1366-C-36	36″	6.95
1366-C-48	48″	6.95

BNC MALE TO BNC FEMALE



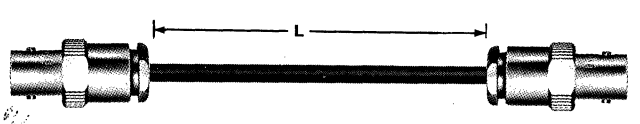
CONN: UG88E/U, Male BNC, **1st END** | **CABLE:** Shielded coax., RG58C/U | **CONN:** UG89C/U, Female BNC, **2nd END**

CABLE DESCRIPTION:
Shielded Coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195″ O.D., Nom. Cap. 28.5 pf/ft.

★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
2223-C-12	12″	6.95
2223-C-24	24″	6.95
2223-C-36	36″	6.95
2223-C-48	48″	6.95
2223-C-60	60″	6.95

BNC FEMALE BOTH ENDS



CONN: UG89C/U, Female BNC, **1st END** | **CABLE:** Shielded Coax., RG58C/U | **CONN:** UG89C/U, Female BNC, **2nd END**

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195″ O.D., Nom. Cap. 28.5 pf/ft.

★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
1808-C-12	12″	6.95
1808-C-24	24″	6.95
1808-C-36	36″	6.95
1808-C-48	48″	6.95
1808-C-60	60″	6.95

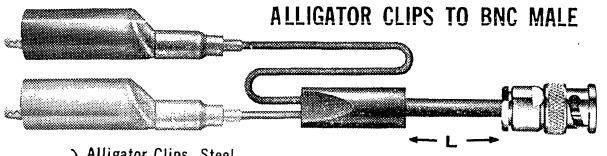
★ Various lengths may be aggregated for best quantity price.

OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

PATCH CORDS CONNECTING LEADS

ALLIGATOR CLIPS TO BNC MALE



CONN.: 1ST END } Alligator Clips, Steel, cad plated. Insulators, Vinyl: Black/Red.

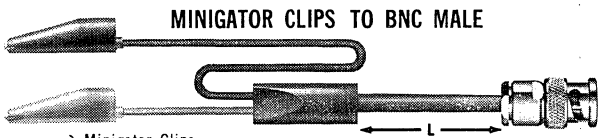
CABLE: Shielded Mic. or Shielded Coax, RG58C/U.

CONN.: 2ND END } UG88E/U, BNC, Male.

SHIELDED MIC. CABLE	SHIELDED COAX. CABLE	LENGTH	NET
AL-B-BNC-18	AL-C-BNC-18	18″	5.95
AL-B-BNC-24	AL-C-BNC-24	24″	5.95
AL-B-BNC-30	AL-C-BNC-30	30″	5.95
AL-B-BNC-36	AL-C-BNC-36	36″	5.95
AL-B-BNC-48	AL-C-BNC-48	48″	5.95
AL-B-BNC-60	AL-C-BNC-60	60″	5.95

★ QUANTITY DISC. CODE (B)

MINIGATOR CLIPS TO BNC MALE



CONN.: 1ST END } Minigator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

CABLE: Shielded Mic. or Shielded Coax, RG58C/U.

CONN.: 2ND END } UG88E/U, BNC, Male

SHIELDED MIC. CABLE	SHIELDED COAX. CABLE	LENGTH	NET
MG-B-BNC-18	MG-C-BNC-18	18″	5.95
MG-B-BNC-24	MG-C-BNC-24	24″	5.95
MG-B-BNC-30	MG-C-BNC-30	30″	5.95
MG-B-BNC-36	MG-C-BNC-36	36″	5.95
MG-B-BNC-48	MG-C-BNC-48	48″	5.95
MG-B-BNC 60	MG-C-BNC-60	60″	5.95

★ QUANTITY DISC. CODE (B)

ALLIGATOR CLIPS TO DOUBLE BANANA PLUG*

CONN.: 1ST END } Alligator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

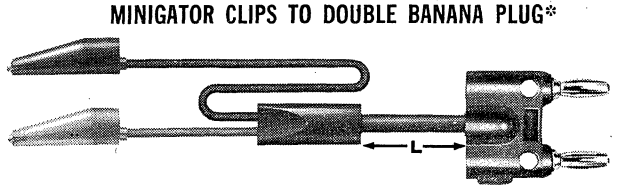
CABLE: Two Cond. Twisted Pair, Shielded Mic. or Shielded Coax, RG58C/U.

CONN.: 2ND END } Double Banana Plug, on ¾″ centers.

TWO COND. TWISTED PAIR	SHIELDED MIC. CABLE	SHIELDED COAX. CABLE	LENGTH	NET
2BA-AL-18	2BB-AL-18	2BC-AL-18	18″	5.95
2BA-AL-24	2BB-AL-24	2BC-AL-24	24″	5.95
2BA-AL-30	2BB-AL-30	2BC-AL-30	30″	5.95
2BA-AL-36	2BB-AL-36	2BC-AL-36	36″	5.95
2BA-AL-48	2BB-AL-48	2BC-AL-48	48″	5.95
2BA-AL-60	2BB-AL-60	2BC-AL-60	60″	5.95

★ QUANTITY DISC. CODE (B)

MINIGATOR CLIPS TO DOUBLE BANANA PLUG*



CONN.: 1ST END } Minigator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

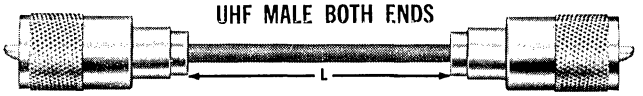
CABLE: Two Cond. Twisted pair, Shielded Mic. or Shielded Coax, RG58C/U.

CONN.: 2ND END } Double Banana Plug, on ¾″ centers.

TWO COND. TWISTED PAIR	SHIELDED MIC. CABLE	SHIELDED COAX. CABLE	LENGTH	NET
2BA-MG-18	2BB-MG-18	2BC-MG-18	18″	5.95
2BA-MG-24	2BB-MG-24	2BC-MG-24	24″	5.95
2BA-MG-30	2BB-MG-30	2BC-MG-30	30″	5.95
2BA-MG-36	2BB-MG-36	2BC-MG-36	36″	5.95
2BA-MG-48	2BB-MG-48	2BC-MG-48	48″	5.95
2BA-MG-60	2BB-MG-60	2BC-MG-60	60″	5.95

★ QUANTITY DISC. CODE (B)

UHF MALE BOTH ENDS



CONN.: 1ST END } PL259, UHF, Male

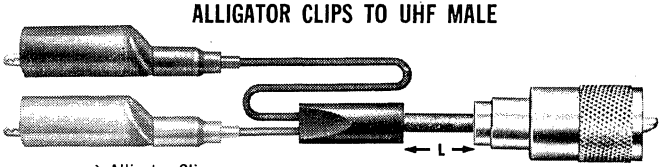
CABLE: Shielded coax., RG58C/U

CONN.: 2ND END } PL259, UHF, Male

SHIELDED COAX. CABLE	LENGTH	NET
UHF-C-18	18″	5.95
UHF-C-24	24″	5.95
UHF-C-30	30″	5.95
UHF-C-36	36″	5.95
UHF-C-48	48″	5.95
UHF-C-60	60″	5.95

★ QUANTITY DISC. CODE (B)

ALLIGATOR CLIPS TO UHF MALE



CONN.: 1ST END } Alligator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

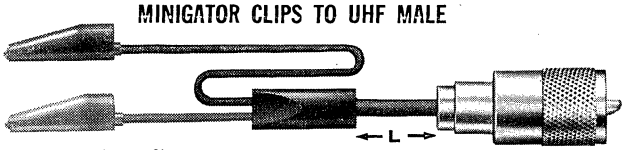
CABLE: Shielded coax., RG58C/U

CONN.: 2ND END } PL259, UHF, Male

SHIELDED COAX. CABLE	LENGTH	NET
AL-C-UHF-18	18″	5.95
AL-C-UHF-24	24″	5.95
AL-C-UHF-30	30″	5.95
AL-C-UHF-36	36″	5.95
AL-C-UHF-48	48″	5.95
AL-C-UHF-60	60″	5.95

★ QUANTITY DISC. CODE (B)

MINIGATOR CLIPS TO UHF MALE



CONN.: 1ST END } Minigator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

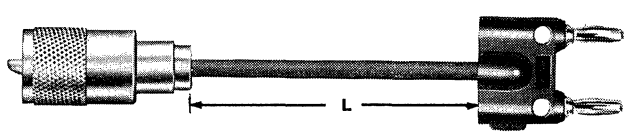
CABLE: Shielded Coax., RG58C/U

CONN.: 2ND END } PL259 UHF, Male

SHIELDED COAX. CABLE	LENGTH	NET
MG-C-UHF-18	18″	5.95
MG-C-UHF-24	24″	5.95
MG-C-UHF-30	30″	5.95
MG-C-UHF-36	36″	5.95
MG-C-UHF-48	48″	5.95
MG-C-UHF-60	60″	5.95

★ QUANTITY DISC. CODE (B)

UHF MALE TO DOUBLE BANANA PLUG*



CONN.: 1ST END } PL259 UHF, Male

CABLE: Shielded Coax., RG58C/U

CONN.: 2ND END } Double Banana Plug, on ¾″ centers.

SHIELDED COAX. CABLE	LENGTH	NET
2BC-UHF-18	18″	5.95
2BC-UHF-24	24″	5.95
2BC-UHF-30	30″	5.95
2BC-UHF-36	36″	5.95
2BC-UHF-48	48″	5.95
2BC-UHF-60	60″	5.95

★ QUANTITY DISC. CODE (B)

*NOTE: Molded double plug matches color of cable. Two cond. Twisted pair, GRAY. Shielded mic. cable, GRAY. Coaxial RG58C/U cable, BLACK.

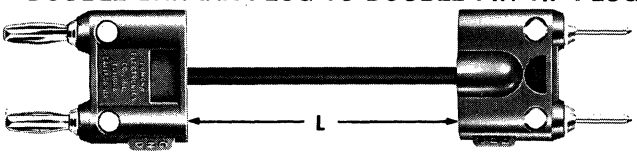
1. Other CABLE COLORS available to order on the Two Cond. Twisted Pair and Shielded Mic. cable models, with plug to match. COLORS: Black, Brown, Red, Crange, Yellow, Green, Blue, Violet, Gray, White.
2. Other lengths and cable types available to order.

★ Various lengths may be aggregated for best quantity price.

POMONA ELECTRONICS

PATCH CORDS CONNECTING LEADS

DOUBLE BANANA PLUG TO DOUBLE PIN TIP PLUG



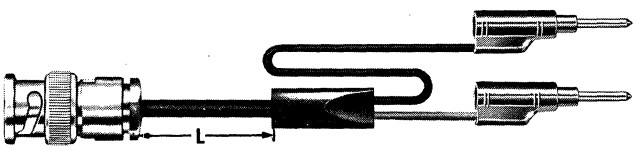
CONN: 1st END } Double Banana Plug, on ¾" Centers **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** } Double Pin Tip Plug, .080 Dia. on ¾" Centers

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
2288-C-18	18"
2288-C-24	24"
2288-C-36	36"
2288-C-48	48"
2288-C-60	60"

MODEL 2288 ★QUANTITY DISC. CODE (B) **NET 4.95**

BNC MALE TO STACK-UP PIN TIPS



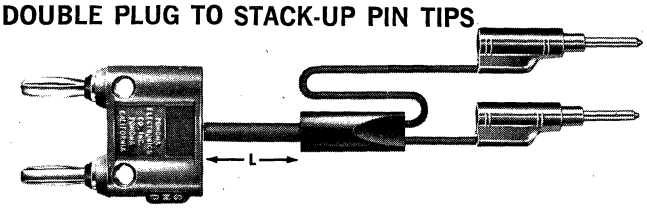
CONN: 1st END } UG88E/U Male BNC **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** } Single Stack-Up Pin Tip Plugs, .080 Dia.; Color: 1 Black, 1 Red.

CABLE DESCRIPTION:
Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
2882-C-18	18"
2882-C-24	24"
2882-C-36	36"
2882-C-48	48"
2882-C-60	60"

MODEL 2882 ★QUANTITY DISC. CODE (B) **NET 7.50**

DOUBLE PLUG TO STACK-UP PIN TIPS



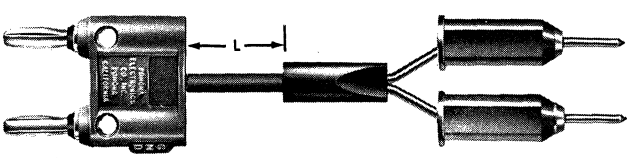
CONN: 1st END } Double Banana Plug, on ¾" Centers. **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** } Single Stack-Up Pin Tip Plugs, .080 Dia. Color: 1 Black, 1 Red.

CABLE DESCRIPTION
Shielded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
COLOR: Cable and Double Plug, Black.

MODEL	LENGTH	NET
2BC-PP-18	18"	7.50
2BC-PP-24	24"	7.50
2BC-PP-36	36"	7.50
2BC-PP-48	48"	7.50
2BC-PP-60	60"	7.50

★QUANTITY DISC. CODE (B)

DOUBLE PLUG TO SINGLE PIN TIPS

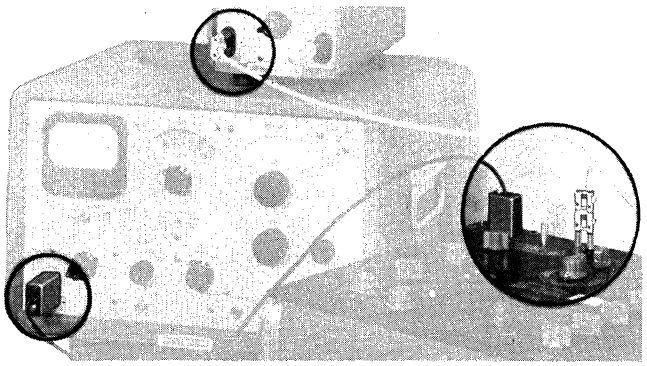


CONN: 1st END } Double Banana Plug, on ¾" Centers. **CABLE:** Two Cond. Twisted Pair **CONN: 2nd END** } Single Pin Tip Plugs, .080 Dia. Color: 1 Black, 1 Red

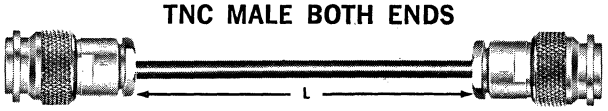
CABLE DESCRIPTION
Two Cond. Twisted pair. 18 AWG, Strand. 65 x 36 T.C. Vinyl insulation, vinyl jacket, .250" O.D. Nom. Cap. 30 pf/ft.
COLOR: Cable and Double plug, Gray.

MODEL	LENGTH	NET
2184-A-24	24"	5.95
2184-A-36	36"	5.95
2184-A-48	48"	5.95
2184-A-60	60"	5.95

★OUANTITY DISC. CODE (B)



TNC MALE BOTH ENDS

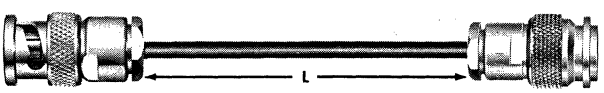


CONN: 1st END } Male TNC **CABLE:** Shielded coax., RG58C/U **CONN: 2nd END** } Male TNC

CABLE DESCRIPTION
Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
1944-C-12	12"	7.95
1944-C-24	24"	7.95
1944-C-36	36"	7.95
1944-C-48	48"	7.95
1944-C-60	60"	7.95

BNC MALE TO TNC MALE

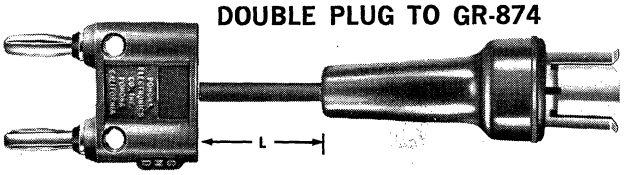


CONN: 1st END } UG88E/U Male BNC **CABLE:** Shielded coax., RG58C/U **CONN: 2nd END** } Male TNC

CABLE DESCRIPTION:
Shielded Coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
★QUANTITY DISC. CODE (B)

MODEL	LENGTH	NET
1948-C-12	12"	6.95
1948-C-24	24"	6.95
1948-C-36	36"	6.95
1948-C-48	48"	6.95
1948-C-60	60"	6.95

DOUBLE PLUG TO GR-874



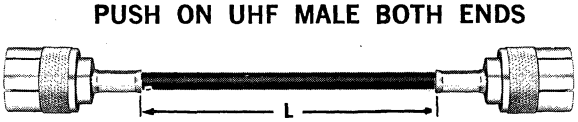
CONN: 1st END } Double Banana Plug, on ¾" Centers. **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** } GR-874

CABLE DESCRIPTION
Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.
COLOR: Cable and double plug, Black.

MODEL	LENGTH	NET
2243-C-24	24"	12.85
2243-C-36	36"	12.85
2243-C-48	48"	12.85

★QUANTITY DISC. CODE (B)

PUSH ON UHF MALE BOTH ENDS



CONN: 1st END } Crimp Push on UHF, Male. **CABLE:** Shielded Coax., RG58C/U **CONN: 2nd END** } Crimp Push on UHF, Male.

A test cable for rapid interconnection of equipment. Connector is pushed on and requires no screwing on of shell. Continuity of shield is maintained. Excellent for those hard to get at places.

MODEL	LENGTH
3137-C-12	12"
3137-C-24	24"
3137-C-36	36"
3137-C-48	48"
3137-C-60	60"

MODEL 3137 ★QUANTITY DISC. CODE (B) **NET 5.95**

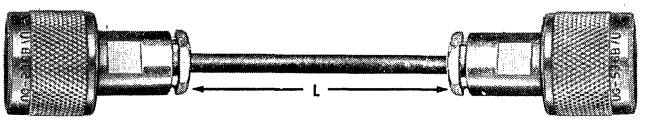
★ Various lengths may be aggregated for best quantity price.

OTHER LENGTHS AVAILABLE TO ORDER

POMONA ELECTRONICS

PATCH CORDS CONNECTING LEADS

SERIES "N" MALE BOTH ENDS



CONN: 1st END } UG536B/U "N" Male — **CABLE:** Shielded Coax., RG58C/U. — **CONN:** 2nd END } UG536B/U "N" Male

CABLE DESCRIPTION: Sheilded coax., RG58C/U, Polyethylene insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
2256-C-24	24"
2256-C-36	36"
2256-C-48	48"
2256-C-60	60"

MODEL 2256 ★ QUANTITY DISC. CODE (B) **NET 7.95**

SERIES "N" MALE BOTH ENDS

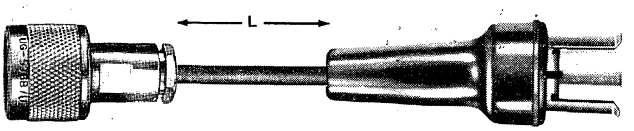
CONN: 1st END } UG21E/U "N" Male — **CABLE:** Coax., RG213/U or RG214/U — **CONN:** 2nd END } UG21E/U "N" Male

CABLE TYPES

RG213/U	NET	LENGTH	RG214/U	NET
1658-S-18	10.85	18"	1658-T-18	12.85
1658-S-24	10.85	24"	1658-T-24	12.85
1658-S-36	10.85	36"	1658-T-36	12.85
1658-S-48	11.35	48"	1658-T-48	13.60
1658-S-60	11.85	60"	1658-T-60	14.35

MODEL 1658 ★ QUANTITY DISC. CODE (B)

SERIES "N" MALE TO GR-874



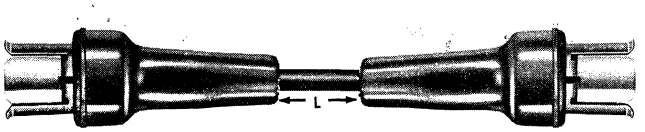
CONN: 1st END } UG536B/U "N" Male — **CABLE:** Shielded Coax., RG58C/U — **CONN:** 2nd END } GR-874

CABLE DESCRIPTION: Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
2438-C-24	24"
2438-C-36	36"
2438-C-48	48"
2438-C-60	60"

MODEL 2438 ★ QUANTITY DISC. CODE (B) **NET 13.85**

GR-874 TO GR-874



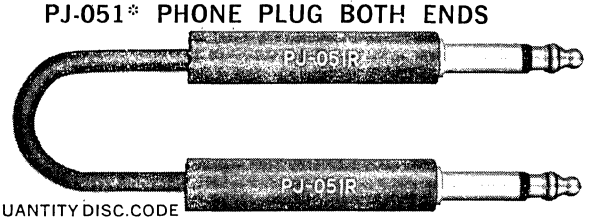
CONN: 1st END } GR-874 — **CABLE:** Shielded coax., RG58C/U — **CONN:** 2nd END } GR-874

CABLE DESCRIPTION: Shielded coax., RG58C/U, Polyethylene Insulation. Vinyl jacket, .195" O.D., Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
2316-C-24	24"
2316-C-36	36"
2316-C-48	48"
2316-C-60	60"

MODEL 2316 ★ QUANTITY DISC. CODE (B) **NET 22.95**

PJ-051* PHONE PLUG BOTH ENDS



★ (B) QUANTITY DISC.CODE

CONN.: 1ST END } PJ-051* — **CABLE: TWO COND. TWISTED PAIR** — **CONN.:** 2ND END } PJ-051*

*PJ-051 Interchangeable with WE310.

Patch Cord is wired tip to tip, and ring to ring. No sleeve connection.

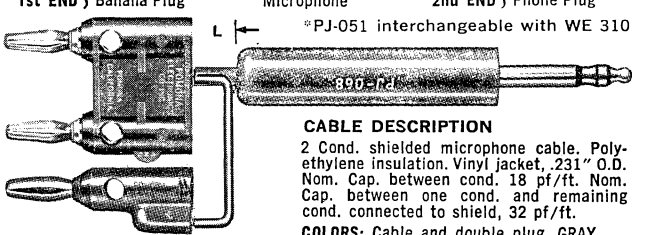
CABLE DESCRIPTION
Two Cond. Twisted pair, 18 AWG, Strand. 65 x 36 T.C. Vinyl Insulation, Vinyl jacket .250" O.D., Nom. Cap. 30 pf/ft.
COLOR: Cable, Gray. Phone Plug Handle, Red.

MODEL	LENGTH	NET
2524-A-18	18"	7.95
2524-A-24	24"	7.95
2524-A-36	36"	7.95
2524-A-48	48"	7.95
2524-A-60	60"	7.95

DOUBLE PLUG BALANCED LINE TO PJ-068 OR PJ-051*

CONN: 1st END } Double and Single Banana Plug — **CABLE:** 2 Cond. Shielded Microphone — **CONN:** 2nd END } PJ-068 or PJ-051 Phone Plug

*PJ-051 interchangeable with WE 310

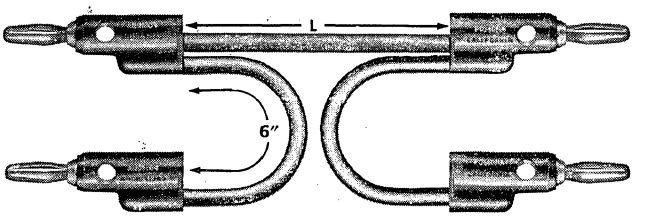


CABLE DESCRIPTION
2 Cond. shielded microphone cable. Polyethylene insulation. Vinyl jacket, .231" O.D. Nom. Cap. between cond. 18 pf/ft. Nom. Cap. between one cond. and remaining cond. connected to shield, 32 pf/ft.
COLORS: Cable and double plug, GRAY. Single ground plug, GREEN.

MODEL	LENGTH	NET
2174-36	36"	10.85 (PJ-068)
2977-J-36	36"	10.85 (PJ-051)

★ QUANTITY DISC. CODE (B)

SINGLE BANANA PLUGS BOTH ENDS



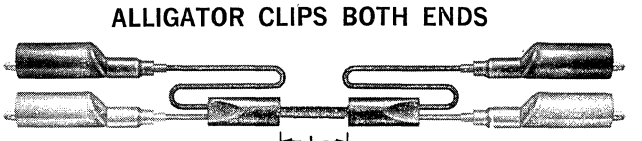
CONN: 1st END } Single Banana Plugs Colors: Inner Conductor plug, Red. Ground Plug, Black. — **CABLE:** Shielded Coax., RG122/U — **CONN:** 2nd END } Single Banana Plugs. Colors: Inner Conductor Plug, Red. Ground Plug, Black.

CABLE DESCRIPTION: Shielded coax., RG122/U polyethylene insulation. Vinyl jacket, .160" O.D., Nom. Cap. 29.5 pt/ft.

MODEL	LENGTH
2239-R-24	24"
2239-R-36	36"
2239-R-48	48"
2239-R-60	60"

MODEL 2239 ★ QUANTITY DISC. CODE (B) **NET 5.95**

ALLIGATOR CLIPS BOTH ENDS



CONN: 1st END } Alligator Clips, Steel, cad plated Insulators, Vinyl: Black/Red. — **CABLE:** Shielded Coax., RG58C/U — **CONN:** 2nd END } Alligator Clips, Steel, cad plated Insulators, Vinyl: Black/Red.

CABLE DESCRIPTION: Shielded coax., RG58C/U, Polyethylene Insulation Vinyl jacket, .195" O.D. Nom. Cap. 28.5 pf/ft.

MODEL	LENGTH
1152-C-12	12"
1152-C-24	24"
1152-C-36	36"
1152-C-48	48"
1152-C-60	60"

MODEL 1152 ★ QUANTITY DISC. CODE (B) **NET 6.95**

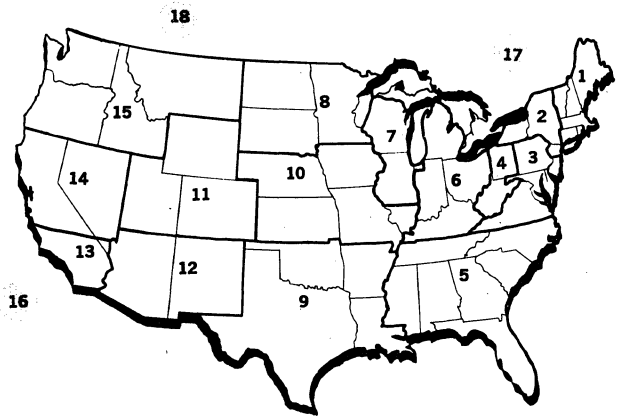
*NOTE: Molded double plug matches color of cable. Two cond. Twisted pair, GRAY. Shielded mic. cable, GRAY. Coaxial RG58C/U cable, BLACK.

1. Other CABLE COLORS available to order on the Two Cond. Twisted Pair and Shielded Mic. cable models, with plug to match. COLORS: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.
2. Other lengths and cable types available to order.

★Various lengths may be aggregated for best quantity price.

SALES REPRESENTATIVES

Listed below are the names of our Factory Representatives who have contributed greatly to the growth of our organization. The men in your area are always ready to confer with you and assist you regarding Pomona Electronics products.



1 Robert S. Reiss Associates
70 Jessie Drive
West Haven, Connecticut 06516
(203) 933-8542
Territory: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island

Robert S. Reiss Associates
(Branch Office)
Al Appell
199 E. Foxboro Street
Sharon, Massachusetts 02067
(617) 784-3439
Territory: Maine, New Hampshire, E. Massachusetts, Rhode Island

2 Jack Weber Assoc., Inc.—Dist. Sales
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Bronx, New York 10463
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Territory: New York State and Northern New Jersey

Jack Weber Assoc., Inc.—Govt. OEM Sales
(Branch Office)
Tobias & Co., Inc.
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Woodside, New York 11377
(212) 726-4551

3 David S. Linz
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Philadelphia, Pennsylvania 19111
(215) 379-0734
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4 Perry Lohse & Company
13932 Fox Hollow Road
Novelty, Ohio 44072
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Territory: W. Virginia and W. Pennsylvania

5 V. Avis McCorvey Company
2187 Briarcliff Road NE
Atlanta, Georgia 30329
(404) 636-2502
Territory: Alabama, Florida, Georgia, N. Carolina, S. Carolina, Tennessee, Mississippi

V. Avis McCorvey Company
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Greenville, South Carolina 29606
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V. Avis McCorvey Company
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(305) 949-9143 (305) 949-5175

V. Avis McCorvey Company
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L. Haas Co., Inc.
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6 Perry Lohse & Company
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Perry Lohse & Company
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(612) 866-3468
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P. O. Box 20544 (Zip Code 75220)
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Territory: Texas, Arkansas, Louisiana, Oklahoma

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Territory: Kansas, W. Iowa, W. Missouri

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Territory: Ontario (West of and excluding Belleville), Manitoba, Saskatchewan

Electronetic Systems
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Ben L. Reitelman
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Montreal 252, Quebec, Canada
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Territory: Quebec, Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland

Electronetic Systems
(Branch Office)
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Ottawa 8, Ontario, Canada
(613) 733-3781
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18 Al Deskin Sales Corporation
1641 Venables Street
Vancouver 6, B.C., Canada
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Territory: British Columbia. Alberta

POMONA ELECTRONICS CO. INC.
1500 E. Ninth St. • Pomona, Calif. 91766 • Phone: (714) 623-3463 • TWX: 910-581-3822

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41 ELM STREET, STONEHAM, MASSACHUSETTS 02180 Tel. (617) 438-3650

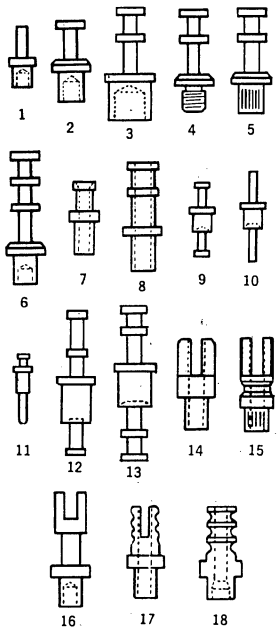
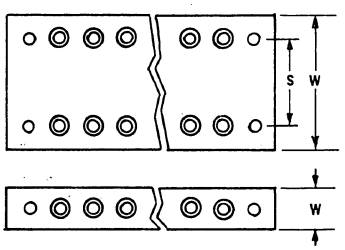


Fig. No.	Part No.	Shank (Thread)	Turret	Shoulder	Above	Below	Thickness	Notes	1-999	1M-4999	5M & Up
1	1P4-26	.090	—	.125	.173	—	1/32-1/8	Pin Dia. .040	$12.50	$10.00	$ 9.50
2	1S2-25	.047	.040	.062	.093	—	1/64-1/8		9.15	8.10	7.00
2	1S4-19	.090	.070	.125	.181	—	1/32-1/8		9.30	7.90	6.70
2	1S6-17	.112	.145	.187	.234	—	1/32-3/16		12.50	11.00	10.10
3	1D3-8	.061	.062	.093	.156	—	1/64-1/8		11.50	9.90	8.10
3	1D3-11	.072	.050	.093	.186	—	1/64-1/8	C-Sink 45° x .020 in Shank	9.90	8.10	7.50
3	1D4-6	.090	.093	.125	.237	—	1/32-1/8		9.00	7.70	7.00
3	1D5-5	.090	.109	.156	.281	—	1/32-1/8		13.20	11.00	10.10
3	1D6-1	.112	.145	.187	.360	—	1/32-1/4		12.50	11.00	10.10
4	1D6-15	4-40	.145	.187	.360	—	1/8 & 3/16	4-40 Thd.	17.05	16.50	15.40
4	1D6-16	4-40	.145	.187 Hex	.360	—	1/8 & 3/16	4-40 Thd.	17.05	16.50	15.40
5	1KD3-9	.061	.062	.093	.156	—	1/64-1/8	Knurled Shank	14.50	12.10	11.10
5	1KD6-2	.112	.145	.187	.360	—	1/32-3/16	Knurled Shank	15.95	14.15	12.40
6	1T4-13	.090	.093	.125	.316	—	1/32-1/8		11.00	9.90	9.10
6	1T6-12	.112	.145	.187	.484	—	1/32-3/16		19.50	18.20	17.40
7	2S4-38	.061	.093	.125	.156	—	1/64-1/8	.043 Dia. Thru Hole	11.00	10.45	8.80
7	2S4-39	.071	.096	.125	.187	—	1/64-1/8	.043 Dia. Thru Hole	11.00	10.45	8.80
7	2S6-35 (.067)	.110	.141	.187	.187	—	1/32-3/16	.067 Thru Hole	14.00	12.50	10.40
8	2D5-33	.078	.109	.156	.328	—	1/32-1/8	.043 Dia. Thru Hole	22.00	19.75	16.40
8	2D6-29	.112	.145	.187	.328	—	1/32-1/4	.078 Dia. Thru Hole	12.00	10.50	9.90
9	3SS3-67	.078	.050	.093	.104	.082	1/64-1/8		8.50	7.35	7.00
9	3SS4-65	.090	.062	.125	.133	.113	1/32-1/8		11.00	9.40	9.00
9	3SS5-63	.116	.070	.156	.156	.125	1/32-1/8		11.00	9.40	9.00
10	3PP4-66	.090	—	.125	.177	.156	1/32-1/8	Pin Dia. .040	18.50	15.90	14.75
11	3SP2-60	.062	.045	.078	.078	.140	1/64-1/8		12.50	11.20	9.35
11	3SP3-59	.072	.050	.093	.078	.250	1/64-1/8		12.50	11.20	9.35
12	3DS3-58	.072	.050	.093	.186	.082	1/64-1/8		9.75	8.50	7.90
12	3DS4-57	.090	.062	.125	.219	.103	1/32-1/8		12.10	10.35	9.90
12	3DS8-54	.202	.144	.250	.344	.109	1/32-3/16		25.30	22.00	20.05
13	3DD3-49	.072	.050	.093	.186	.164	1/64-1/8		10.25	8.80	8.40
13	3DD4-48	.090	.062	.125	.219	.187	1/32-1/8		12.75	10.90	10.40
13	3DD6-45	.156	.093	.187	.250	.218	1/32-3/16		28.00	25.00	21.00
13	3DD8-43	202	.144	.250	.357	.312	1/32-1/4		28.00	26.00	24.75
14	4S3-78	.061	—	.093	.156	—	1/64-1/8	Thru Hole .043	11.00	9.40	9.00
14	4S5-77	.112	—	.156			1/32-3/16	Thru Hole .078 Dia.	15.90	14.40	13.75
14	4S6-74	.112	—	.187	.345	—	1/32-3/16	Thru Hole .078 Dia.	19.95	17.60	15.70
15	4S5-76	.125	—	.156	.344	—	1/32-3/16	Thru Hole .070	19.00	17.00	16.10
16	5S4-86	.090	.090	.125	.219	—	1/32-1/8	Slot .032 Wide	17.60	15.95	14.30
16	5S6-82	.112	.145	.187	.390	—	1/32-3/16	Slot .063 Wide	17.60	15.95	14.30
17	52S6-83	.113	.140	.187	.328	—	1/32-3/16	Thru Hole .070 Dia. Slot .046 Wide	22.50	18.00	15.90
18	52S6-84	.112	.130	.187	.315	—	1/32-3/16	Thru Hole .060 Dia.	21.00	19.50	17.10

SEE ORDERING CHART BELOW.

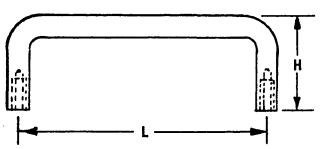
TERMINAL BOARDS



Part No.	W	S	Material	NEMA	1-49	50-249	250-500
2600A *	5/16	—	Phenolic (PBE)	(XXX)	$ .83 ea.	$ .72 ea.	$ .66 ea.
2600B *	3/4	1/2	Phenolic (PBE)	(XXX)	1.80	1.60	1.49
2600C *	1	3/4	Phenolic (PBE)	(XXX)	1.87	1.65	1.54
2601	1/2	—	Paper Phenolic	(XXX)	.83	.72	.66
2602	2	1 1/2	Paper Phenolic	(XXX)	1.80	1.60	1.49
2603	2 1/2	2	Paper Phenolic	(XXX)	1.87	1.65	1.54
2604	3	2 1/2	Paper Phenolic	(XXX)	1.98	1.71	1.60
2611	1/2	—	Linen Phenolic	(LE)	.88	.77	.72
2612	2	1 1/2	Linen Phenolic	(LE)	1.92	1.71	1.60
2613	2 1/2	2	Linen Phenolic	(LE)	2.04	1.76	1.65
2614	3	2 1/2	Linen Phenolic	(LE)	2.09	1.80	1.71
2621	1/2	—	Glass Epoxy	(GEE)	.99	.88	.83
2622	2	1 1/2	Glass Epoxy	(GEE)	2.26	2.04	1.93
2623	2 1/2	2	Glass Epoxy	(GEE)	2.42	2.20	2.08
2624	3	2 1/2	Glass Epoxy	(GEE)	2.53	2.31	2.20

* Board Thickness 1/16" - Terminal is No. 2S4-38B. Board Thickness is 3/32 Terminal is No. 1D6-1C

HANDLES & FERRULES



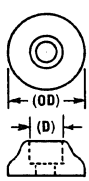
Part No.	Fig.	L (D)	H (OD)	Material	Finish	1-49	50-249	250-500
2101	1A	3	1 5/16	Brass	Nickel Plate	$ .95 ea.	$ .80 ea.	$ .69 ea.
2102	1A	4 1/2	1 1/2	Brass	Nickel Plate	1.00	.85	.74
2103	1A	6 1/2	1 3/4	Brass	Nickel Plate	1.15	.95	.84
2105	1B	(.320)	(3/4)	Brass	Nickel Plate	.13	.12	.11
2107	1B	(.320)	(.562)	Brass	Nickel Plate	.12	.11	.10
2121	1A	3	1 5/16	Stainless Steel		.95	.80	.70
2122	1A	4 1/2	1 1/2	Stainless Steel		1.00	.85	.75
2123	1A	6 1/2	1 3/4	Stainless Steel		1.10	.90	.80
2126	1B	(.320)	(3/4)	Stainless Steel		.16	.15	.14
2127	1B	(.320)	(.562)	Stainless Steel		.13	.12	.11
2130	1A	4	1 7/8	Aluminum	Black Anodize	1.15	.94	.82
2130F	1B	(3/8)	(3/4)	Aluminum	Black Anodize	.13	.12	.11
2141	1A	3	1 5/16	Brass	Nickel Plate	.95	.80	.69
2142	1A	4 5/16	1 1/2	Brass	Nickel Plate	1.00	.85	.74
2143	1A	6 5/16	1 3/4	Brass	Nickel Plate	1.15	.95	.84
2160	1A	4 1/4	2 1/8	Brass	Nickel Plate	1.20	1.00	.95
2171	1A	3	1 9/32	Brass	Nickel Plate	1.70	1.25	1.18
2172	1A	4 5/16	1 1/2	Brass	Nickel Plate	1.90	1.45	1.35
2173	1A	6 5/16	1 3/4	Brass	Nickel Plate	2.15	1.60	1.50
2174	1A	9	1 3/4	Brass	Nickel Plate	2.40	1.75	1.65
2181	1A	3	1 9/32	Aluminum	Black Anodize	1.25	.95	.85
2182	1A	4 5/16	1 1/2	Aluminum	Black Anodize	1.35	1.00	.90
2183	1A	6 5/16	1 3/4	Aluminum	Black Anodize	1.45	1.05	.95
2184	1A	9	1 3/4	Aluminum	Black Anodize	1.60	1.15	1.05

SEE ORDERING CHART AT LEFT.

ORDERING CHART

Add Suffix to Indicate Board Thickness

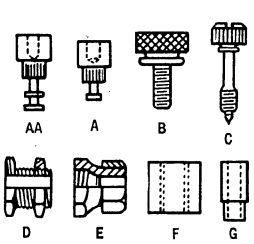
Suffix	Bd. Thickness
AA	1/64
A	1/32
B	1/16
C	3/32
D	1/8
E	5/32
F	3/16
G	1/4



All Terminals Brass, Silver Plated.
Specify other finishes when ordering.

Part No.	Fig.	Diameter in Inches: Shank (Thread)	Diameter in Inches: Turret	Shoulder	Height (In.): Above	Height (In.): Below	Board Thickness	Notes	1-49	50-249	250-500
1700	AA	.202	.141	.312	.250	.312	1/32 - 3/16		$.09	$.07	$.06
1710	A	.220	.125	.312	.250	.170	1/32 - 3/16		.09	.07	.06

HARDWARE



		Length	Thds./in.	Dia.	Material	Finish				
2000	B	23/32	6-32	7/16 on 1/2 dia. head	Brass	Nickel Plate		.18	.15	.13
			8-32	3/8 on 7/16 dia. head	Brass	Nickel Plate				
			10-32	5/16 on 3/8 dia. head	Brass	Nickel Plate				
2010	C	15/16	6-32	3/8	Half hard Brass	Nickel Plate		.22	.19	.16
14	D	5/16	3/8 -32 nef 2	1/2 hex	Brass	Bright Alloy	7/16, & 1 1/32	.20	.17	.15
77	E	1/16	1/4 -32	3/8 hex	Brass	Bright Alloy		.20	.18	.16
77A	E	3/8	3/8 -32	3/8 hex	Brass	Bright Alloy		.22	.20	.18
79	E	7/16	1/4 -32 nef 2	3/8 hex	Brass	Bright Alloy		.20	.18	.16
79A	E	17/32	1/4 -32 nef 2	3/8 hex	Brass	Bright Alloy		.22	.20	.18
2301	F	1/4	4-40	3/16	Brass	Cadmium or Nickel Plate		.07	.06	.05
2302-6	F	1/4 - 3/4	6-32	1/4	Brass	Cadmium or Nickel Plate	1/8" Incr.	.10	.08	.06
2307-10	F	5/8 - 1 1/4	8-32	5/16	Brass	Cadmium or Nickel Plate	Specified	.12	.10	.08
2500	G	1/8 - 1/2	6-32 top	1/4	Brass	Cadmium Plate	1/32 - 3/16	.10	.08	.06
2510	G	1/8 - 1/2	6-32 top	1/4	Brass	Cadmium Plate	1/32 - 3/16	.10	.08	.06
2520	G	1/8 - 12	2-56 top	.156	Brass	Cadmium Plate	1/32 - 1/8	.10	.08	.06

PROGRAM DATA COMPANY

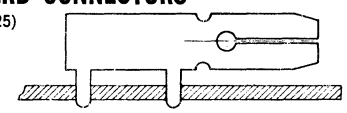
INTERCONNECTION DEVICES Manual & *Air Operated

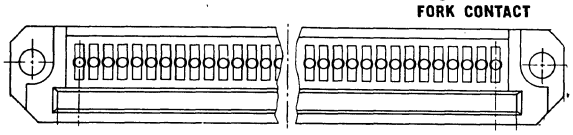
*Patented

PC BOARD CONNECTORS

(Contact Spacing .050 or .025)

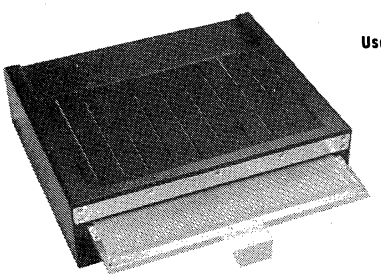
- **PC board to round wire**
- **PC board to flat cable interconnections**





Socket Contact: Crimp or Solder type
Pin Contact: Crimp insertable (.050 centers)
Solder type (.025 centers)

CARD READER (Manual or Air Operated)



Uses: — Testing
— Programming
— Data Processing
— Instrumentation
— Automated Machine Control

Manual model or Air Operated push button models are available. Prewired models include 12 x 80 matrix; 12 x 80 matrix with diode isolation; and 960 individual inputs and outputs. All contacts gold plated with adjusted wiping action.

PROBE CONTACTS & SOCKETS

Probe Contacts provide reliable access to printed circuit boards, wire wrap panels, and other circuitry having a multitude of contact points on uneven levels.

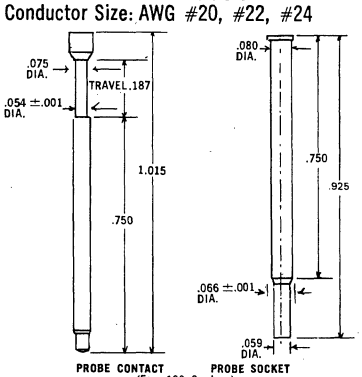
SPECIFICATIONS:

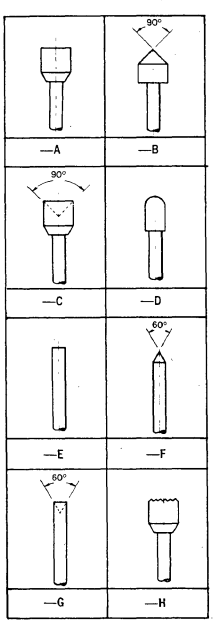
Electrical:

Current Rating: 3 amps. continuous
Contact Resistance: 10 milliohms or less

Mechanical:

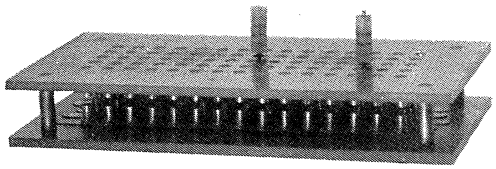
Travel: 3/16 in.
Contact Pressure: Initial: 1.4 oz.
Final: 4 oz.
Conductor Size: AWG #20, #22, #24





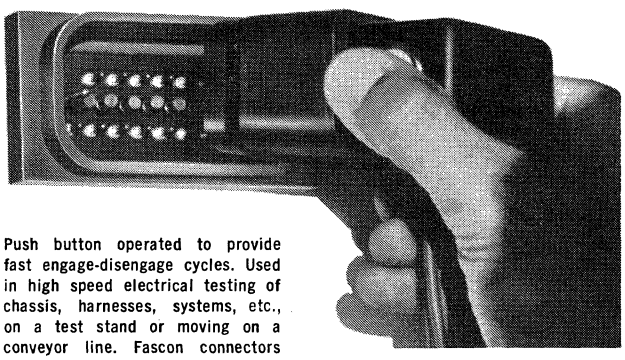
* Other sizes ranging from .050 centers to .187 centers are available.

MATRIX PIN BOARDS



Designed for applications requiring high reliability. Used for matrix interconnection, programming or as multi input output switches. Available with .100 centers and up. Larger models also available with diode pins.

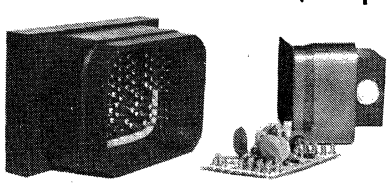
FASCON TEST CONNECTORS (Air Operated)



Push button operated to provide fast engage-disengage cycles. Used in high speed electrical testing of chassis, harnesses, systems, etc., on a test stand or moving on a conveyor line. Fascon connectors are available with any combination of replaceable pin and socket and coaxial contacts.

Push button switch pressed with the thumb turns on vacuum. Connector engages automatically.

PC BOARD TEST FIXTURES (Air Operated)



Each custom built to test a specific PC board, Test Fixtures are furnished in different sizes and shapes utilizing Program Data's exclusive probe contacts and sockets.

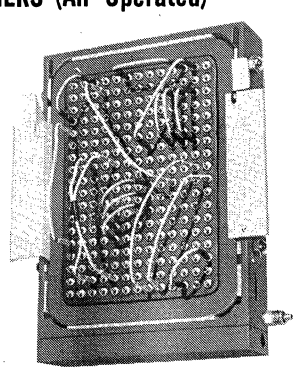
PATCHCORD PROGRAMMERS (Air Operated)

Push button operated Patchcord Programming Systems make use of pneumatic power to make and break interconnections.

Remote controlled models are also available for multi contact switching applications.

Furnished with DC or coaxial contacts, all contacts Mil spec. Gold plated.

Sizes vary from 230 to 5120 contacts. Required air pressure is +10 psig and −10 psig tapped from line pressure or air compressor 5 in. dia. by 6 in. long supplied by Program Data can operate one or more systems.

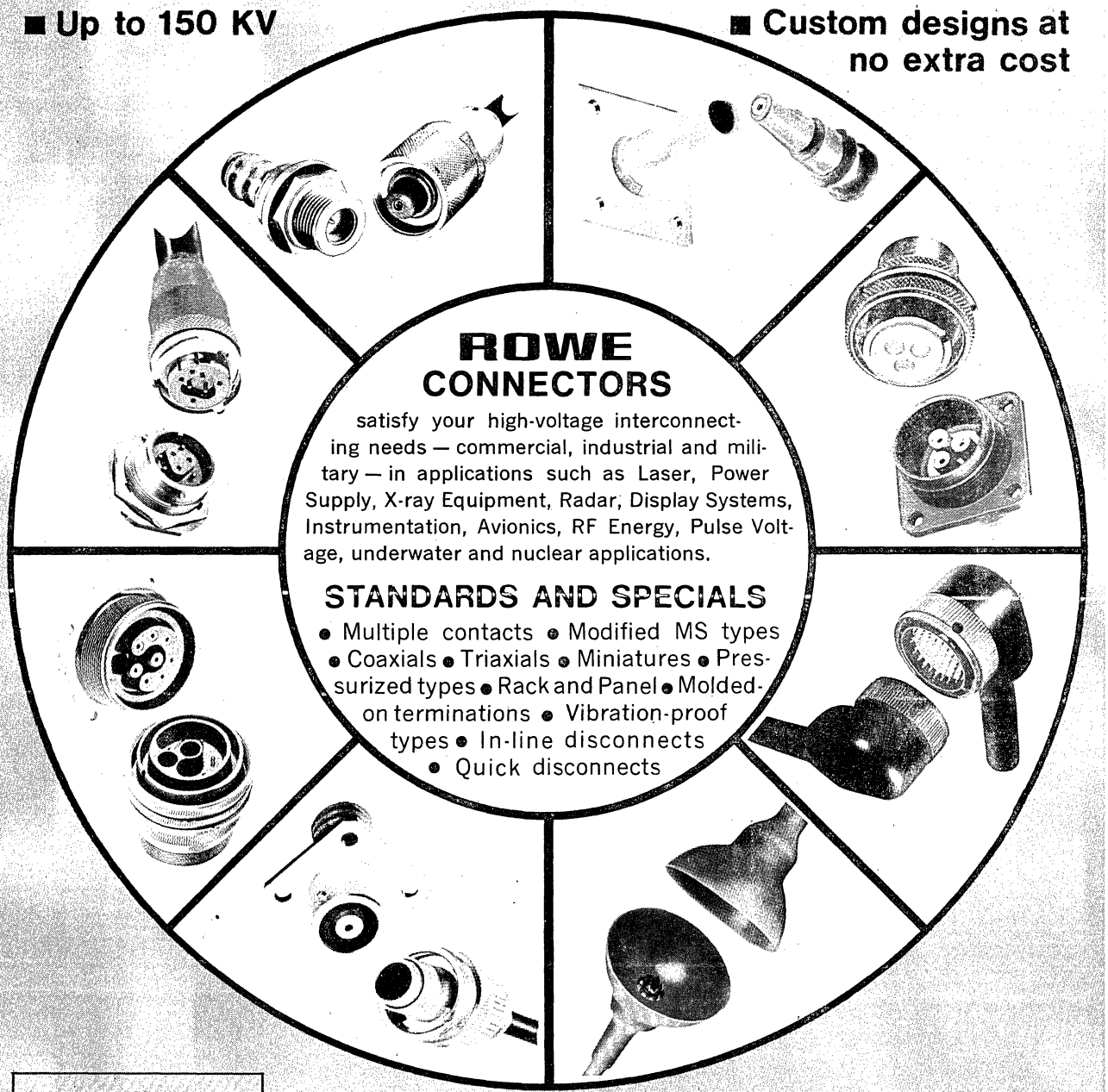


For further information and data please contact
PROGRAM DATA COMPANY
739 EAST 223rd STREET, TORRANCE, CALIFORNIA 90502

HIGH VOLTAGE CORONA-FREE CONNECTORS and CABLE ASSEMBLIES

■ **Up to 150 KV**

■ **Custom designs at no extra cost**

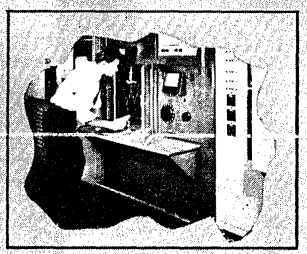


ROWE CONNECTORS

satisfy your high-voltage interconnecting needs — commercial, industrial and military — in applications such as Laser, Power Supply, X-ray Equipment, Radar, Display Systems, Instrumentation, Avionics, RF Energy, Pulse Voltage, underwater and nuclear applications.

STANDARDS AND SPECIALS

• Multiple contacts • Modified MS types • Coaxials • Triaxials • Miniatures • Pressurized types • Rack and Panel • Molded-on terminations • Vibration-proof types • In-line disconnects • Quick disconnects



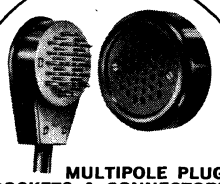
SPECIALIZED TEST FACILITIES

To insure that connectors and cable assemblies meet rigid specifications — dielectric strength, corona inception and extinction, altitude, leakage, temperature, humidity, shock, vibration, and hydrostatic pressure testing.

FOREMOST IN HIGH VOLTAGE CONNECTORS

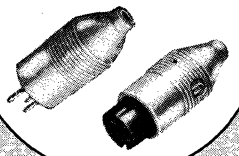
ROWE INDUSTRIES INCORPORATED

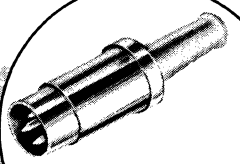
6100 BENORE ROAD, TOLEDO, OHIO 43612
PHONE (419) 729-9761, TWX 810-442-1734,
TELEX 286014 or contact rep in your area.
(Listed under "Sales Offices")



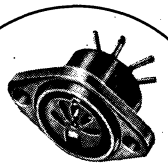
MULTIPOLE PLUGS SOCKETS & CONNECTORS UP TO 36 POLES

MULTIPOLE CONNECTORS UNSHIELDED





MULTIPOLE CONNECTORS DOUBLE-SHIELDED SHIELDED, UNSHIELDED



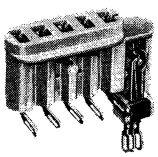
MINIATURE SOCKETS SHIELDED AND UNSHIELDED

TEST PRODS THIRD HAND PROBES

PHONO PLUGS, SOCKETS AND ADAPTERS

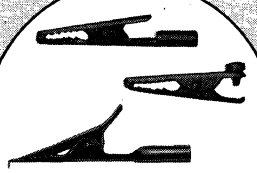
BANANA PLUGS & JACKS
More than a hundred configurations. Bunch pin, transverse slot, leaf spring, rigid handles, unbreakable handles, quick-acting, with or without strain-relief. Available in over 20 colors.

BANANA PLUGS & JACKS



I.E.C. CONNECTORS

MULTI-WAY BINDING POSTS AND TERMINALS

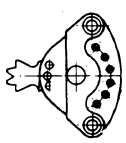


ALLIGATOR CLIPS STAINLESS OR PLATED

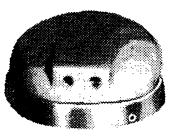
ULTRA-MINIATURE AND MICRO-MESH ALLIGATOR CLIPS

ALLIGATOR CLIPS INSULATED, QUICK-ACTING

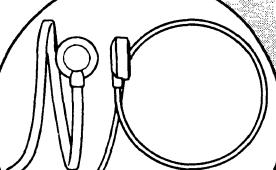
UNDER THE CHIN HEADSETS



MINIATURE SWITCHES
Ball bearing detent.

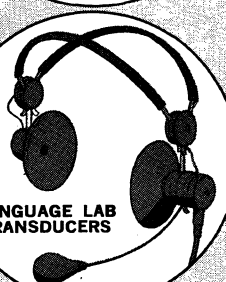


HIGH PERFORMANCE MINIATURE EARPHONES



THROAT AND HEARTBEAT MICROPHONES

rye INDUSTRIES

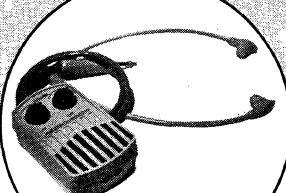


LANGUAGE LAB TRANSDUCERS

COMMUNICATION MICROPHONES

PROFESSIONAL MICROPHONES

Request:
☐ Plug, socket connector, test prod catalog. ☐ General catalog, including miniature switches. ☐ Professional and consumer microphones, headsets, transformers.



ACOUSTIC CONTROL BOX

Sound control boxes. Complete with volume control and driver units. With acoustical headset. As engineered and manufactured for a major American airline.

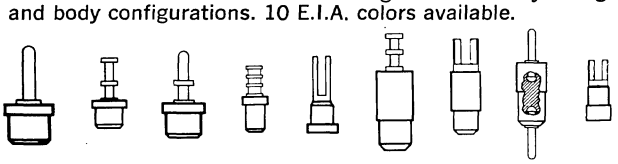
SEALECTRO CIRCUIT HARDWARE

PRESS-FIT® TEFLON* INSULATED TERMINALS

Simply punch or drill the correct hole in a chassis or panel and insert the "Press-Fit" terminal... it's in for good and with all of the outstanding insulating properties of Teflon. "Press-Fit" terminals are available in the most complete across-the-board selection of types in the industry—from micro-miniature units designed, developed and available only from Sealectro to heavy duty types especially designed for high current capacities.

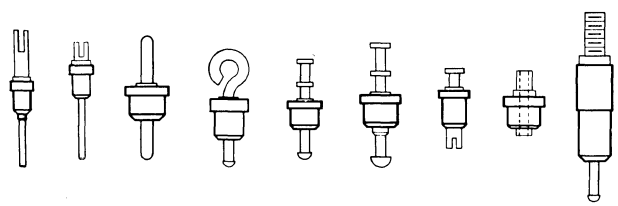
STAND-OFFS

Extremely wide selection of bushings, lugs, platings and finishes in micro-miniature, sub-miniature, and miniature sizes. One piece assembly—no additional hardware involved. From .073" to .215" diameter bushings with a variety of lug and body configurations. 10 E.I.A. colors available.



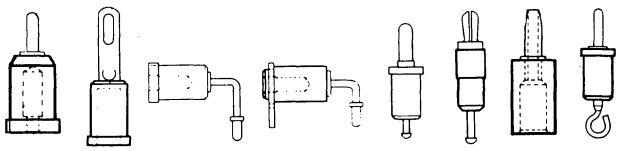
FEED-THRUS

Machined from virgin Teflon to extremely close tolerances for fast, easy and sure installation. Bushing diameters from .075" to .218" in over 350 micro-miniature, sub-miniature, miniature, and tubular units. Available in 10 standard E.I.A. colors and dozens of terminal styles.



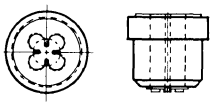
JACKS AND PROBES

Ideal for test points, instrument probes, jumper plugs and multiple connectors while many units are designed for printed circuit applications. Body and mating jack and probe configurations are available to fill virtually every requirement. Offered in 10 standard E.I.A. colors for ease of circuit coding.



CLOVERLEAF RECEPTACLES

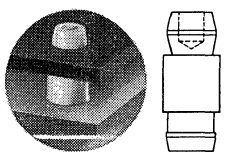
Designed to allow dip-soldering of metal chassis. Unique design for three, four or more thru-leads provides multi-wire connections with each wire in a perfect capillary flow configuration for positive, uniform solder connections. "Press-Fit" chassis installation.



U.S. Pat. No. 3,193,617

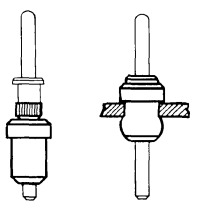
SPACER/BUSHINGS

Completely eliminate the need for metal stand-offs, spacers, and insulators. Install in seconds. Specifically designed for mounting printed circuit boards on metal chassis or panels. "Press-Fit" chassis installation with "snap-on" P. C. board mounting.



NEW Rivet-Loc™ TERMINALS (Pat. Pending)

Rivet-Loc terminals are a new type terminal designed for insertion in either chamfered or unchamfered holes. They overcome the inherent shortcomings of older semi-assembled terminal types while providing uniform above chassis height. After bushing insertion in the chassis, the lug is inserted from the major diameter side expanding the bushing and securely locking the terminal in the chassis.

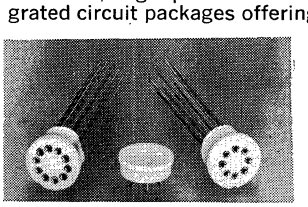


BEFORE INSTALLATION AFTER INSTALLATION

PRESS-FIT® NEW TRANSISTOR & I.C. SOCKETS & HARDWARE

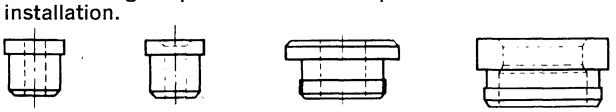
SOCKETS

Low cost, high precision sockets for transistors and integrated circuit packages offering "Press-Fit" installation combined with virgin Teflon bodies and precise new contact design for maximum electrical and mechanical performance. Standard units designed for 3 and 4 lead TO-18 and TO-5 packages and 8, 10, and 12 lead integrated circuit packages.



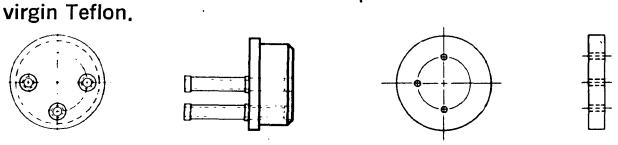
"PRESS-FIT" BUSHINGS

A complete line of over 500 standard bushing configurations designed for lead feed-thrus, insulators, bearings, stand-offs, component mounting devices and hundreds of other applications. All machined from virgin Teflon, offered in E.I.A. colors, and featuring simple economical and permanent "Press-Fit" installation.



HOLDERS AND PADS

The widest line of Teflon transistor and I.C. holders and pads in the industry. Available in numerous JEDEC packages with from 3 to 12 leads. Color coded and precision machined from virgin Teflon.



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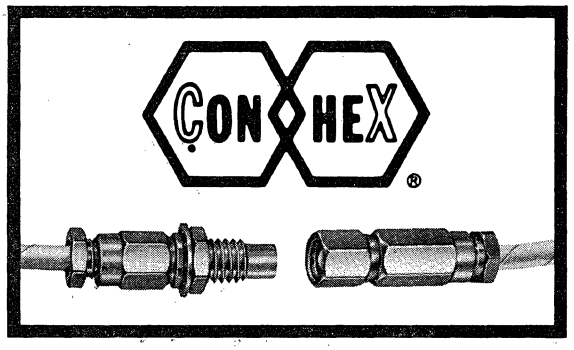
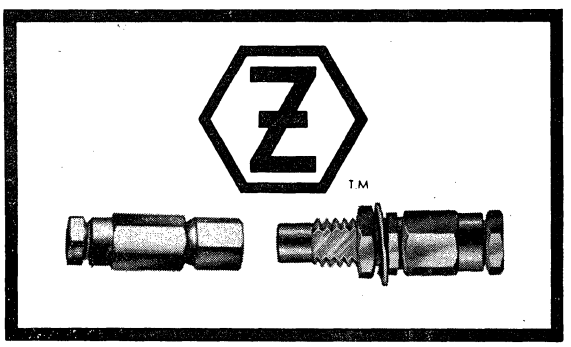
®CIRCUIT HARDWARE DIVISION
SEALECTRO CORPORATION
MAMARONECK • NEW YORK 10543
PHONE: 914 698-5600 TWX: 710-566-1110
Sealectro Ltd., Portsmouth, Hants, England
Sealectro S.A. Villiers-le-Bel, Paris, France

CONHEX® R. F. CONNECTORS



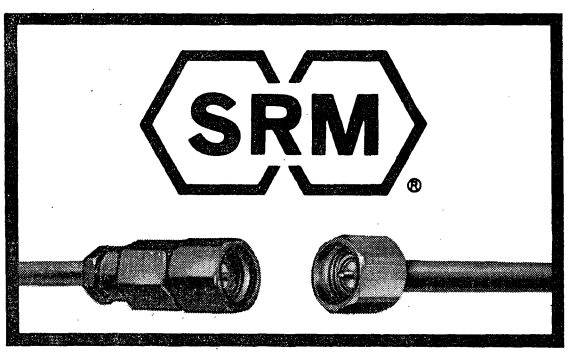
PERFORMANCE, PRICE, DELIVERY FOR RG-188/U AND SIMILAR CABLES UP TO 12.4 GHz

Conhex subminiature R. F. connectors are designed to meet or exceed the requirements of MIL-C-22557. Over 300 standard units — straight, right angle, bulkhead, strip-line, screw-on, snap-on and slide-on — are standard items.



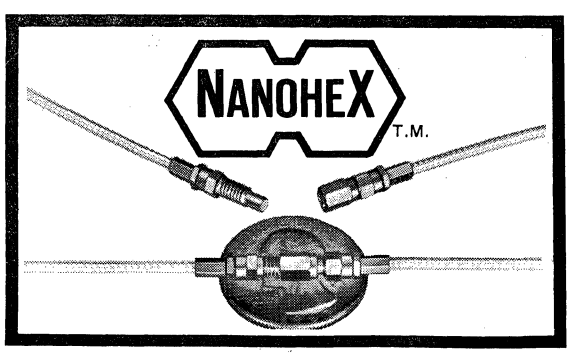
RELIABILITY AND HIGH PERFORMANCE IN AN ECONOMICAL CONNECTOR PACKAGE

Designed for complete compatibility with miniature coaxial cables, such as .141" diameter semirigid types, the Z Series offers the optimum in performance, reliability and cost. More and major manufacturers are discovering that Sealectro Z connectors not only meet their VSWR and power handling requirements but are many times more reliable than similar size connectors especially when subjected to adverse environmental conditions.



FOR STANDARD MATING ENGAGEMENTS AT REDUCED COSTS.

SRM connectors are designed to mate with standard OSM-type mating engagements at reduced cost. SRM connectors are designed for use with RG-141/U, RG-142/U, RG-188/U and similar subminiature coaxial cables, and provide maximum performance and minimum VSWR all the way to 18 GHz



MAXIMUM SPACE AND PAYLOAD SAVINGS WITH PERFORMANCE TO 12.4GHz

Specifically designed for microminiature RG-196/U and RG-178/U, Nanohex connectors are the smallest commercially available. They combine extremely small size and light weight with exceptional performance and reliability. Over 50 standard types including straight, right angle, printed circuit, and bulkhead mounted units in screw-on, slide-on and snap-on are featured in the complete line.

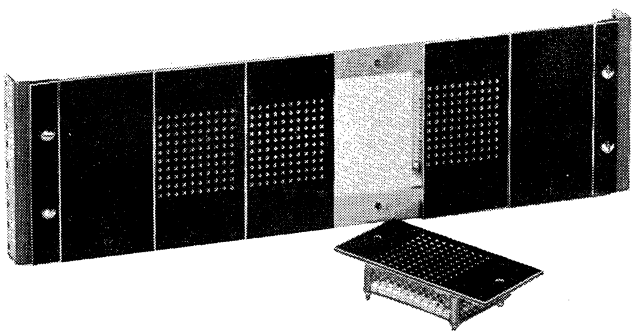
® R. F. COMPONENTS DIVISION
SEALECTRO
CORPORATION
MAMARONECK, NEW YORK
Phone: 914 698-5600 TWX: 710-566-1110
Sealectro Ltd., Portsmouth, Hants, England

Write for the complete SEALECTRO R. F. CONNECTOR CATALOG

SEALECTRO

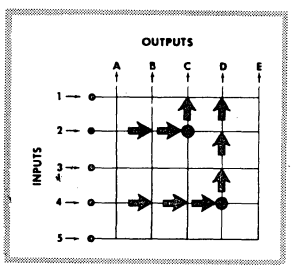
SEALECTROBOARD®

CORDLESS PROGRAMMING BOARDS



"Sealectroboard" programming and switching provides complete ease and simplicity of operation with drastic reductions in hardware and space. A single pin is used to complete the program circuit or insertion of a component . . . move the pin to a new location and you have a new program function. "Sealectroboards" are made in 2 to 5 deck versions and with a variety of pin styles such as shorting pins, diode holders and skip pins as well as with engraved or silk-screened panel marking and color coded program areas.

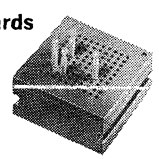
Modular "Sealectroboard" are designed to facilitate program board expansion in prototype and design appications and are offered off-the-shelf from Sealectro Distributors. Each modular board is a 10 x 10 matrix with two contact decks in bussed upper and lower or bussed upper, individual lower contact configurations. Companion mounting and panel pieces are designed for 19" relay rack mounting and allow expansion from a single board up to 6 boards in just 5½" of rack space. Write for our complete catalog and technical specifications. . . .



Bussed Upper and Lower Contacts

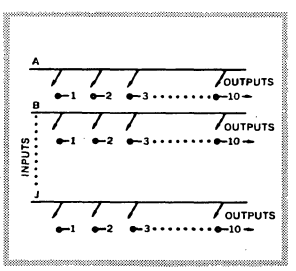
The Modular Sealectroboard is available with bussed upper and lower contacts and provides an ideal means for input/output switching. The standard 10 x 10 hole Modular Sealectroboard may be considered 10 Single Pole, Single Throw, Normally Open switches with 10 inputs each.

New Miniboards



Pack a 10 x 10 hole format (100 crosspoints) into a 1 inch square. These new microminiature boards have all of the standard features of the larger size Sealectroboard, including modular, expandable construction, shorting and diode pins, and Sealectro's built in reliability.

U.S. Pat. No. 3,027,534

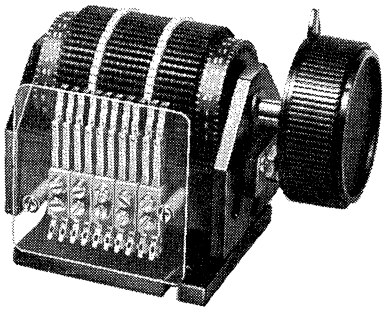


Bussed Upper and Individual Lower Contacts

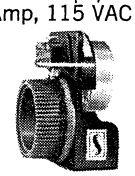
The Modular Sealectroboard is also available with bussed upper and individual lower contacts which provide individual electrical access to each program hole and a path between many terminals and a lesser number of bussed terminals. The standard 10 x 10 hole Modular Sealectroboard with this contact configuration may be considered a 10 Pole, Single Throw, Normally Open switch with 10 positions per pole.

PROGRAM SWITCHING SEALECTROSWITCH®

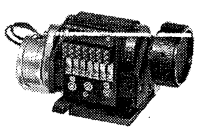
PROGRAMMING SWITCHES



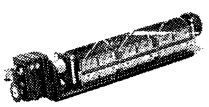
Programs may be changed in seconds without special tools and with 100% reproducibility. The Sealectroswitch programming switch provides a degree of versatility that can't be met by comparable devices . . . and in half the space and half the cost. Extremely high "built in accuracies" are provided through precision machined drums while flexibility is obtained through unique, field-adjustable, sliding contact actuators. Check these features • Field Adjustable Cams With Multiple ON/OFF Functions or Point-to-Point Switches • Manual or Remote Operation With Timing Motor or Solenoid Drive • Transfer Speeds to 50 Milliseconds Without Appreciable Contact Bounce • Removable Drums • Form A, B, and C Contacts in a Single Unit • Up to 57 Circuit Controls in a Single Unit. • Contacts Rated for Dry Circuit to 2 Amps, 24 VDC or 115 VAC. • Optional 10 Amp or 20 Amp, 115 VAC U. L. Approved Contacts.



Recycling timer with point-to-point or cam action, single snap-action contact.



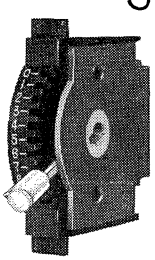
Enclosed, snap-action contacts and timing motor drive.



60 program positions, 60 contacts and stepping motor drive.

U.S. Pat. No. 3,330,917 Also protected by foreign patents

SEALECTRO SLIDE 'N SWITCH™



The Sealectro Slide 'n Switch circuit selector is designed to provide a highly reliable random access switching device for the programming of all types of automated equipment. Standard units are 11 position, single pole with a built-in "skip" function. If it is desired to switch from position 1 to position 5, the Slide 'n Switch handle is pulled out and the switch handle moved from 1 to 5. No electrical contact is made with any of the intermediate switch contacts.

Multiple units may be stacked side-by-side to provide any number of decade switches while the unique printed circuit board construction of the switch permits any special electrical coding to be supplied at minimum cost. Slide 'n Switch output terminations mate with standard edge-mount pc card connectors.

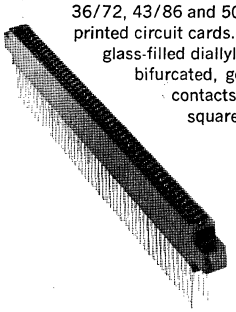
Write today for our complete catalog . . .

®
PROGRAMMING DEVICES DIVISION
SEALECTRO CORPORATION
MAMARONECK • NEW YORK 10543
PHONE: 914 698-5600 TWX: 710-566-1110
Sealectro Ltd., Portsmouth, Hants, England
Sealectro S.A. Villiers-le-Bel, Paris, France

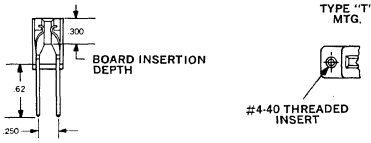
ADVANCED PACKAGING, INC.

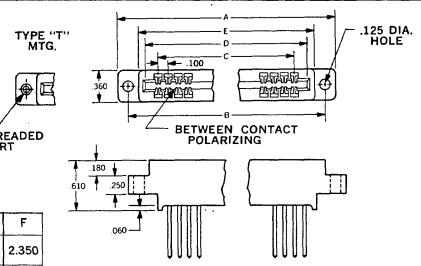
PRINTED CIRCUIT CARD CONNECTORS

P7000 SERIES .100" CONTACT CENTERS WIRE WRAP TAILS



The P7000 series is available in 22/44, 30/60, 36/72, 43/86 and 50/100 contact pairs, for 1/16" printed circuit cards. Insulator bodies are green, glass-filled diallyl phthalate, with pre-loaded, bifurcated, gold-plated phosphor-bronze contacts. Wire wrap posts are .025" square, by .62" long. Commercial or military contact platings are offered.





Part No. (*)	Pairs/Contacts	A	B	C	D	E	F
P7000-44	22/44	3.035	2.775	2.100	2.300	2.460	2.350
P7000-60	30/60	3.835	3.575	2.900	3.100	3.260	3.150
P7000-72	36/72	4.435	4.175	3.500	3.700	3.860	3.750
P 7000-86	43/86	5.135	4.875	4.200	4.400	4.560	4.450
P 7000-100	50/100	5.835	5.575	4.900	5.100	5.260	5.150

*Add C for commercial plating (.000010 gold). Add M for military plating (.000030 gold). Add T for stainless steel threaded insert. Example: CP7000-60T

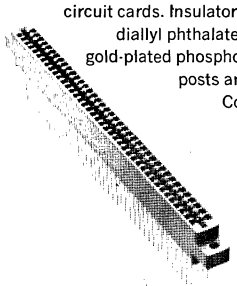
PERFORMANCE

- Contact resistance: will not exceed 30 Mv at rated current.
- Operating voltage: 800 VDC at sea level.
- Current rating: 3 Amps
- Insulation resistance: 5000 megohms minimum.
- Operating temperature: −65°C to +150°C

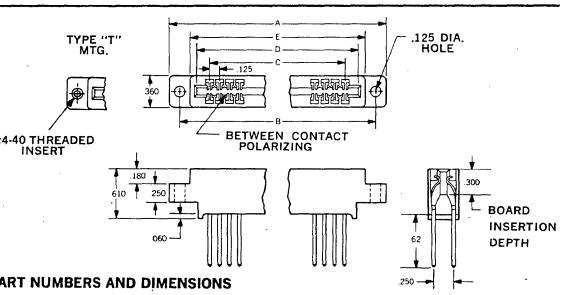
MATERIALS

- Insulator: Diallyl phthalate per MIL-M-14, Type SDG-F (color, green)
- Contacts: Phos. bronze per QQ-B-750. Gold plated per MIL-G-45204, Type II.

P8000 SERIES .125" CONTACT CENTERS WIRE WRAP TAILS



The P8000 series is available in 28/56, 31/62, 40/80 and 50/100 contact pairs, for 1/16" printed circuit cards. Insulator bodies are green, glass-filled diallyl phthalate, with pre-loaded, bifurcated, gold-plated phosphor-bronze contacts. Wire wrap posts are .025" square, by .62" long. Commercial or military contact platings are offered.

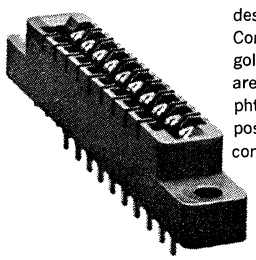


PART NUMBERS AND DIMENSIONS

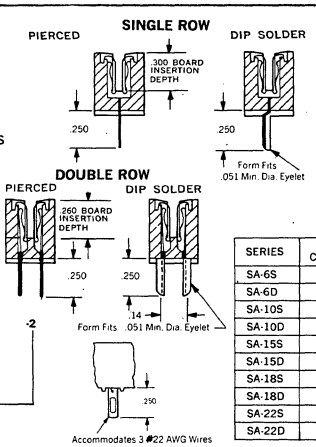
Part No. (*)	Pairs/Contacts	A	B	C	D	E
P8000-56	28/56	4.305	4.045	3.375	3.625	3.785
P8000-62	31/62	4.680	4.420	3.750	4.000	4.160
P8000-80	40/80	5.805	5.545	4.875	5.125	5.285
P8000-100	50/100	7.055	6.795	6.125	6.375	6.535

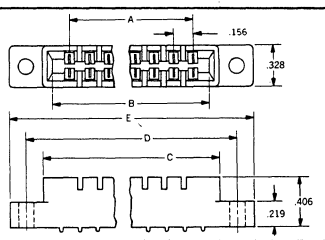
*Add C for commercial plating (.000010 gold). Add M for military plating (.000030 gold). Add T for stainless steel threaded insert. Example: CP8000-80T

SA SERIES PIERCED OR DIP-SOLDER TERMINALS .156" CONTACT CENTERS



The SA series circuit board connectors, with .156" contact spacing, accept 1/16" boards. SAE connector contacts are the latest in bifurcated bellows design, with either pierced or dip-solder terminals. Contact plating meets military requirements, or is gold-flashed for commercial use. Insulator bodies are precision molded in green, glass-filled diallyl phthalate, and are available in 6 to 22 contact positions, with in-between and in-contact polarizing keying.



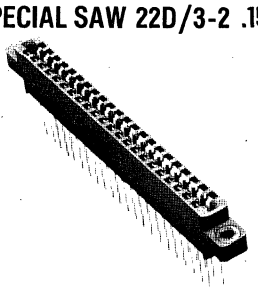


ORDERING NUMBER, EXAMPLE SA C 22 D/ 1 -2
- Connector Series
- Plating style: C, commercial; M, military (*)
- Contact positions:
- Connector style: S, single row; D, double row
- Contact termination: 1, pierced; 2, dip solder
- Mounting style: -2, clearance hole; -3, threaded insert

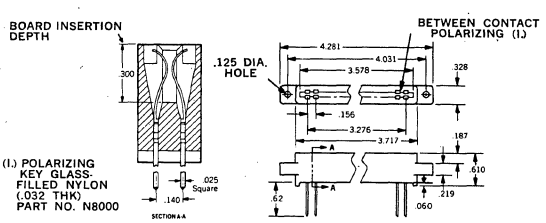
(*) Add C for commercial plating (.000010 gold). Add M for military plating (.000030 gold).

SERIES	NO. OF CONTACTS	A	B	C	D	E
SA-6S	6	.780	1.078	1.218	1.531	1.781
SA-6D	12					
SA-10S	10	1.404	1.703	1.843	2.156	2.406
SA-10D	20					
SA-15S	15	2.184	2.484	2.624	2.937	3.187
SA-15D	30					
SA-18S	18	2.652	2.953	3.093	3.406	3.656
SA-18D	36					
SA-22S	22	3.276	3.578	3.717	4.031	4.281
SA-22D	44					

SPECIAL SAW 22D/3-2 .156" CONTACT CENTERS WIRE WRAP TAILS



The SAW22D/3-2 circuit board connector, with .156" contact spacing, accepts 1/16" boards. Built to the same high quality standards as the SA series, the insulator body is of black glass-filled nylon, with phosphor bronze, gold plated contacts meeting MIL-G-45204, Type II requirements. Double row of 22 contact positions provides for 44 terminals. Wire wrap posts are .025" square by .62" long, on a .156 x .140 mounting matrix. These connectors are specifically designed to meet high volume wire wrap production requirements.



ADVANCED PACKAGING, INC.
THE NEW CONNECTOR PEOPLE
Subsidiary of STANFORD APPLIED ENGINEERING, INC.
2165 S. Grand Ave. • Santa Ana, California 92705 • (714) 540-9256 • TWX: 910-595-1122

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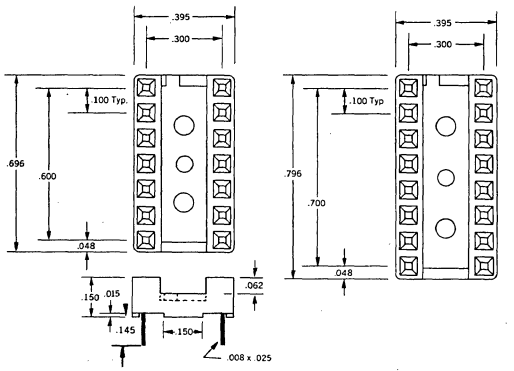
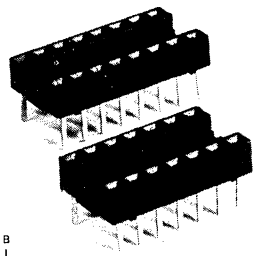
THE NEW CONNECTOR PEOPLE

DUAL-IN-LINE IC SOCKETS & IC STRIPS (Wire Wrap* & Dip Solder)

3100 SERIES HIGH DENSITY, LOW PROFILE, CLOSED ENTRY MOUNTING FOR 14 AND 16 PIN DIPS



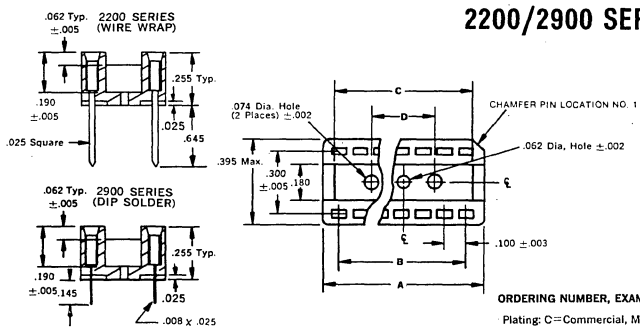
The 3100 series DIP sockets are designed for very high density packaging of 14 and 16 pin IC packages or module boards. Only .150" high above the circuit board, these low profile sockets can be mounted end-to-end on .100" centers and side-to-side on .400" centers. Molded of black or white glass filled nylon, with the special SAE spring design, the contacts can be plated with either military or commercial gold plate, or tin plate.



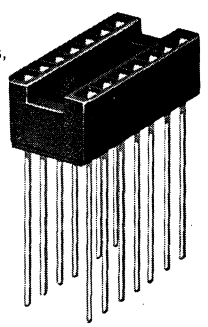
ORDERING NUMBER, EXAMPLE C SA 3100 – 14 B

- Plating: C=Commercial, M=Military, T=Tin
- SAE IC Socket Symbol
- Series:
- Number of Contacts
- Color: B=Black, W=White

2200/2900 SERIES HIGH DENSITY MOUNTING FOR 14 AND 16 PIN DIPS



The 2200/2900 series DIP sockets accept 14 and 16 pin standard dual-in-line IC packages or module boards, mounting on a .100 x .300" contact matrix. They are molded of black or white glass filled nylon, Type 6, with spring temper phosphor bronze contacts, military or commercial plated, or tin plate.

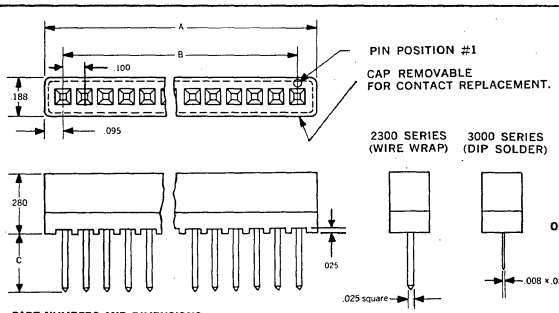


Dimensions	A	B	C	D	E
14 Contact	.760	.600	.610	.300	.800
16 Contact	.860	.700	.710	.400	.900

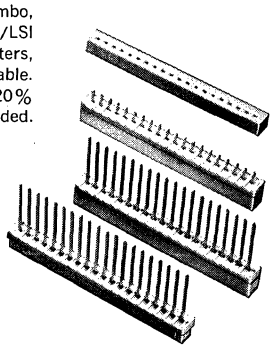
ORDERING NUMBER, EXAMPLE C SA 2200 – 14 B C ST

- Plating: C=Commercial, M=Military, T=Tin
- SAE IC Socket Symbol
- Series: 2200=Wire Wrap, 2900=Dip Solder
- Number of Contacts
- Color: B=Black, W=White
- Closed Entry Cap (Optional, adds .035 to overall height)
- 2 Level Wire Wrap Tail .425 long (Optional)

2300/3000 SERIES CONNECTOR STRIPS FOR MSI/LSI DIPS



The 2300/3000 series connector strips are designed to be used in pairs to accommodate the new jumbo, dual-in-line packages recently introduced by MSI/LSI manufacturers. Contact spacings are on .100 centers, and either wire wrap or dip solder terminals are available. Black or white insulator bodies are of 20% glass-filled nylon. Closed entry cap included.



ORDERING NUMBER EXAMPLE: C SA 2300 –20 BC ST

- (*) Plating — C = Commercial, M = Military, T = Tin
- SAE connector symbol
- SERIES: 2300 = Wire wrap 3000 = Dip solder
- No. of Contacts:
- COLOR: BC = Black body and cap WC = White body and cap
- 2 level wire wrap tail .425 long (optional)

PART NUMBERS AND DIMENSIONS

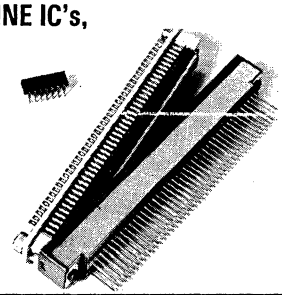
SERIES	NO. OF CONTACTS	A	B	C
*SA2300-12	12	1.290	1.100	.645
*SA2300-20	20	2.090	1.900	.645
*SA3000-12	12	1.290	1.100	.145
*SA3000-20	20	2.090	1.900	.145

(*) C = .000010 gold per MIL-G-45204, Type II
M = .000050 gold per MIL-G-45204, Type II, class I.
T = .00020 bright tin per MIL-T-10727

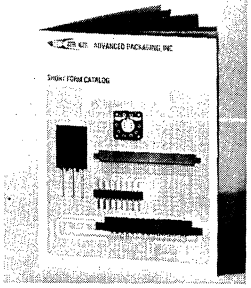
THE SAE DIPSTIK HOLDS 5 DUAL-IN-LINE IC's, AND WITH MANY ADVANTAGES OVER USUAL MOUNTING TECHNIQUES.

No soldering
holds either 14 or 16 pin dips
IC replacement takes only seconds, and NO special tools
100% test point accessibility
integral EMI shielding

WRITE FOR OUR DIPSTIK CATALOG



IF YOU WANT ALL THE DETAILS ON SAE's TIME AND MONEY SAVING IDEAS, JUST ASK FOR OUR NEW CATALOG.



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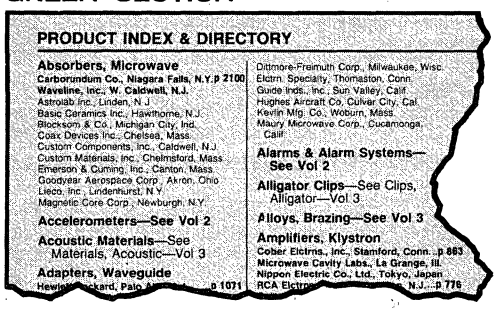
How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo A... p 1071
Dittmore-Freimuth Corp., Milwaukee, Wisc.
Elctrn. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J....p 776

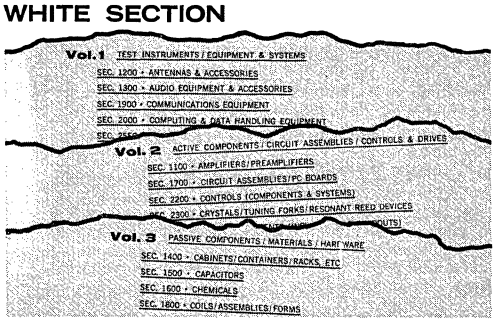
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

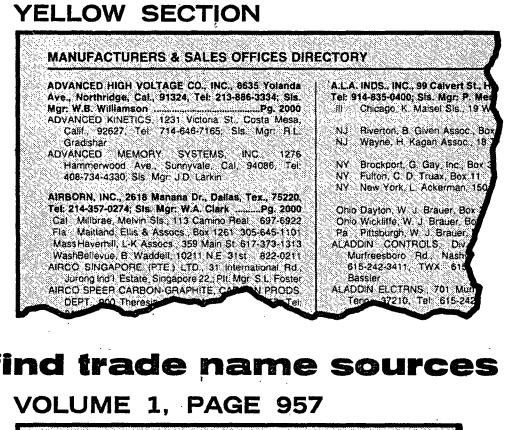
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION

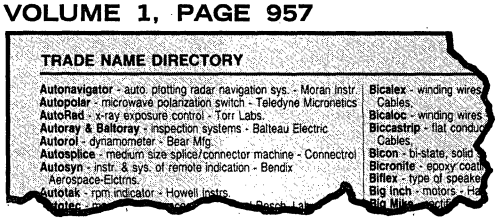

MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627. Tel: 714-646-7165. Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086. Tel: 408-734-4330. Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Milbrae, Melvin Sls., 113 Camino Real 697-6922
Fla.: Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st. 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22., Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA... PRODS. DEPT., 900 Theres... Tel:
A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill: Chicago, K. Massel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa.: Pittsburgh, W. J. Brauer,
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nashv... 615-242-3411, TWX 615... Bassler...
ALADDIN ELCTRNS., 701 Mur... Tenn. 37210. Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Bicalex - winding wires, Cables.
Bicaloc - winding wires
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid ...
Biconite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike - ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

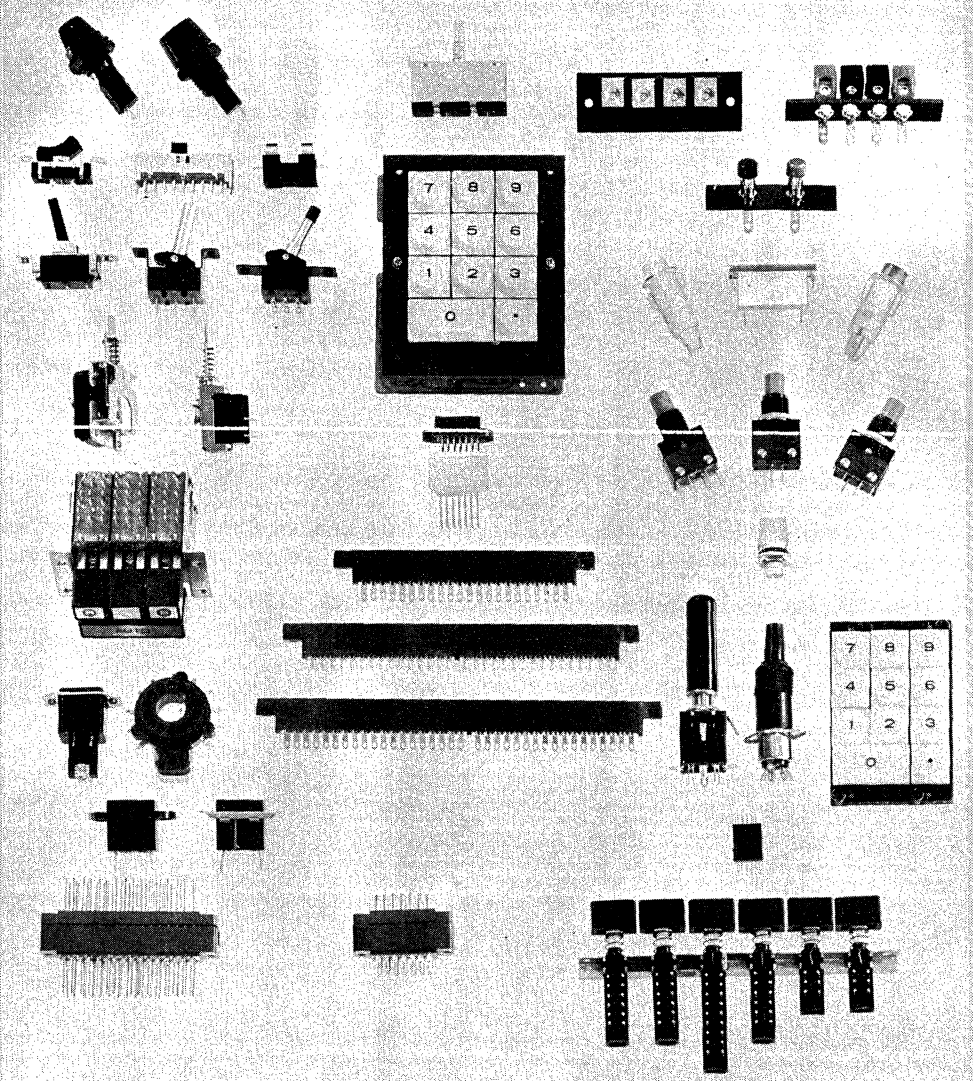
if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

SMK'S HIGHLY DEPENDABLE COMPONENTS

A half-century of diverse experience

SMK leads the field in Japan's electronic component industry. All SMK products reflect extensive and intensive research and development activities. A wide, inclusive product line and scheduled supply combine to insure complete customer satisfaction.



MAIN PRODUCTS:

- Connectors
- Switches
- Tube Sockets
- Fuse Holders
- Binding Posts
- Lamp Sockets
- Jacks
- Plugs
- Other Components

• *For further information, please write to:*

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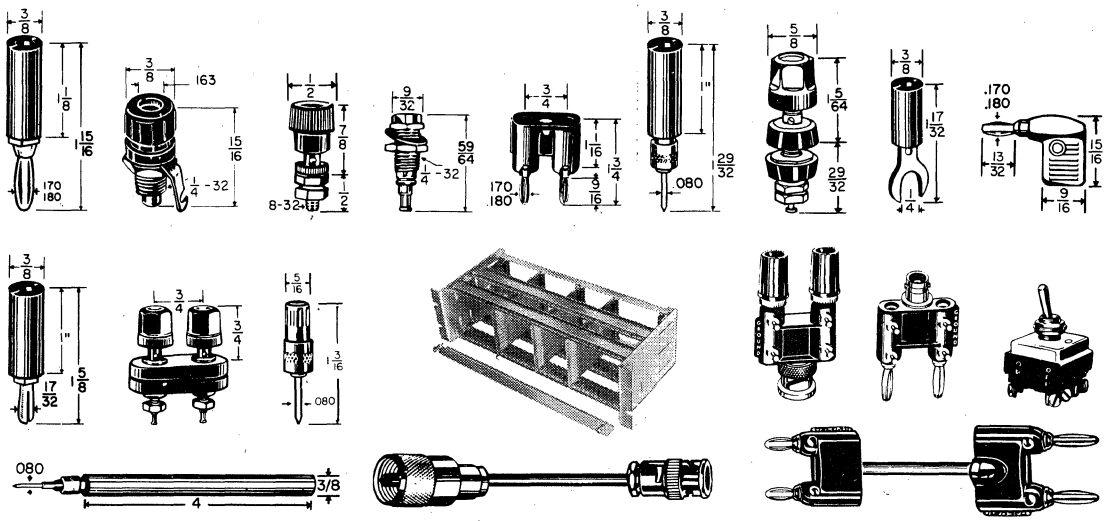
No.5-5, 6-chome, Togoshi, Shinagawa-ku, Tokyo, 141, Japan. Cable: "SHOWAMUSEN TOK" Phone: 785-1111
Telex: 246-6301 "SHOWAMUSEN TOK"

IT'S SOUND PLANNING TO SPECIFY

HERMAN H. SMITH, INC.

For Whatever You Need in

Electronic Components



MORE THAN TEN THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

- BINDING POSTS
- BANANA PLUGS & JACKS Insulated & Non-Insulated
- PHONE TIP PLUGS & JACKS Insulated & Non-Insulated
- Telephone Type Plugs & Jacks
- ALLIGATOR CLIPS
- TEST PRODS & TEST LEADS
- JUMPERS & PATCH CORDS
- SWITCHES Arrow, H-H, Kulka Cutler-Hammer, Micro, Continental-Wirt
- TEFLON & TURRET TERMINALS
- SHAFT ACCESSORIES
- ELECTRONIC HARDWARE Terminal Strips, Boards, Grommets, Bumpers, Bushings, Washers, Lugs
- KNOBS

You'll find these SMITH products on the shelves of leading industrial Electronic Distributors, throughout U.S.A. For your production runs, draw directly on our large plant inventories of standard components.

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We invite you to utilize our modern manufacturing facilities and methods for your molding, screw-machine, stamping or sub-assemblies. We are equipped for both long and short runs. From raw material to finished part, SMITH detailed workmanship and production efficiency assure a quality product, speedily and economically made.

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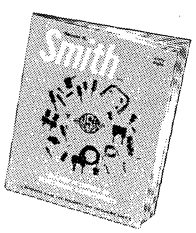
Use our Engineering and Production Facilities to design and develop new products or modify existing components to meet your specific needs. "Specials are Standard with SMITH!"

FOR ENGINEERS & PURCHASING AGENTS!

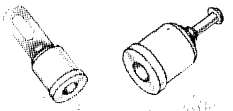
Send for **New Complete SMITH Catalog 72E**

IN A HURRY?
See **SMITH** full listing in **Radio-Electronic MASTER** 35th Ed., pages 468-511



HERMAN H. SMITH, INC.
A NORTH AMERICAN PHILIPS COMPANY
812 Snediker Avenue, Brooklyn, N. Y. 11207
Telephone: (212) 272-9400 • TWX: 710-584-2363

MANUFACTURERS OF ELECTRONIC COMPONENTS



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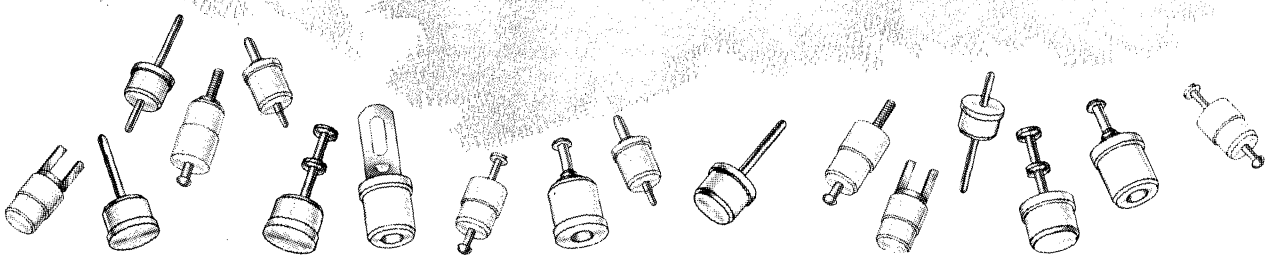
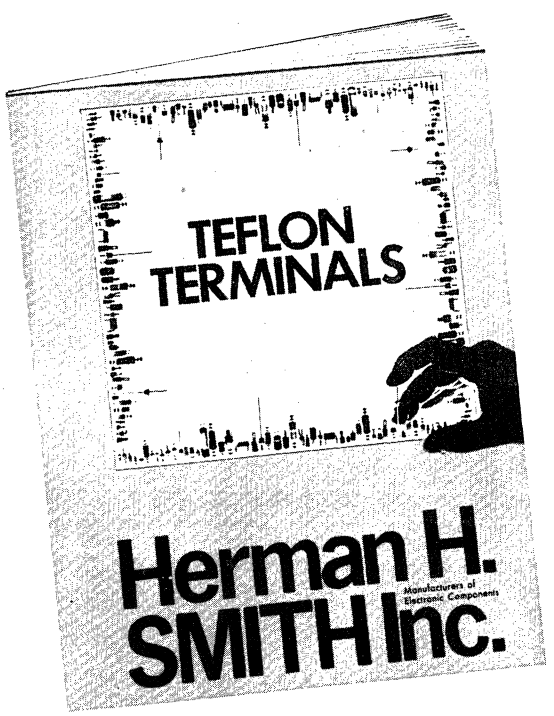
TEFLON TERMINALS



SMITH TEFLON Terminals are designed for use as precision components in critical electronic applications such as Computers Microwave UHF-VHF Missiles Satellites

Utilizing the plastic memory characteristic of Teflon* these terminals literally glide into and lock themselves in punched or drilled holes thus minimizing labor as well as added cost of materials.

* DuPont™



ALL SIZES!

- Microminiature
- Subminiature
- Miniature

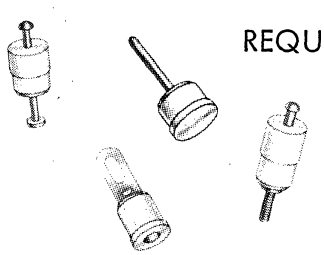
ALL TYPES!

- Standoff
- Feed-thru
- Probes
- Test jacks
- Connectors
- Plus . . . specials to your specific needs!

10 COLORS!

STANDARD E.I.A. COLORS

If you specify or purchase precision components for critical electronic applications, you **NEED** this up-to-date **BUYING GUIDE!**



REQUEST NEW SMITH TEFLON TERMINAL CATALOG 71E

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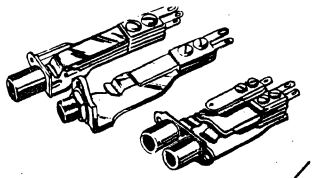
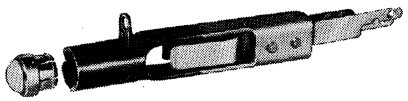
JACK MOUNTING PANELS

Used for mounting standard and miniature telephone and coaxial jacks, keys, lamp sockets, etc. Equivalents of W.E. and many others available. Request bulletins on Product Family 70.



SINGLE and TWIN TELEPHONE JACKS

Standard and miniature size jacks. All circuit configurations. Panels for these provided by Product Family 70. Request bulletin on Product Family 51, 53, and 55 on jacks.

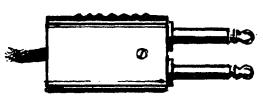


LAMP SOCKETS and KEYS

Mount on telephone type jack mounting panels. Sockets use telephone type slide-base lamp. Numerous varieties of turn and push keys. Request bulletin on Product Families 54 and 56.

TELEPHONE PLUGS

Nearly all types, W.E., Kellogg, A.E., etc. both single and twin in two and three circuit forms. All have molded in place nylon insulation. Request bulletins on Product Family 80.



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Full Line

TERMINAL and RELATED PATCHING EQUIPMENT —and HEADSETS

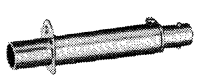
Available from our industrial distributor in your area.

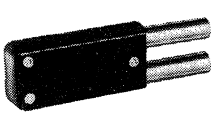
AUDIO PATCH, SWITCHBOARD, and TEST CORDS

With standard and miniature size single and twin telephone plugs. Nylon braided tinsel conductor cords. Request bulletin on Product Family 30.

COAX JACKS — PLUGS — PATCH CORDS — and RELATED COMPONENTS

Standard sized single and twin jacks including normal through and terminating types, W.E. and RCA compatible, fitting wide assortment of coax cables and other connectors. Twin looping plugs, single plugs, plug adapters, patch cords, etc. Also specialized triax and twinax concentric series jacks and plugs as well as miniaturized type. Request bulletin on Product Family 60.





HEADSETS

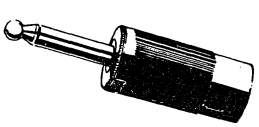
Many types in all cost ranges, applicable to wide variety of applications. Request bulletin on Product Family 01 through 29.

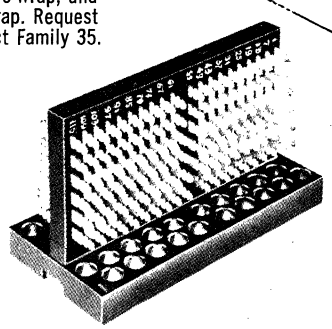
AUDIO PLUGS and JACKS

Numerous low cost plugs and jacks for hi-fi, tape recorders, sound equipment, etc. Request bulletin on Product Family 40.

TERMINAL BLOCKS

Originally used by the telephone industry (often called Christmas Tree type) now also widely used in other system work. Up to 14 rows per block; 10, 20, and 26 terminals per row. Lug types — solder, wire-wrap, and hybrid solder-wire wrap. Request bulletin on Product Family 35.





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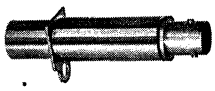
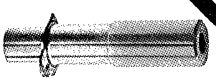
Connector and Patching Systems



COAXIAL PANEL JACK
J-3
for .070" pins (RCA)
J3-W
for .090" pins (WE)
Rear mates with Trompeter Plugs PL-23 thru PL-29 or any standard BNC plug.

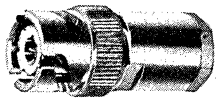
JACK
J3E-N*
for .070" pins (RCA)



J3EW-N* for .090" pins (WE)

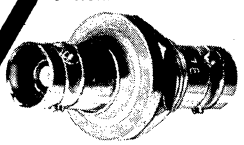
Substitute cable group for "N" i.e. J3EW-2

COAXIAL PANEL JACK
J13-R*
for .070" pins (RCA)
J13W-R*
for .090" pins (WE)
Incorporates ½ watt, 2% resistor for circuit termination when patch cord plug is not inserted.
*Substitute resistance value for "R" i.e. **J13-75**
for Video only

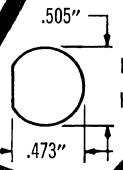


CABLE PLUG
PL-75
for ¼" OD Twinax only or Cable Group 9.
PL-76, ¼" Triax, Cable Group 7
PL-77, WE 754E & RG22/U Group 10.
PL-78, WE Group 11, 760A Twinax Cable.
Mates with jack J-72, receptacles BJ-72, 73,74, 77, 78, 79.

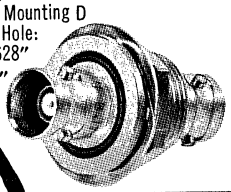
BJ-78
CONCENTRIC CONNECTOR



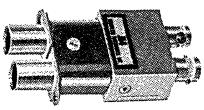
Bulkhead Mounted FEED THROUGH
for Twinax/Triax



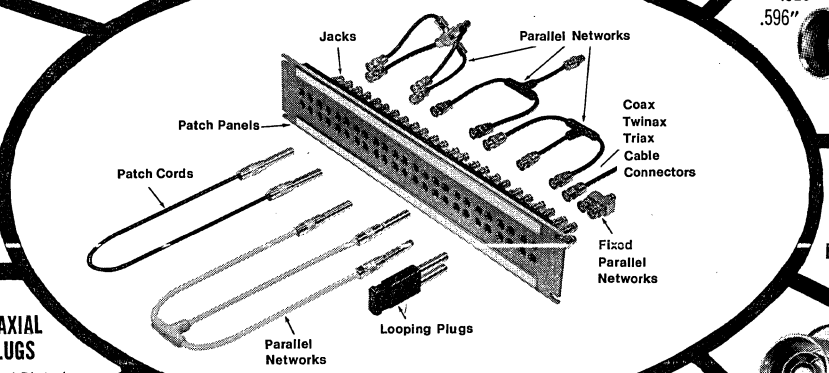
BJ-73
FEED THROUGH
(insulated)
Outer Circuit insulated from chassis
Mounting Hole: .628" .596"

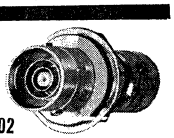


J-14
PANEL JACK

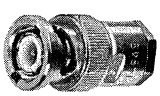


for .070" pins (RCA)
J-14-W for .090" pins (WE)
'Normal Through' connection eliminates looping plug. Patch cord allows signal re-routing.



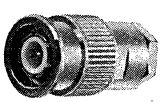


BJ-102
QUADRAX FEED THROUGH



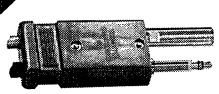
BNC PL-28

COAXIAL PLUGS
Nickel Plated Body
Gold Plated Pins

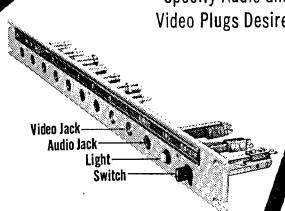


TNC PL-49

AUDIO / VIDEO
PCAV-L-75
for Simultaneous Patching



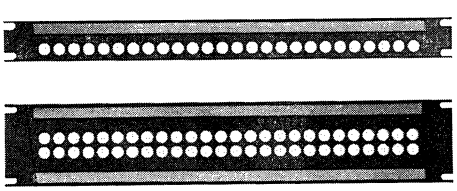
Specify Audio and Video Plugs Desired



AUDIO/TELEPHONE JACKS
Write, stating requirements.

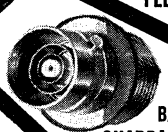
PATCH PANEL
JS-26
26 Jacks, non-insulated
JSI-26 (Insulated)
19" long x 1¾" high.
Hole diam. — 29/64"
Holes — .62" OC apart
Not for Jacks, J-2, 4, 9, 14, 14M.

PATCH PANEL
JS-52
52 Jacks-non-insulated.
JSI-52 (Insulated)
19" long x 3½" high.
Hole diam. — 29/64"
Holes — .62" OC apart
Not for Jacks, J-2, 4 or 9



QUADRAX CONNECTOR
PL-101

Concentric Construction for ¼" OD Cable. Over ¼" on Special Order only.



BJ-101
QUADRAX BULKHEAD CONNECTOR
Concentric Construction for ¼" Quadrax Cable

TROMPETER CABLE

Diam's: ¼" OD, 50, 75, 78, 124Ω

Here are only 28 of the hundreds of items stocked. Call or write for your T-8 Catalog!

TROMPETER Electronics, Inc.

For Matrix/Switching Information, See Page 1958

8936 COMANCHE AVE. • CHATSWORTH, CAL. 91311
TEL. (213) 882-1020 TWX: 910-494-1210

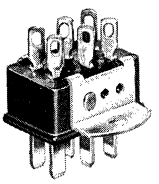
BEAUPLUG® Connectors/Plugs and Sockets

BEAUPLUG Series 3300

BEAUPLUG Series 3300 is interchangeable with Cinch-Jones 300 Series. Molded bakelite bases; cadmium plated metal backshells; and bright plated hardware. UL rated at 250v at 10 amp.

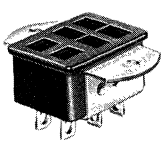
Series 3300 Plugs and Sockets are available as: DB Deep Bracket Mounted; EB End Bracket; FHT Flared Hole Top; FHT-L Flared Hole Top Latch; FHT-K Flared Hole Top Keeper; CCE Cable Clamp End; CCT-L Cable Clamp Top Latch; CCT-K Cable Clamp Top Keeper.

BEAU No.	Contacts	List	Each 1-24	Each 25-49	Each 50-99	Each 100-249
PLUGS — ANGLE BRACKETS MOUNTED (-AB)						
P-3303-AB	3	$.46	$.345	$.276	$.230	$.184
P-3304-AB	4	.47	.353	.282	.235	.188
P-3306-AB	6	.58	.435	.348	.290	.232
P-3308-AB	8	.68	.510	.408	.340	.272
P-3310-AB	10	.77	.578	.462	.385	.308
P-3312-AB	12	.87	.653	.522	.435	.348
P-3315-AB	15	1.21	.908	.726	.605	.484
P-3318-AB	18	1.47	1.103	.882	.735	.588
P-3321-AB	21	1.86	1.395	1.116	.930	.744
P-3324-AB	24	2.25	1.688	1.350	1.125	.900
P-3327-AB	27	2.64	1.980	1.584	1.320	1.056
P-3330-AB	30	3.04	2.280	1.824	1.520	1.216
P-3333-AB	33	3.42	2.565	2.052	1.710	1.368



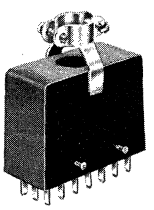
P-3306-AB

SOCKETS — ANGLE BRACKETS MOUNTED (-AB)						
S-3303-AB	3	$.48	$.360	$.288	$.240	$.192
S-3304-AB	4	.49	.368	.294	.245	.196
S-3306-AB	6	.62	.465	.372	.310	.248
S-3308-AB	8	.77	.578	.462	.385	.308
S-3310-AB	10	.92	.690	.552	.460	.368
S-3312-AB	12	1.07	.803	.642	.535	.428
S-3315-AB	15	1.39	1.043	.834	.695	.556
S-3318-AB	18	1.65	1.238	.990	.825	.660
S-3321-AB	21	2.05	1.538	1.230	1.025	.820
S-3324-AB	24	2.49	1.868	1.494	1.245	.996
S-3327-AB	27	2.89	2.168	1.734	1.445	1.156
S-3330-AB	30	3.36	2.520	2.016	1.680	1.344
S-3333-AB	33	3.65	2.738	2.190	1.825	1.460



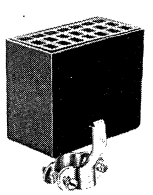
S-3306-AB

PLUGS — CABLE CLAMP TOP (-CCT)						
P-3303-CCT	3	$.91	$.683	$.546	$.455	$.364
P-3304-CCT	4	.93	.698	.558	.465	.372
P-3306-CCT	6	1.04	.780	.624	.520	.416
P-3308-CCT	8	1.11	.833	.666	.555	.444
P-3310-CCT	10	1.25	.938	.750	.625	.500
P-3312-CCT	12	1.37	1.028	.822	.685	.548
P-3315-CCT	15	1.80	1.350	1.080	.900	.720
P-3318-CCT	18	2.12	1.590	1.272	1.060	.848
P-3321-CCT	21	2.54	1.905	1.524	1.270	1.016
P-3324-CCT	24	2.96	2.220	1.776	1.480	1.184
P-3327-CCT	27	3.38	2.535	2.028	1.690	1.352
P-3330-CCT	30	3.88	2.910	2.328	1.940	1.552
P-3333-CCT	33	4.33	3.248	2.598	2.165	1.732



P-3321-CCT

SOCKETS — CABLE CLAMP TOP (-CCT)						
S-3303-CCT	3	$.92	$.690	$.552	$.460	$.368
S-3304-CCT	4	.94	.705	.564	.470	.376
S-3306-CCT	6	1.07	.803	.642	.535	.428
S-3308-CCT	8	1.25	.938	.750	.625	.500
S-3310-CCT	10	1.38	1.035	.828	.690	.552
S-3312-CCT	12	1.59	1.193	.954	.795	.636
S-3315-CCT	15	1.99	1.493	1.194	.995	.796
S-3318-CCT	18	2.31	1.733	1.386	1.155	.924
S-3321-CCT	21	2.66	1.995	1.596	1.330	1.064
S-3324-CCT	24	3.15	2.363	1.890	1.575	1.260
S-3327-CCT	27	3.53	2.648	2.118	1.765	1.412
S-3330-CCT	30	4.11	3.083	2.466	2.055	1.644
S-3333-CCT	33	4.42	3.315	2.652	2.210	1.768

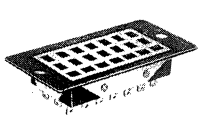


S-3321-CCT

PLUGS — SHALLOW BRACKETS MOUNTED (-SB)						
P-3315-SB	15	$1.60	$1.200	$ .960	$.800	$.640
P-3318-SB	18	1.97	1.478	1.182	.985	.788
P-3321-SB	21	2.39	1.793	1.434	1.195	.956
P-3324-SB	24	2.89	2.168	1.734	1.445	1.156
P-3327-SB	27	3.23	2.423	1.938	1.615	1.292
P-3330-SB	30	3.70	2.775	2.220	1.850	1.480
P-3333-SB	33	4.10	3.075	2.460	2.050	1.640

P-3321-SB

SOCKETS — SHALLOW BRACKETS MOUNTED (-SB)						
S-3315-SB	15	$1.83	$1.373	$1.098	$.915	$.732
S-3318-SB	18	2.20	1.650	1.320	1.100	.880
S-3321-SB	21	2.60	1.950	1.560	1.300	1.040
S-3324-SB	24	3.08	2.310	1.848	1.540	1.232
S-3327-SB	27	3.47	2.603	2.082	1.735	1.388
S-3330-SB	30	3.93	2.948	2.358	1.965	1.572
S-3333-SB	33	4.33	3.248	2.598	2.165	1.732

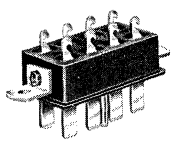


S-3321-SB

BEAUPLUG Series 5400

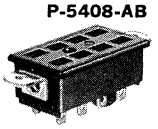
BEAUPLUG Series 5400 is interchangeable with Cinch-Jones 2400 Series. Rated at 250v at 15 amps. Molded bakelite bases; cadmium plated contacts (gold, silver and rhodium available); polypropylene metal backshells; and bright plated hardware.

Series 5400 Plugs and Sockets are also made as: DB Deep Bracket Mounted; LAB Less Angle Bracket; FHE Flared Hole End; CCE Cable Clamp End. UL and CSA listed.



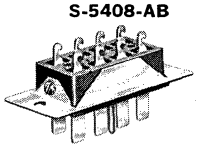
P-5408-AB

BEAU No.	Contacts	List	Each 1-24	Each 25-49	Each 50-99	Each 100-249
PLUGS — ANGLE BRACKETS MOUNTED (-AB)						
P-5404-AB	4	$1.30	$ .975	$.780	$.650	$.520
P-5406-AB	6	1.46	1.095	.876	.730	.584
P-5408-AB	8	1.67	1.253	1.002	.835	.668
P-5410-AB	10	1.94	1.455	1.164	.970	.776
P-5412-AB	12	2.18	1.635	1.308	1.090	.872



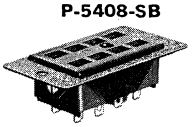
S-5408-AB

SOCKETS — ANGLE BRACKETS MOUNTED (-AB)						
S-5404-AB	4	$1.46	$1.095	$.876	$.730	$.584
S-5406-AB	6	1.68	1.260	1.008	.840	.672
S-5408-AB	8	1.97	1.478	1.182	.985	.788
S-5410-AB	10	2.10	1.575	1.260	1.050	.840
S-5412-AB	12	2.34	1.755	1.404	1.170	.936



P-5408-SB

PLUGS — SHALLOW BRACKETS MOUNTED (-SB)						
P-5404-SB	4	$1.45	$1.088	$ .870	$.725	$.580
P-5406-SB	6	1.69	1.268	1.014	.845	.676
P-5408-SB	8	1.85	1.388	1.110	.925	.740
P-5410-SB	10	2.15	1.613	1.290	1.075	.860
P-5412-SB	12	2.33	1.748	1.398	1.165	.932



S-5408-SB

SOCKETS — SHALLOW BRACKETS MOUNTED (-SB)						
S-5404-SB	4	$1.60	$1.200	$ .960	$.800	$.640
S-5406-SB	6	1.86	1.395	1.116	.930	.744
S-5408-SB	8	2.16	1.620	1.296	1.080	.864
S-5410-SB	10	2.29	1.718	1.374	1.145	.916
S-5412-SB	12	2.54	1.905	1.524	1.270	1.016

P-5406-CCT

S-5406-CCT

PLUGS — CABLE CLAMP TOP (-CCT)						
P-5404-CCT	4	$1.97	$1.478	$1.182	$ .985	$.788
P-5406-CCT	6	2.23	1.673	1.338	1.115	.892
P-5408-CCT	8	2.35	1.763	1.410	1.175	.940
P-5410-CCT	10	2.59	1.943	1.554	1.295	1.036
P-5412-CCT	12	2.86	2.145	1.716	1.430	1.144

SOCKETS — CABLE CLAMP TOP (-CCT)						
S-5404-CCT	4	$2.16	$1.620	$1.296	$1.080	$.864
S-5406-CCT	6	2.33	1.748	1.398	1.165	.932
S-5408-CCT	8	2.63	1.973	1.578	1.315	1.052
S-5410-CCT	10	2.77	2.078	1.662	1.385	1.108
S-5412-CCT	12	3.03	2.273	1.818	1.515	1.212

P-5408-DB

S-5408-DB

BEAUCAP Octal Plug Caps

2001

Series 2001 octal type plug and socket caps replace the metal caps with rubber grommets and fishpaper insulation. (Beau Products Division does not make the octal plugs and sockets.) Type 2001-1 caps have no hole for cable; Type 2001-2 have cable hole in top; Type 2001-3 have cable hole on side; Type 2001-4 have cable hole top with cable clamp. 4 NEMA colors: black, blue, red, and green.

SEE YOUR LOCAL REPRESENTATIVE LISTED IN E. E. M. YELLOW PAGES!

Request Catalog No. 76DA for complete technical specifications

Beau Products Division
Vernitron Electrical Components
117 Union Avenue, Laconia, N.H. 03246
Tel: (603) 524-5101 TWX: 710-364-1843

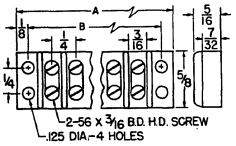
In CANADA: Brimark Electronics Limited
340 Carlaw Avenue, Toronto 8, Ontario

BEAU® Open Back, Closed Back, Single Row Barrier Terminal Strips

Series 10000 Open Back Terminal Strips

SERIES 10000—10 AMP

Wire size #26 to #22. Stand screw 2-56 x 3/16" brass, nickel-plated.

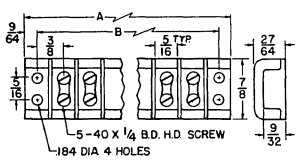


No. Circuits	A	B	No. Circuits	A	B
10001	¼	½	10011	3¼	3
10002	1	¾	10012	3½	3¼
10003	1¼	1	10013	3¾	3½
10004	1½	1¼	10014	4	3¾
10005	1¾	1½	10015	4¼	4
10006	2	1¾	10016	4½	4¼
10007	2¼	2	10017	4¾	4½
10008	2½	2¼	10018	5	4¾
10009	2¾	2½	10019	5¼	5
10010	3	2¾	10020	5½	5¼

Open and Closed Back Terminal Strips

Nos. 14000 & 15000—15 AMP

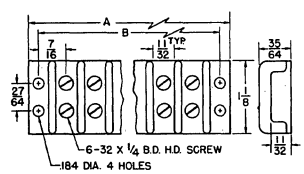
Wire size #22 to #16. Stand screw 5-40 x 1/4" brass, nickel-plated.



No. Circuits	A	B	No. Circuits	A	B
--001	1 1/32	¾	--014	5 29/32	5⅛
--002	1 13/32	1⅛	--015	6 9/32	6
--003	1 25/32	1½	--016	6 21/32	6⅛
--004	2 5/32	1⅞	--017	7 1/32	6¼
--005	2 17/32	2¼	--018	7 13/32	7⅛
--006	2 29/32	2⅝	--019	7 25/32	7½
--007	3 9/32	3	--020	8 5/32	7⅞
--008	3 21/32	3⅜	--021	8 17/32	8¼
--009	4 1/32	3¾	--022	8 29/32	8⅝
--010	4 13/32	4⅛	--023	9 9/32	9
--011	4 25/32	4½	--024	9 21/32	9⅜
--012	5 5/32	4⅞	--025	10 1/32	9¾
--013	5 11/32	5¼	--026	10 13/32	10⅛

Nos. 18000 & 19000—20 AMP

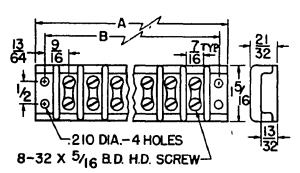
Wire size #16 to #14. Stand screw 6-32 x 1/4" brass, nickel-plated.



No. Circuits	A	B	No. Circuits	A	B
--001	1 3/16	⅞	--014	6⅛	6 9/16
--002	1⅛	1 5/16	--015	7 5/16	7
--003	2 1/16	1¾	--016	7¾	7 1/16
--004	2½	2 1/16	--017	8 3/16	7⅞
--005	2 15/16	2⅜	--018	8⅜	8 5/16
--006	3⅜	3 1/16	--019	9 1/16	8¼
--007	3 13/16	3½	--020	9½	9 1/16
--008	4¼	3 15/16	--021	9 15/16	9⅝
--009	4 1/16	4⅜	--022	10⅜	10 1/16
--010	5⅛	4 13/16	--023	10 13/16	10½
--011	5 9/16	5¼	--024	11¼	10 15/16
--012	6	5 11/16	--025	11 1/16	11⅜
--013	6 7/16	6⅛	--026	12⅛	11 13/16

Nos. 21000 & 22000—30 AMP

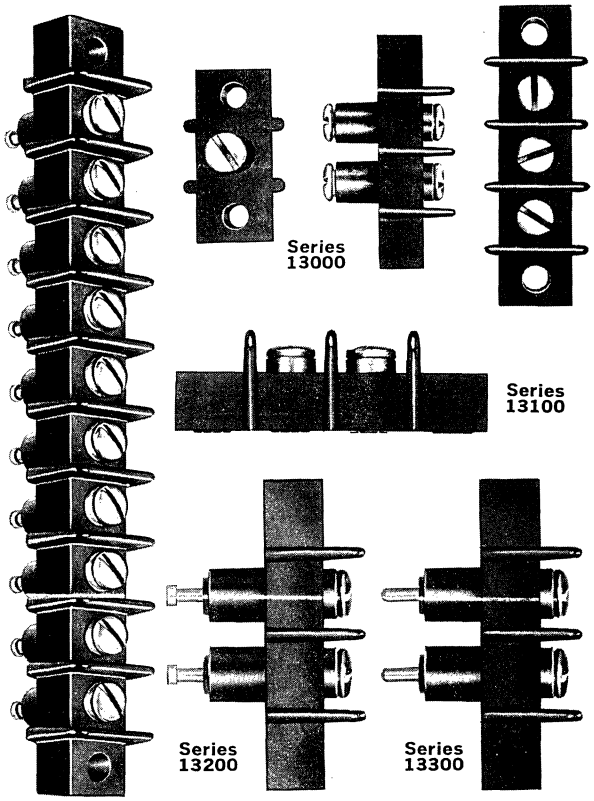
Wire size #14 to #12. Stand screw 8-32 x 5/16" brass, nickel-plated.



No. Circuits	A	B	No. Circuits	A	B
--001	1 17/32	1⅛	--014	8 27/32	8 1/16
--002	2 3/32	1 11/16	--015	9 1/32	9
--003	2 21/32	2¼	--016	9 31/32	9 9/16
--004	3 7/32	2 13/16	--017	10 17/32	10⅛
--005	3 25/32	3⅜	--018	11 3/32	10 11/16
--006	4 11/32	3 15/16	--019	11 21/32	11¼
--007	4 29/32	4½	--020	12 7/32	11 13/16
--008	5 15/32	5 1/16	--021	12 5/32	12⅜
--009	6 1/32	5⅝	--022	13 11/32	12 15/16
--010	6 19/32	6 3/16	--023	13 29/32	13½
--011	7 5/32	6¾	--024	14 15/32	14 1/16
--012	7 23/32	7 5/16	--025	15 1/32	14⅝
--013	8 9/32	7⅞			

Single Row Terminal Strips

BEAU precision injection molded thermosetting phenolic Series 13000 Single Row Terminal Strips are rated 300v at 20 amp. Fully insulated feed-thru. Available in 1 to 26 terminals, so order by Model No. and desired number of terminals: No. 13018 (No. 13000 with 18 terminals). Marker strips available for mounting beneath the blocks. Tab terminals available as noted below.



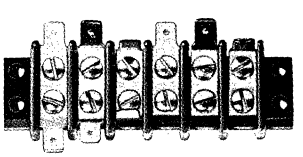
NEW . . . for 1971 . . . PC CONNECTOR

A new BEAU Connector has been introduced for use on pc board assemblies or flexible circuits and uses the "Jones" connector base concept.

See your local representative listed in E. E. M. Yellow Pages . . . or call the BEAU Distributor in your area.

DIMENSIONS	DESCRIPTION	PART NO.	A	B	C	D	E	F	G
	TWO SIDED	1410	1⅜	.187	9/32	¼	5/16	.136	—
	TAB	1810	1⅝	.250	5/16	5/16	27/64	.144	—
	FLAT	2110	1 53/64	.250	13/32	5/16	½	.171	—
	TWO SIDED	1411	1 1/16	.187	9/32	¼	5/16	.136	11/16
	TAB	1811	1 27/64	.250	5/16	5/16	27/64	.144	53/64
	45° ANGLE	2111	1 19/64	.250	13/32	5/16	½	.171	1 1/32
	TWO SIDED	1412	—	.187	9/32	¼	5/16	.136	11/16
	TAB	1812	—	.250	5/16	5/16	27/64	.144	53/64
	90° ANGLE	2112	—	.250	13/32	5/16	½	.171	1 1/32
	ONE SIDED	1413	15/16	.187	9/32	¼	5/16	.136	—
	TAB	1813	1 1/32	.250	5/16	5/16	27/64	.144	—
Hole Dia.	FLAT	2113	1⅛	.250	13/32	5/16	½	.171	—
	ONE SIDED	1414	—	.187	9/32	¼	5/16	.136	19/32
	TAB	1814	—	.250	5/16	5/16	27/64	.144	¾
	45° ANGLE	2114	—	.250	13/32	5/16	½	.171	31/32
	ONE SIDED	1415	—	.187	13/32	¼	5/16	.136	19/32
	TAB	1815	—	.250	5/16	5/16	27/64	.144	¾
	90° ANGLE	2115	—	.250	13/32	5/16	½	.171	31/32

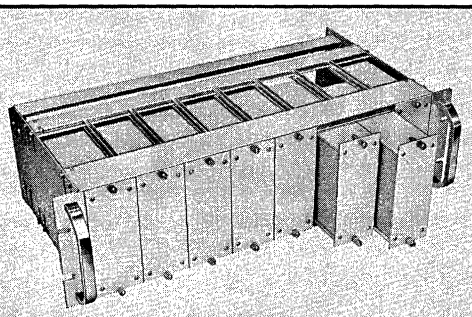
FAST-TAB Barrier Terminal Strips



Modified versions of standard Barrier Terminal Strips designed to save time and labor. 6 different terminal variations. Fastening can be made by riveting, eyeletting or with standard screws. All parts are of 1/32 brass, cadmium plated.

Beau Products Division
Vernitron Electrical Components
117 Union Avenue, Laconia, N.H. 03246
Tel: (603) 524-5101 TWX: 710-364-1843

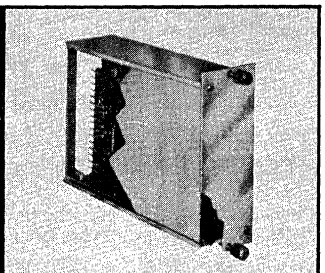
Vector PACKAGING SYSTEM FOR CARDS AND MODULES



CMA3-20 with 10 EFP204-6.6 modules for 4½ x 6½ cards FP52-2 filler panels, HA-12 handles.

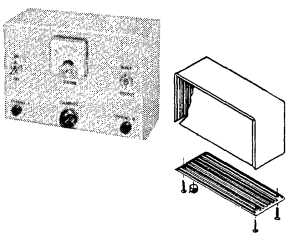
VECTOR STRUT CAGES

Sleek, versatile system employs aluminum extrusions for rack mounting plug-in modules. Built in adjustability with slotted side walls, sliding bracket mounted cross members. Available for 3½", 5¼", 8¾" rack panel heights, depths of 9", 12" & 15" for rack widths of 10", 19" & 24". NIMS (Nuclear Instrument Module System) bins & modules also available.



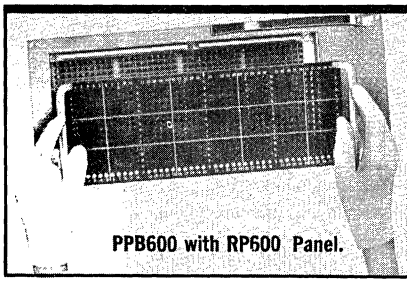
VECTOR "EFP" (EXTENDED FRONT PANEL) CASES

Typical module has extruded internal .075" grooves top and bottom for card mounting, plus slide-off side covers, 10-32 thumb screws. Modules available in widths of 1.6", 2.0", 3", 4½", for cards 2.73" x 4.50", 4.50" x 6.50", 4.5" x 9.6", 7.98" x 9.62". Modules supplied with front panel and unpunched rear plates

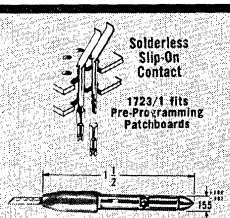


MULTI-MOD CASES

Versatile all aluminum Multi-Mod cases have four interior surfaces with .075" slots for cards and mounting plates and are ideal for packaging instruments, meters and other circuitry. Available in widths of 1.6", 2.0", 3.0", 4.5" for following card sizes: 2.98" x 2.98", 2.98" x 4.50", 4.49" x 4.50", 4.49" x 6.50", 4.49" x 8.50", 4.49" x 9.89", 6.49" x 9.89", 7.88" x 9.89" and 7.88" x 13.89".



PPB600 with RP600 Panel.

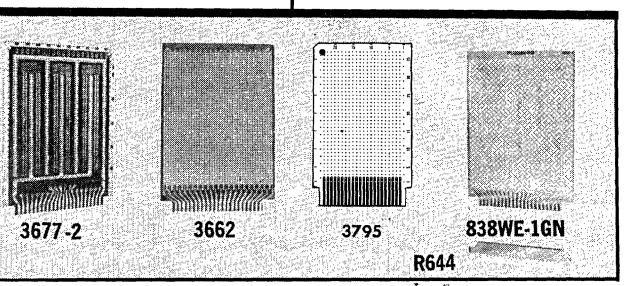


Pre-Programing Patch Cord Plug

VECTOR PRE-PROGRAMING PATCHBOARDS

Vector Pre-Programing Patchboard Systems are made with 204, 300, 600, and 1200 contacts, Long lived beryllium copper, nickle or gold contacts assure reliability over thousands of cycles. Transverse engagement cycle assures post patching capability. Complete line of color coded patch cords available. Removable programing panels supplied with standard alpha-numeric markings, blank or customer supplied markings.

Recept. Frame Cat. No.	Outside Dimen. W.	Outside Dimen. H.	No. of Contacts	Mating Remov. Panels Unmarked Cat. No.	Mating Remov. Panels Std. marked Cat. No.
PPB204	10⅜"	6"	204	RP204BLK	RP204BLKA
PPB300	10⅜"	6"	300	RP300BLK	RP300BLKA
PPB450	16"	6"	450	RP450BLK	RP450BLKA
PPB600	16"	6"	600	RP600BLK	RP600BLKA
PPB1200	17"	10¾"	1200	RP1200BLK	RP1200BLKA



PLUGBORDS FOR MOUNTING

DUAL-IN-LINE PACKAGES, ROUND OR RECT. INTEGRATED CIRCUIT PACKAGES, FLAT PACKS, TRANSISTORS, DISCRETES.

Plugbords listed are provided with G pattern of .062" dia. pre-punched holes on alternate .1" centers or in P pattern grid of .042" dia. holes on .1" centers. Use Vector T28 push-in Mini-Klip terminals with the G pattern and Vector T42-1 Micro-Klip Terminals with P pattern (see Vectorbords).

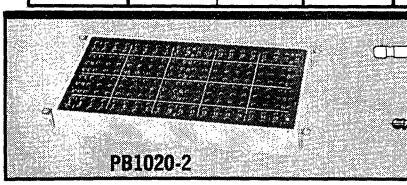
3795 2.73" W x 4.5" L, 44 contacts (total 2 sides, spaced on .1" centers) .042" diameter holes located .1" x .1", no matrix pattern. Holds sixteen 14- or 16-lead DIP, I.C.s or Sockets.

3677-2 4½" x 6½" Epoxy glass. 44 Contacts (total 2 sides) spaced on .156" ctrs. .042" dia. holes located .1" x .1" plus etched, tinned Vcc & ground bus plus soldering pads. Hold 24, 14-lead DIP, I.C.s or Sockets.

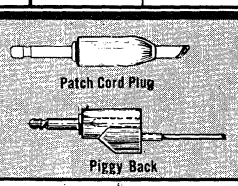
838WE-1GN 4½" x 6½" Epoxy glass. 43 contacts (total 2 sides) on .156" ctrs. .062" dia. holes located .1" x .2" grid. No matrix pattern.

3662 4½" x 6½" Epoxy glass. 43 contacts (total 2 sides) spaced on .156" ctrs. .042" dia. holes located .1" x .1" grid. No matrix pattern.

BR27 Brackets, aluminum, provide support for cards. Attach to receptacle mounting screw.



PB1020-2

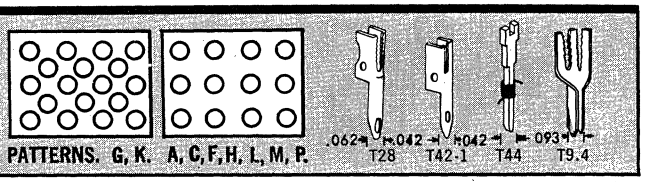


FIXED PANEL PATCHBOARDS

Reliable, low cost programing panels for maximum program flexibility at minimum cost. Available in sizes with 9, 10, 20, 50, 100, 200 and 300 contacts, spaced on .265" grid. Wrap-around beryllium copper nickle gold plated contacts handle up to 5 amps, and are located behind protected entry hole for damage-free years of use. Supplied with standard alpha-numeric markings or custom markings to order. Full line of color coded .090" tip diameter patchcords including piggy backs available.

Cat. No.	Contacts	Outside Dimensions W.	Outside Dimensions H.
PB33-2	9	1.130"	1.130"
PB110-2	10	2.985"	.600"
PB210-2	20	2.985"	.865"
PB510-2	50	2.985"	1.660"
PB1010-1	100	3.250"	3.250"
PB1010-2	100	2.985"	2.985"
PB1020-2	200	5.635"	2.985"
PB1520-2	300	5.635"	4.310"

Patch Cords		
Standard	Piggyback	Lgth.
K2.06	K9.06	6"
K2.09	K9.09	9"
K2.15	K9.15	15"
K2.02-1	—	Jumper



VECTORBORD® AND PUSH-IN-TERMINALS

Vectorbord,® Micro-Vectorbord® Pre-punched terminal boards. All flame retardant and Mil. Spec. Phenolic, Epoxy Paper, Epoxy Glass, Mylar. Available with: .025" holes on .05" ctrs., .042" holes on .1" ctrs., .062" holes on .1", .2", .1" x 2", .187" ctrs. & .093" holes on .2" & .265" ctrs.

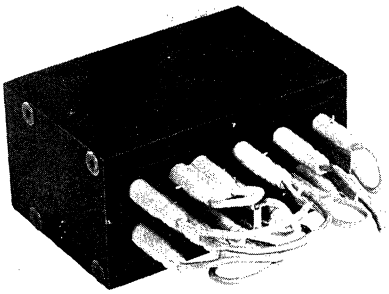
MOST POPULAR SIZES AND MATERIALS

CAT. NO.	PATTERN	DIMENSIONS W	DIMENSIONS L	HOLE SIZE
.062" Glass Epoxy				
169P44-062	.1" x .1" P	4.5 "	17"	.042"
169P84-062	.1" x .1" P	8.5 "	17"	.042"
85G24WE	.1" x .2" G	4.80"	17"	.062"
170H48WE	.1" x .1" H	4.80"	17"	.062"
.062" Epoxy Paper				
64A18EP	.265" x .265" A	4.80"	17"	.093"
85F24EP	.2" x .2" F	4.80"	17"	.062"
85G24EP	.1" x .2" G	4.80"	17"	.062"
42G24EP	.1" x .2" G	4.80"	8.51"	.062"
64P44-062EP	.1" x 1" P	4.5 "	6.5"	.042"
169P44-062EP	.1" x .1" P	4.5 "	17"	.042"
.062 XXXP Phenolic				
64A18	.265" x .265" A	4.80"	17"	.093"
42G24	.1" x .2" G	4.80"	8.51"	.062"

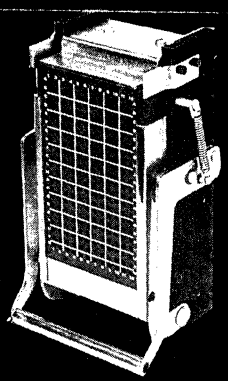
CAT. NO.	PATTERN	DIMENSIONS W	DIMENSIONS L	HOLE SIZE
.032" XXXP Phenolic				
32AA18	.265" x .265" A	4.80"	8.51"	.093"
64AA18	.265" x .265" A	4.80"	17"	.093"
64AA32	.265" x .265" A	8.5 "	17"	.093"
.032" Epoxy Glass				
59P19-032	.1" x .1" P	2 "	6 "	.042"
169P59-032	.1" x .1" P	6 "	17"	.042"
126M76-032	.05" x .05" M	4 "	6.5"	.025"
.062" Epoxy Paper Copper Clad, 2 Sides				
64P44-062EPC2	.1" x .1" P	4.5 "	6.5"	.042"
169P44-062EPC2	.1" x .1" P	4.5 "	17"	.042"
.062" Epoxy Glass Copper Clad, 2 Sides				
85F42WEC2	.2" x 2" F	8.5 "	17"	.062"

VECTOR ELECTRONIC CO., INC., 12460 Gladstone Ave., Sylmar, Calif. 91342 Phone (213) 365-9661

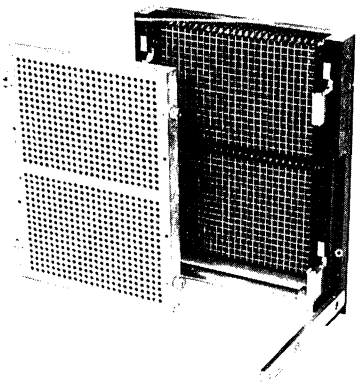
Patchboard Programming Systems and Accessories



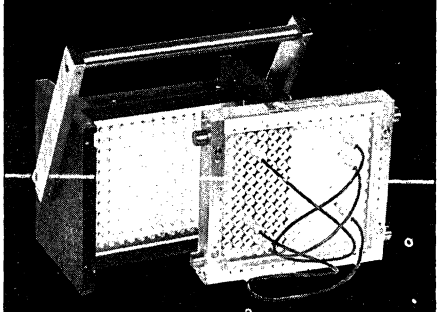
Fixed Systems —26 standard models ranging from 30 contact points to 7,188 combine reliability and economy to meet a wide variety of programming needs primarily in industrial controls and communications.



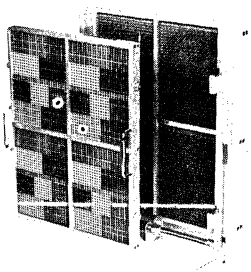
Lever Lock Systems —are most utilized by large computer manufacturers. A lever provides the necessary force to simultaneously mate up to 680 patchcord tips and paddle contacts. A smaller model offers 252.



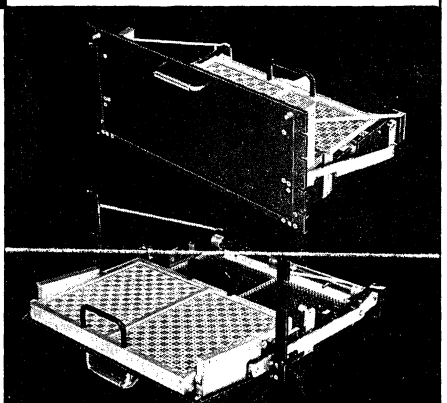
Shielded Systems —Each paddle contact is isolated with metal shielding. Crosstalk reduction is 92 db at 1000 cycles, 100 volts peak to peak. There are six models ranging from 360 to 4200 contacts.



True Thru-Shielded Systems —offer individual shielding, matched impedance, VSWR of 1.01 from 100 MHz to 500 MHz. These advanced programming systems can be manufactured to virtually any specifications.



Roll Cam Systems —offer greatest capability and reliability, large number of contacts (24 sizes from 48 to 5120 contacts). Camming action engages full patchboard gently and accurately and optimizes connections.



Drawer Type Systems —a roll cam designed for horizontal mounting to save up to 50% in panel areas. Also provides R.F. shielding. Five standard sizes range from 480 to 1870 contacts. All fit 19"-wide racks.

Plating—Nickel or Gold
Board Material—Phenolic or Diallyl Phthalate
Contact Diameters—.093 and .053
Connections—Solder, wire wrap or Locktite
Finish—clear polish or black anodized
Silk Screen—Alpha/ numeric grid or special designs
Patchcords—Manual or fixed; single tip to nine-prong tip; squids; splits; shunts.
All unconditionally guaranteed.
Tools—a variety of 27 tools for crimping, extraction, insertion, and paddle contacts.
Send for complete 40-page catalog today.

VPC

VIRGINIA PANEL CORPORATION
1400 NEW HOPE ROAD
WAYNESBORO, VIRGINIA 22980
(703) 942-8376

We have salesmen in 24 U.S. cities. Please refer to the proper section in this catalog for the one nearest you, or contact our factory in Waynesboro, Va.

Besides our 75 standard models of programming systems, some of which are described on this page, VPC also produces a wide variety of custom products.

We invite your inquiries and will appreciate your business.

Winchester

the standard connector line that solves

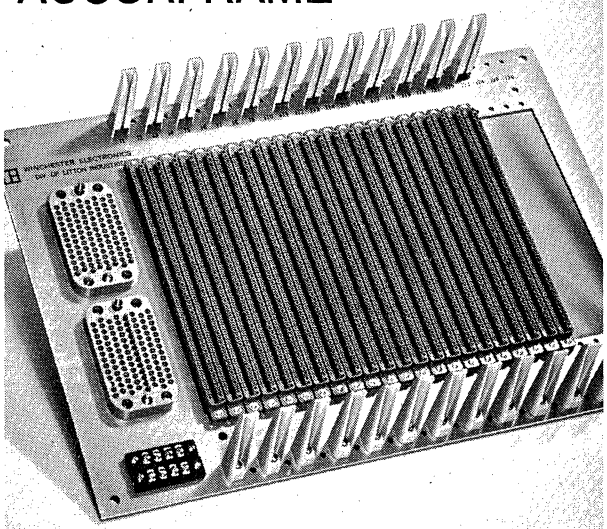
WINCHESTER ELECTRONICS
DIVISION OF LITTON SYSTEMS INC.
Main Street & Hillside Avenue
Oakville, Connecticut 06779 Phone (203) 274-8891

ACCURFRAME®

The AccurFrame® system is the simple yet accurate positioning of precision molded Wire-Wrap connectors onto a metal frame. This technique offers substantial cost reduction, versatility of application and flexibility of design for automatic wire wrapping.

The heart of the AccurFrame packaging is our HW Series of Wire-Wrap printed circuit connectors. Designed for .062 printed circuit cards, the connectors are precision molded of diallyl phthalate with contact spacings of .100 x .200 inches or .125 x .250 inches. The contacts are bifurcated phosphor bronze with gold over nickel plating. The terminal posts are .025 inches square and have been designed to MIL-STD-1130. Post ends are flat within .020 inches of true position, and each post will accept up to three #30 AWG solid wires. Correct post alignment and retention is assured in the body of the connector by twisting the terminal a full 90 degrees.

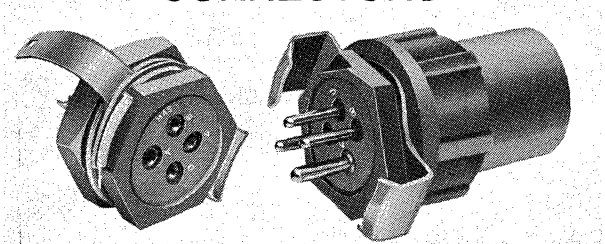
Standard AccurFrames are available for off-the-shelf delivery. Custom designs and configurations can be made to order.

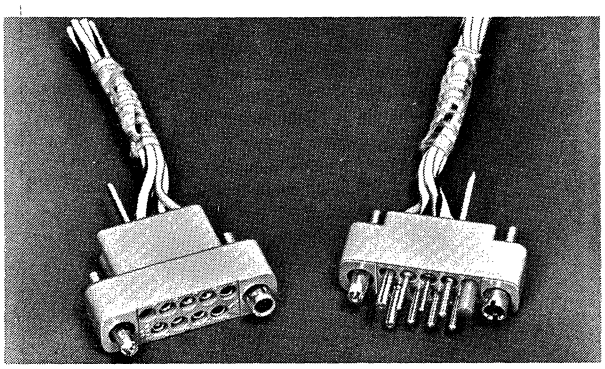


RACK AND PANEL CONNECTORS

The following chart indicates our broad range of standard rack and panel connectors, available in a wide variety of dielectrics. Many were developed for and qualify under Mil-C 008384 and Mil-C 22857.

Type of Connector	Current Rating (range)	No. of Contacts (range)	Max. Wire Size (Stranded)	Protective Types	Termination Types*	Series
Miniature	7.5–13 amps	7–104	No. 16	Yes	S.D.	MRA, MRE, XMRA, XMRE, SA, QRE
Subminiature, Hi-Density	3–7.5 amps	4–104	No. 20	Yes	S.D.	SME, SRM, SRE, SREC/D, SLE
Microminiature	5 amps	32–74	No. 22	Yes	S.D.	SRD, 42
Environmental	7.5–13 amps	14–104	No. 16	Yes	S	EA, EE, CM/CRB
Hi-Voltage Circular	3–13 amps	1–12	No. 16	Yes	S	JF, JFA, M, PM, SM
Removable contact	5–13 amps	7–260	No. 13	Yes	S, S*, D, C, SH, W	MRAC, XAC, CAC, 40, NIM, SREC, SQC





*Termination Types
S—Solder Cup
D—Dip Solder
C—Crimp Removable Contacts
SH—Shielded Contacts
S*—Solder Removable Contacts
W—Wire Wrap Terminations

Electronics

many non-standard problems.

RF CONNECTORS

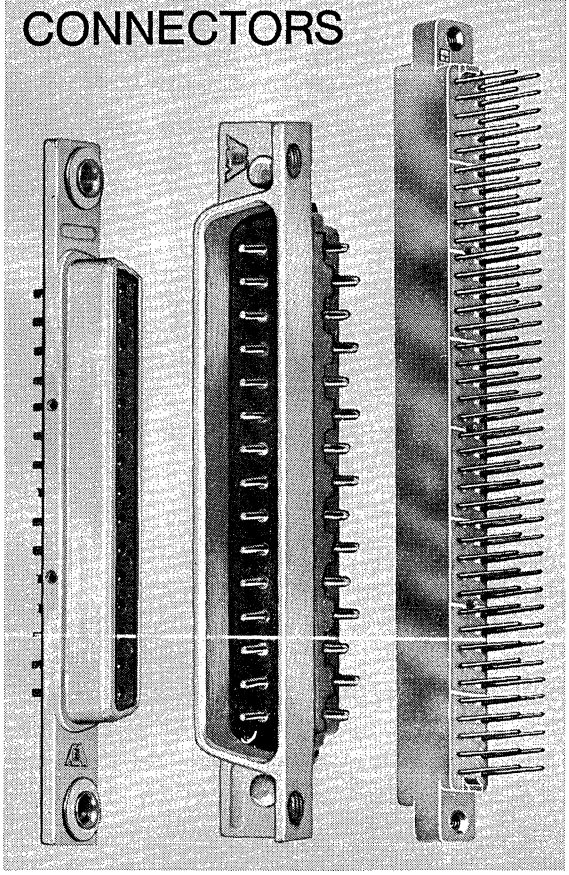
Winchester Electronics offers the complete line of Radiall coaxial connectors. These include standard BNC, TNC, Type N (Mil-C 39012), SMA, SMB, SMC, UG and miniatures (Mil-C 22557), as well as the proprietary miniQUICK and SUBLOCK Series of quick disconnect high performance connectors.

Winchester Electronics also offers full capability to design and produce special RF and High Voltage connectors to customer requirements.

The miniature and sub-miniature series is finished with a heavy gold plate. The standard series is plated with NSR, a patented nickel base finish providing better physical characteristics than standard nickel plating.

All connectors are machined to close tolerances, are rack plated, and provide superior electrical performance at competitive prices.

PRINTED CIRCUIT CONNECTORS



Type	Spacing	Circuit Board Thick.	Connectors Single or Double Sided	Class	Series	Number of Contacts	Termination
	.050	.031	Double	M/I	PCM	20/40 30/60 40/80 50/100	S
	.050	.031	Single	M/I	PCM	25	S
	.050	.062	Double	M/I	PCM	20/40 25/50 30/60 40/80 50/100	S
	.078	.062	Single	I	KM	14 21 31 37 44	S
	.100	.062	Double	M/I	HCD	25/50 30/60 36/72 48/96	D S
	.100	.062	Double	M/I	HW	20/40 22/40 25/50 30/60 32/64 36/72 43/86 48/96 50/100	W
	.125	.062	Double	M/I	HW	28/56 31/62 40/80 49/98 50/100	W
	.125	.062	Single	I	PQ	31	S, D, W, A
	.125	.062	Double	I	PQD	31/62	S, D, W, A
Card	.150	.062	Single	I	PBH	25	S, D, W, A
	.150	.062	Double	I	PBDH	25/50	S, D, W, A
Edge	.150	.062	Double	I	PJDH	25/50	S, D, W, A
	.156	.062	Single	C	8B	6 10 12 15 18 22 28 30	S, D, W, A
	.156	.062	Double	C	8BD	6/12 10/20 12/24 15/30 18/36 22/44 28/56 30/60	S, D, W, A
	.156	.062	Double	C	8BDJ	6/12 10/20 12/24 15/30 18/36 22/44 28/56 30/60	S, D, W, A
	.156	.062	Single	M	HB	6 15 18 22 28	D, S, W
	.156	.062	Single	I	HK	6 15 18 22 28	D, S, W
	.156	.062	Double	M	HBD	10/20 15/30 18/36 22/44 36/72 43/86	D, S, W
	.156	.062	Double	I	HKD	10/20 15/30 18/36 22/44 36/72 43/86	D, S, W
	.156	.062	Single	I	K	6 10 12 15 18 22	SC
	.156	.062	Single	I	KKM	6 10 12 15 18 22	S
Board Joiner	.100	to .187	—	M/I	WD	11 22	D
	.100	to .187	—	M/I	WD	11 22	Plug-D, FT Recpt-SC, D
Dip Solder	.100	to .250	—	M/I	WM	11 17 23 29 35	Plug-D Recpt-SC, D TT
	.100	to .250	—	I	42	50	D
	.156	to .250	—	M/I	W NAS 714 NAS 715	7 11 15 19 23	Plug, D Recpt-SC, D TT
Recpt.	.156	—	—	M/I	WC	23	C

CONTACT TERMINATION LEGEND

S—solder tab
W—wire wrap
D—dip solder
A—taper tube
C—crimp socket contact
SC—solder cup
TT—turret terminal
FT—feed-thru

CLASS DEFINITION

Class M—Designed to meet military requirements as to materials, plating and performance.
Class I—Same as Class M except for reduced plating.
Class C—Economical non-military applications.

PLUGMOLD® MULTIOUTLET SYSTEMS FOR ELECTRONIC APPLICATIONS

Plugmold systems: the versatile, efficient way to organize electrical wiring and devices

To contain power wiring — along with a variety of outlets, switches, jacks, circuit breakers and other devices — use versatile Plugmold systems. Rugged, attractive Plugmold systems accommodate 14 to 2/0 AWG wire and accept a variety of electrical devices up to 60A, circuit breakers to 100A.

- With outlets and other devices placed where you need them, Plugmold adds efficiency and convenience wherever it is used.
- Made of steel, Plugmold protects wiring and keeps it accessible.
- A complete line of fittings makes it easy to apply Plugmold to almost any wiring situation.
- All Plugmold multioutlet assemblies and fittings are listed by Underwriters' Laboratories, Inc., and Canadian Standards Association.
- For engineering assistance, contact your nearest Wiremold representative — listed in the EEM yellow section.

Plugmold with prewired outlets

PLUGMOLD 2000 and 2200: Furnished completely prewired (No. 12 Type TW). Grounding outlets (15A, 125V) are spaced at regular intervals.

Outlet Spacing: 6, 9, 12, 18, 30, 60″ on centers.

Lengths: 1, 3, 5, 6′, and in Snapicoil® prewired harness up to 500′.

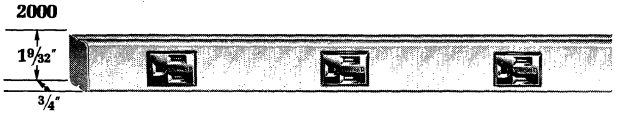
Circuit arrangements . . .

G Series: 2-wire, 1-circuit; Plugmold base serves as grounding conductor.

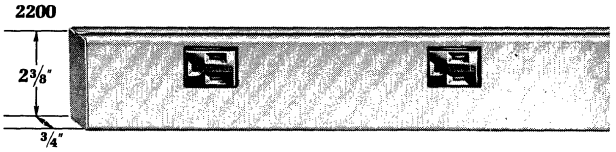
GA Series: 3-wire, 2-circuit; outlets wired alternately; Plugmold base serves as grounding conductor.

GB Series: 2-wire, 1-circuit; has insulated grounding conductor. (On special order, GB series available with insulated, isolated grounding conductor.)

2000



2200



Other Plugmold systems

Four types are furnished unwired. Outlets and other devices may be spaced as desired.

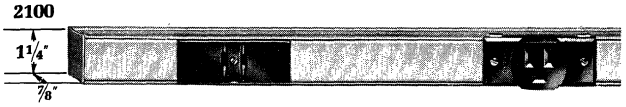
PLUGMOLD 2100: For use with various receptacles made by Wiremold (15A, 125V; 15A, 250V; 15A, 277V; and 20A, 125V). Devices include 2- and 3-wire receptacles, Lumiline single receptacle, single-pole switch, and keyless socket. Accepts wiring from 14 to 6 AWG. Devices can also be installed in 1-, 2-, and 3-gang Wiremold boxes as desired.

PLUGMOLD G-3000: For use with most outlets (up to 50A) and devices designed for a 1-gang box. Accepts wiring from 14 to 2 AWG.

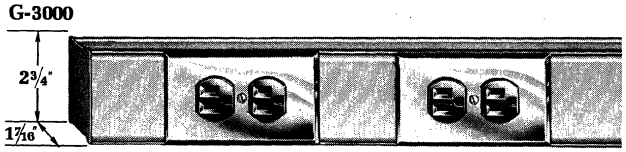
PLUGMOLD G-4000: Used with or without channel divider strip. With divider, one compartment holds power wiring (devices to 20A), the other carries low potential (communications, etc.) circuits. Without divider, the full channel accepts devices to 50A. Max. depth of devices, 1 5/8″. Accepts wiring from 14 to 2 AWG.

PLUGMOLD G-6000: For use with most outlets (up to 60A) and devices designed for a 1- or 2-gang box. Holds circuit breakers (to 100A). Accepts wiring from 14 to 2/0 AWG.

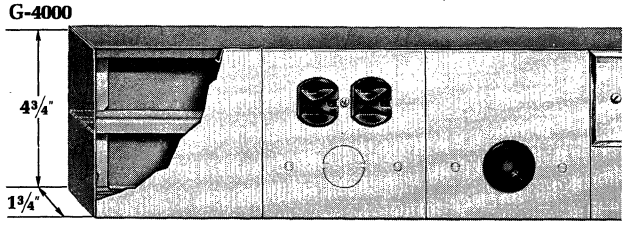
2100



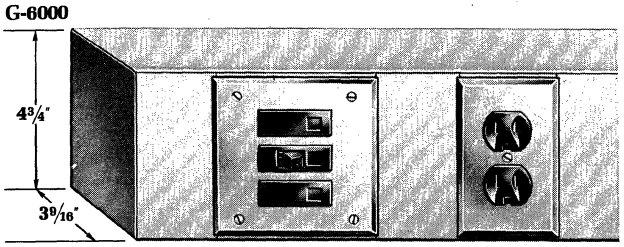
G-3000



G-4000



G-6000



SEND FOR WIREMOLD CATALOG AND WIRING GUIDE

Wiremold®

THE WIREMOLD COMPANY WEST HARTFORD, CONNECTICUT 06110

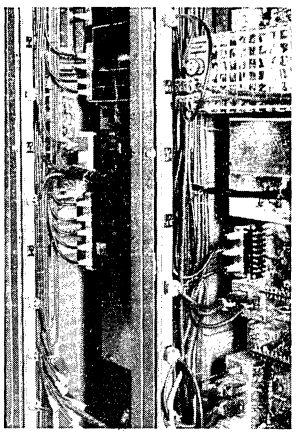
2726 **PAGES: 1-988** (Vol. 1) . . . **989-2008** (Vol. 2) . . . **2009-3076** (Vol. 3) eem/1971

PLUGMOLD® MULTIOUTLET SYSTEMS FOR ELECTRONIC APPLICATIONS

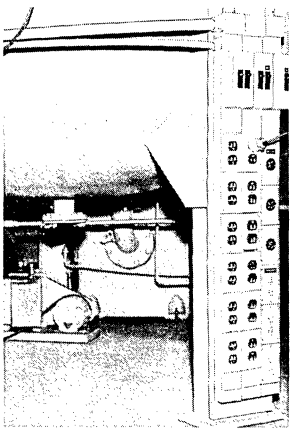
Typical uses of Plugmold

On original equipment: Plugmold adds value, convenience and efficiency to control consoles, cabinets, racks, benches, chassis, modular equipment, data processing equipment, trailers, shelters, etc.

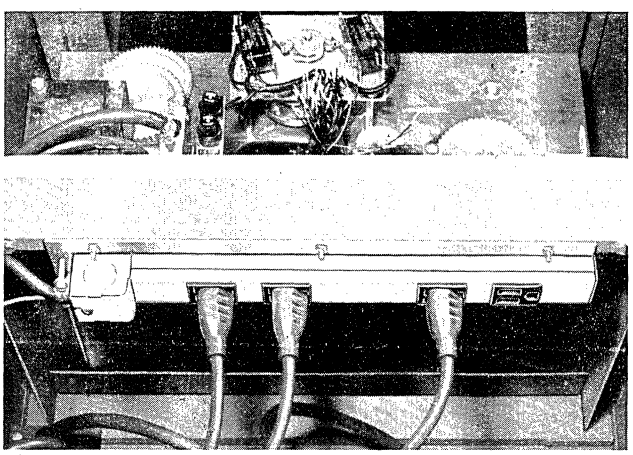
In laboratory and production areas: Use Plugmold on benches, over benches, on walls and partitions — wherever you need to put electricity to work.



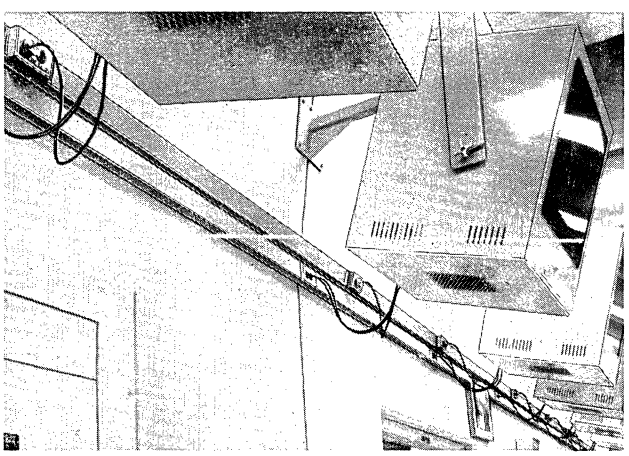
Strips of Plugmold in cabinets feed radio/TV transmitting equipment. *WTIC Broadcast House, Hartford, Conn.*



Rotary accelerator has Plugmold on leg to handle a variety of services. *G.E. Space Center, Valley Forge, Pennsylvania.*



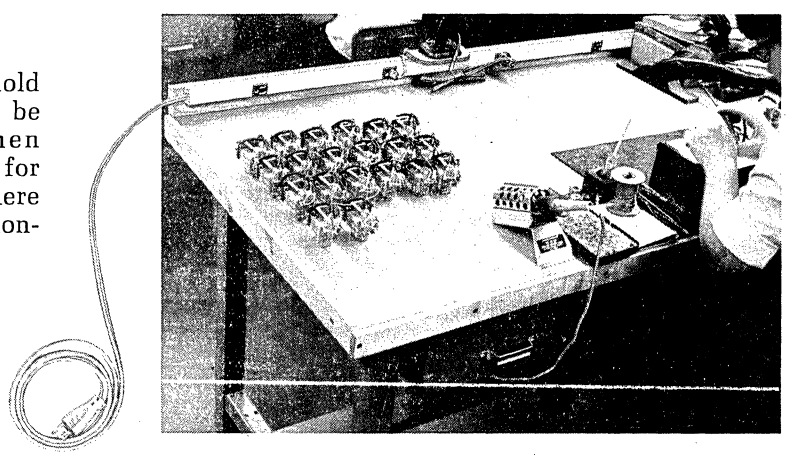
Central time transmitter in computer uses Plugmold to feed power to fan, clocks, etc. *Friden, Inc., Rochester, N.Y.*



Plugmold brings power wiring and antennae leads to closed-circuit TV monitors. *J. F. Kennedy Space Center.*

20CSK Cord Set Kit

The Cord Set Kit converts runs of Plugmold 2000 into portable power units that can be easily moved with work benches, then plugged in again at a new location. Ideal for laboratory and production situations where changing needs require frequent repositioning of benches.



Wiremold®

SOLD BY ELECTRICAL DISTRIBUTORS EVERYWHERE

Delay Lines

Andersen designs and develops many more different types of delay devices (including optical and microwave) than any other concern.

Andersen is the only firm producing delay devices for the entire range of frequencies.

Andersen is the sole major manufacturer of delay devices specializing in signal processing systems.

Andersen supplies a substantially greater volume of delay equipment than any other source.

	TYPICAL APPLICATIONS	RANGE OF PARAMETER	NEWEST DEVELOPMENTS and UNIQUE CHARACTERISTICS
AUDIO	Sonar, voice equalization, ASW sensors.	1 usec to 1 sec delay, balance or unbalanced. Typical delay-bandwidth products up to 40. Impedances from 100 to 1000 ohms.	Delay-BW products up to 60 or more for fixed lines, and 15 or more for electrically variable lines. Extremely low attenuation for delay-BW of 40 max, e.g. 0.001 db per usec max. For higher delay-BW 0.01 db per usec max. Extremely low frequency ripple, better than 1%. Phase response and group delay to better than 1% at 3 db response.
VIDEO	Radar-sonar signal processing, comb filters, correlation, cancelling, television broadcast, delay equalization, field storage, signal synchronization.	Lumped constant lines with delay-BW products of 40 to 60, delays from 1 nsec to milliseconds. Quartz lines with CF to 150 Mhz and delays to 4000 msec. Electrically variable delays of 0.1-100 usec with delay-BW product of 15.	High fidelity storage of one full field of TV signal. Variable delay of full 360° of chrominance. EVDL's with improved group delay and response characteristics meeting video color standards.
IF-RF	Non-dispersive: MTI, clutter cancellation, coherent integration, target simulation, range markers, coded sequence processing, transversal equalizers, receiver gain control versus time, time multiplexing correlation, Variable time delay, digitally controlled. Dispersive: Pulse expansion-compression systems, spectrum analyzers, doppler estimators.	CF to 150 Mhz, BW to 50% of CF. Delay 4000 usec in single unit, longer when used in cascade. Products always offered with unity gain.	Short delays with low spurious, e.g., 1 usec delay, 48 db spurious at 60 Mhz. Wider BW, e.g., 65% at 60 Mhz CF. Flat amplitude response e.g., plus or minus 0.2 db 30% BW 60 Mhz CF. VSWR across BW e.g., 1.3 to 1 nom 50 ohms.
MICRO-WAVE	Non-dispersive: ECM, ECCM, radar processing and checkout systems, fusing, altimeters, transponders. Dispersive: High resolution pulse compression and similar wide band signal processing.	CF UHF through X-band, delay 200 nsec to 10 usec. BW to 500 Mhz. Pulse-compression ratios to 500 to 1.	10 db insertion loss at 500 Mhz, delays to 10 usec at X-band. Dispersive lines with 500 Mhz Bw, .5 usec dispersion. Transducer peak power capability to 50 watts, average power 2 watts.
DISPER-SIVE	Pulse expansion — compression systems, spectrum analyzers, panoramic receivers, doppler estimators.	C.F. 1-120 MHz, Dispersive B.W. to 60 MHz, Delay Dispersion to 1000 microseconds, Compression Ratio to 2500. All units available with ovens and temperature controllers, meet Mil-specs. Complete pulse compression systems our specialty.	IMCON systems, B.W. up to 15 MHz, dispersion up to 300 micro-seconds, small size, good linearity and temperature stability. DELECON systems offer B.W. up to 60 MHz, dispersion up to 30 microseconds, good linearity and temperature stability. STRIP LINES are least expensive, B.W. up to 6 MHz, compression ratio up to 200 per strip, low insertion loss, small size.
DIGITAL	Deltics, delta modulators, spectrum analyzers, matched filters, serial memories, scratch pad, refresh, buffer storage, A-D conversion.	Wiresonic: CF to 2 Mhz, storage 20,000 bits per unit. Glass: CF to 20 Mhz, storage 4500 bits per unit. Quartz: CF to 40 Mhz, storage 30,000 bits per unit.	Dual channel, 35 Mhz memory in single small package. Low cost high capacity temperature compensated multi-line packages. Lowest cost per bit in comparison with ferrites and MOS. Highest bits per cubic inch. Lowest power dissipation per bit.
OPTICAL	Laser modulation, Switched light sources, Q switches, mode lockers, beam deflectors, optical signal processing, cross and auto correlation, radar pulse compression-expansion matched filters, spectrum and Fourier analyzers, acousto optical continuously variable and multi-tapped delay lines.	CF 0.1 Mhz to 12 Ghz. BW octave or greater. Modulation to 4 Ghz. Time-BW products to 20,000 Mhz-useconds. Spectral ranges from UV to IR.	High efficiency, high power broad band transducers, IR modulation Stable, high rep rate Q switches, liquid cooling for high power, compact solid state designs.

ANDERSEN LABORATORIES, INC.

1280 BLUE HILLS AVENUE • BLOOMFIELD, CONN. 06002 • 203-242-0761

signal processing equipment

Andersen is also the leading producer of delay oriented signal processing systems for broadcast, computer and radar fields.

ALLEN AVIONICS, INC.
224 EAST SECOND STREET • MINEOLA, NEW YORK 11501 • PHONES: (516) 248-8080 OR (516) 747-5450

SEE OUR PAGE UNDER FILTERS SECTION 2700

LUMPED CONSTANT DELAY LINES

CUSTOM-BUILT

Allen Avionics, Inc. manufactures a wide variety of delay lines to customers' specifications. The following specifications encompass areas in which we normally work. If, however, your requirements fall outside of the following parameters, we would still be interested in hearing from you.

RANGE — Delay times from 3 nanoseconds through audio ranges are available.

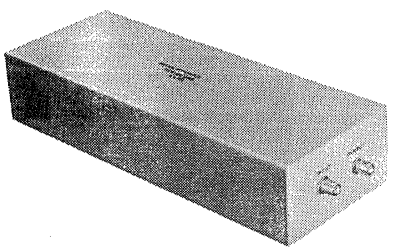
TIME DELAY/RISE TIME RATIO — Time delay to rise time ratio to 300/1.

CONSTRUCTION — Units are hermetically sealed in metal cans with glass to metal terminals. Epoxy encapsulated units are also available.

SIZE — Sizes are available from .750 x .270 x .225 inches.

DELIVERY — Prototypes of special lines can often be delivered in a week or two.

Our engineering staff is always available to help with any delay line and application problems.



HIGHEST $\frac{\text{TIME DELAY}}{\text{RISE TIME}}$ RATIO EVER BUILT!

These Delay Lines have the highest ratio of time delay to rise time that has ever been built in a Lumped Constant Line. Unlike other types of high ratio lines, the Lumped Constant Delay Line has a passband from D.C. to its cutoff frequency and maintains a constant delay over these frequencies. These lines are also unique in that they offer relatively low insertion loss.

This group of lines is characterized by tight time delay tolerances, low pulse distortion, excellent phase linearity and good temperature stability.

For laboratory use, any time delays from 10 microseconds to 100 microseconds can be built into variable decade instruments with ratios of over 100/1. These units could have a resolution of up to 1/5000 of the total delay.

SERIES "HF" HIGH FREQUENCY

The HF Series in most cases will serve as more than adequate electrical replacement for coaxial cable. The inconvenience of handling and storing cable will thus be eliminated. Standard impedances of 50 and 75 ohms are available. Units are normally supplied with BNC connectors. Tapped lines can also be supplied.

50/1 RATIO
ATTENUATION 9 db MAXIMUM
SIZE: 2½" x 4½" x 12"

Available in any delay from .5 to 4.75 μs

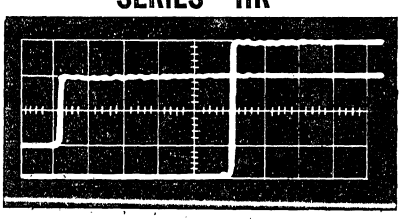
75/1 RATIO
ATTENUATION 12 db MAXIMUM
SIZE: 3½" x 4½" x 12"

Available in any delay from 1.5 to 4.75 μs

100/1 RATIO
ATTENUATION 15 db MAXIMUM
SIZE: 3½" x 6½" x 16"

Available in any delay from 2.0 to 4.75 μs

SERIES "HR"



1 MICROSECOND PER DIVISION
(5 Microseconds Delay — .05 Microsecond Rise Time)

100/1 RATIO
ATTENUATION 8 db MAXIMUM
SIZE: 2½" x 4½" x 12"

Available in any delay from 5 to 50 μs

130/1 RATIO
ATTENUATION 9 db MAXIMUM
SIZE: 3½" x 4½" x 12"

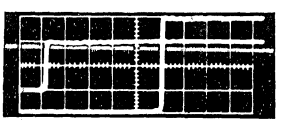
Available in any delay from 5 to 100 μs

SERIES "VHR"

The "VHR" Series have a characteristic impedance of 50 ohms.

These units are hermetically sealed in a metal can 3½ x 6½ x 16 inches, with four ¼ x 20 studs on the 6½ x 16 inch surface.

Two BNC connectors are located on the 3½ x 6½ inch surface for input and output connections. Variable Decade Delay Units can be manufactured for laboratory use from the "VHR" Lines.



5 MICROSECONDS PER DIVISION
(25 Microseconds Delay — .1 Microsecond Rise Time)

150/1 RATIO ATTENUATION 16 db MAXIMUM
SIZE: 3½" x 6½" x 16"

Available in any delay from 10 to 70 μs

200/1 RATIO ATTENUATION 18 db MAXIMUM

Available in any delay from 10 to 75 μs

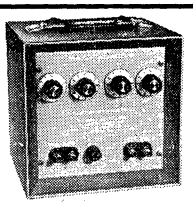
250/1 RATIO ATTENUATION 20 db MAXIMUM

Available in any delay from 20 to 100 μs

LUMPED CONSTANT DECADE DELAY LINES TYPE "D"

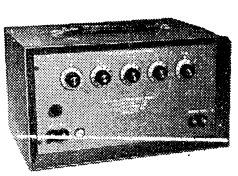
Type "D" Variable Decade Delay Units are engineered to provide variable time delays with absolute stability for accurate triggering and excellent reproduction of the input pulse. These lumped constant delay lines are completely passive. All models have a minimum of 1000 to 1 resolution and consist of three or more decade switches. Any delay output of Type "D" decade delay unit is the summation of individual lines. It is not the result of a tapped line. This feature is an important factor in eliminating undesirable reflections in the output pulse. Accuracy at any delay exceeding 1% of the unit's total delay is within 3%. These units have a characteristic impedance of 500 ohms in and out. While the units listed are standard, other delays and impedances can be manufactured to specifications.

Part No.	Maximum Time Delay In Microseconds	Resolution In Microseconds	Rise Time @ Max. Delay In Microseconds	Bandwidth Kilohertz	Attenuation In db
D11	11.1	.01	.45	800.00	3
D21	21.1	.01	.85	424.00	5
D41	41.1	.01	1.65	218.00	5
DD41	41.1	.01	.83	434.00	5
D61	61.1	.01	2.45	147.00	6
DD61	61.1	.01	1.23	293.00	6
D1C	111.1	.01	4.45	81.00	3
DD1C	111.1	.01	2.23	161.00	8



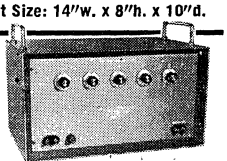
Cabinet Size: 8"w. x 8"h. x 7"d.

D2C	211.1	.01	8.45	42.60	3
DD2C	211.1	.01	4.23	85.10	3
D4C	411.1	.01	16.45	21.90	3
DD4C	411.1	.01	8.23	43.70	6
D6C	611.1	.01	24.45	14.70	3
DD6C	611.1	.01	12.23	29.40	6
D1K	1111.1	.01	40.45	8.89	3
DD1K	1111.1	.01	20.23	17.80	8
D2K	2111	.1	84.50	4.26	5
D4K	4111	.1	164.50	2.18	6
D6K	6111	.1	244.50	1.47	8
D11K	11,111	.1	444.50	.80	11
D21K	21,111	1	844.50	.42	11



Cabinet Size: 14"w. x 8"h. x 10"d.

DD2K	2111	.1	42.25	8.52	5
DD4K	4111	.1	82.25	4.37	6
DD6K	6111	.1	122.25	2.94	8
DD11K	11,111	.1	222.25	1.61	11
DD21K	21,111	1	422.25	.85	11
DD41K	41,111	1	822.25	.43	12
DD61K	61,111	1	1222.25	.29	12



Cabinet Size: 17"w. x 9½"h. x 11½"d.

ALLEN AVIONICS, INC.
224 EAST SECOND STREET • MINEOLA, NEW YORK 11501 • PHONES: (516) 248-8080 OR (516) 747-5450

DUAL-IN-LINE "MINI" SPIRADEL®*
THE WORLD'S LOWEST COST DELAY LINE
HAVING TIME DELAY TO RISE TIME GREATER THAN 5/1

FEATURES EXCELLENT PULSE FIDELITY

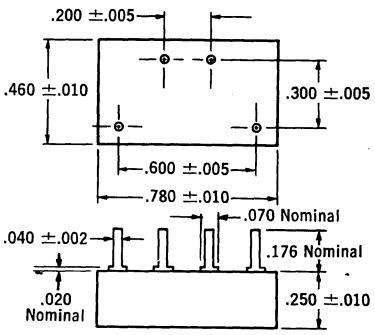
Exceptionally Fine Phase Linearity Over Wide Frequency Range.

- **Operation from −55°C to +105°C. Units exhibit a change of less than 175 parts/million/°C over this entire temperature range.**
- Designed for dual-in-line mounting. Compatible with integrated circuits.
- Standard delay tolerance 10%. (5% available).
- Maximum attenuation for all delays: 7%.
- Bandwidth from DC to frequency f = .35/rise time.

To order standard units, specify "Mini" Spiradel and Total Delay.

Time Delay (Nano-seconds)	Rise Time (Nano-seconds)	Bandwidth Megahertz	Impe-dance (Ohms)
10	2.5	144.0	125
20	4.0	90.0	200
30	6.0	60.0	250
40	8.0	45.0	300
50	10.0	36.0	350
60	12.0	30.0	400
70	14.0	25.7	400
80	16.0	22.5	475
90	18.0	20.0	500
100	20.0	18.0	500
125	25.0	14.4	500
150	30.0	12.0	1000
175	35.0	10.2	1000
200	40.0	9.0	1000

ACTUAL SIZE



UP TO 5 UNITS can be connected in series to achieve longer delays providing the delays and impedances of each unit are the same. The total rise time of the series combination can be determined by the following formula:

$$Tr = \frac{Td}{50} + Tr_1$$

Where Tr = Total Rise Time
Td = Total Time Delay
Tr_1 = Rise Time of Individual Unit

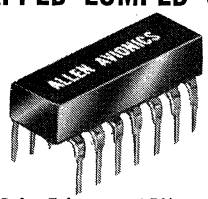
*Patented and patents applied for.

"LC DIP" THE WORLD'S SMALLEST DUAL-IN-LINE 14 PIN TAPPED LUMPED CONSTANT DELAY LINE

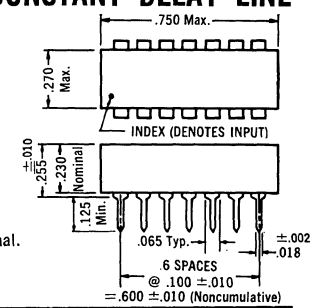
THE "LC DIP" represents the smallest delay line now available. It offers the ultimate in high density packaging and tapping capabilities. The units are excellent for high frequency applications. The availability of 10 equal delay increments and the dual-in-line packaging along with its low silhouette make for compatibility with semiconductor and other assemblies where circuit board height must be held to a minimum. This makes the "LC DIP" extremely adaptable for the computer and allied industries.

While the table lists our standard units with an impedance of 100 ohms, other delays and impedances can be manufactured.

Time Delay (nano-seconds)	Rise Time (nano-seconds)	Band-width (MHz)	Maximum Attenuation (%)
50	10	36.0	8
100	20	18.0	12
150	30	12.0	15
200	40	9.0	23
250	50	7.2	30

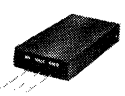


Delay Tolerance: ±5% or 4 ns (whichever is greater).
Impedance: 100 ohms nominal.
Working Voltage: 50 volts DC.
Construction: Epoxy encapsulated.



TYPES "N", "A", "L" DELAY LINES

TYPES "N" & "A"

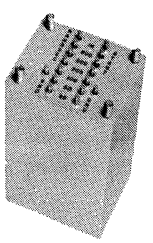


TYPE "L"

Type	Time Delay	Impe-dance	Time Delay To Rise Time Ratio	Size
N	20, 30, 40, 50, 60, 70, 80, 90, 100 ns.	100 Ω	3.5 to 1	⅝" x ⅝" x .450"
A	0.1, 0.2, 0.3, 0.4, 0.5 μs.	500 Ω	3.5 to 1	⅝" x ⅝" x .450"
	0.5, 0.6, 0.7, 0.8, 0.9, 1.0 μs.	1000Ω		
L	25, 75, 200, 250 μs.	250 Ω	5 to 1	2½" x 4½" x .8"
	50, 150, 400, 500 μs.	500 Ω		
	100, 300, 800, 1000 μs.	1000 Ω		

PULSE & VIDEO DELAY LINE TYPE AV-397

Maximum Delay: 2.075 microseconds ±3% variable in .025 microsecond steps from .025 microseconds to 2.075 microseconds.
Time Delay of Individual Lines: 1, .5, .2, .2, .1, .05, .025 microseconds.
Rise Time for Entire Line: .06 microseconds maximum.
Frequency Response: 3 db down at 5 MHz for 2.075 microseconds delay.
Distortion: 2% maximum with .2 microsecond input pulse.
Impedance: 75 ohms ±5%.
DC Working Volts: 300.
Temperature Coefficient: 50 parts/million/°C from −55°C to 105°C.
Attenuation: 7% maximum for 2.075 microsecond delay.
Mechanical: Hermetically sealed in a steel can 2" x 2½" x 5½", painted gray with black identification markings, and using 10/32 x ½ inch studs spaced on 1½" x 2" centers for mounting.



TV LINE EQUALIZER TYPE AV-535

The Allen Avionic's AV-535 Equalizer is designed to compensate for losses in RG-11/U (75 ohm) cable and its equivalents. The unit is capable of equalizing 50 to 300 feet in 50 foot increments.

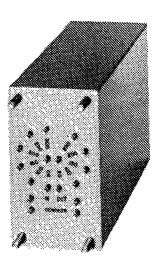
Terminals on mounting surface are so arranged to provide for simplified strapping for compensation of different cable lengths. All units are foamed and hermetically sealed in steel cans.

Size: 2 x 3½ x 5 inches (not including mounting stud length).
Mounting Centers: 1½ x 3 inches.
Stud Size: 8/32 x ½ inch long.

Impedance: 75 ohms ±2 ohms to 8 MHz.
Attenuation of Cable Plus Equalizer: 3 db.
Attenuation of equalizer alone is as shown in the following table:

Feet	0.1 MHz	2 MHz	4 MHz	8 MHz
50	2.97 db	2.86 db	2.79 db	2.67 db
100	2.93	2.68	2.53	2.27
150	2.90	2.51	2.28	1.88
200	2.86	2.35	2.03	1.52
250	2.82	2.19	1.82	1.21
300	2.78	2.02	1.58	0.86

Tolerance: ±.07 db.



ALLEN AVIONICS, INC.
224 EAST SECOND STREET • MINEOLA, NEW YORK 11501 • PHONES: (516) 248-8080 OR (516) 747-5450

SPIRADEL* THE MOST COMPACT
Highest Time Delay to Rise Time Ratio DISTRIBUTED DELAY LINE

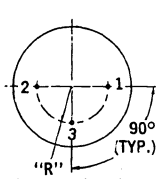
FIXED DELAY

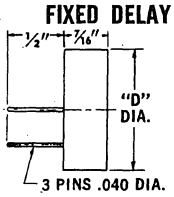
STANDARD HEIGHT OF ALL UNITS: 7/16"

Time Delay (Nanoseconds)	Rise Time (Nanoseconds) Maximum	Diam. Inches
50 OHMS IMPEDANCE		
50	10.0	1.60
100	13.0	2.00
150	14.0	2.50
200	16.0	2.50
250	19.0	3.25
300	21.0	3.25
350	22.0	3.25
400	23.0	3.75
450	24.0	3.75
500	25.0	3.75
75 OHMS IMPEDANCE		
25	4.5	1.20
50	6.0	1.20
100	9.5	1.60
150	11.5	2.00
200	13.0	2.00
250	14.0	2.50
300	16.0	2.50
350	17.0	2.50
400	18.5	3.25
450	20.0	3.25
500	22.0	3.25
600	25.0	3.75
700	28.0	3.75
150 OHMS IMPEDANCE		
20	5.0	1.20
30	6.5	1.20
40	7.5	1.20
50	7.7	1.20
60	7.9	1.20
70	8.0	1.20
80	8.2	1.20
90	8.5	1.20
100	9.0	1.20
150	12.0	1.60
200	14.0	1.60
250	15.0	2.00
300	17.5	2.00
350	19.0	2.00
400	20.0	2.00
450	22.0	2.50
500	24.0	2.50
600	27.0	2.50
700	30.0	2.50
800	33.0	3.25
900	36.0	3.25
1000	40.0	3.25
325 OHMS IMPEDANCE		
100	12.0	1.20
150	14.0	1.20
200	17.0	1.20
250	19.0	1.60
300	21.0	1.60
350	23.0	1.60
400	24.0	1.60
450	26.0	2.00
500	28.0	2.00
550	29.0	2.00

Time Delay (Nanoseconds)	Rise Time (Nanoseconds) Maximum	Diam. Inches
325 OHMS IMPEDANCE		
600	31	2.00
650	33	2.50
700	34	2.50
750	35	2.50
800	37	2.50
850	39	2.50
900	41	2.50
950	43	2.50
1000	45	2.50
500 OHMS IMPEDANCE		
300	33	1.20
400	40	1.60
500	44	1.60
600	50	1.60
700	55	2.00
800	57	2.00
900	60	2.00
1000	66	2.00
1500	87	2.50
2000	110	2.50
2500	120	3.25
3000	137	3.25
3500	154	3.25
4000	165	3.25
600 OHMS IMPEDANCE		
400	46	1.20
500	48	1.60
600	54	1.60
700	58	1.60
800	60	1.60
900	65	2.00
1000	70	2.00
1500	85	2.50
2000	100	2.50
2500	115	2.50
3000	125	3.25
3500	140	3.25
4000	150	3.25
4500	165	3.75
5000	170	3.75
5500	185	3.75
6000	200	3.75
1000 OHMS IMPEDANCE		
500	58	1.20
600	63	1.20
700	72	1.20
800	80	1.20
900	87	1.60
1000	95	1.60
1500	116	1.60
2000	126	2.00
2500	147	2.00
3000	158	2.00
3500	182	2.50
4000	203	2.50
4500	220	2.50
5000	240	3.25

FIXED DELAY

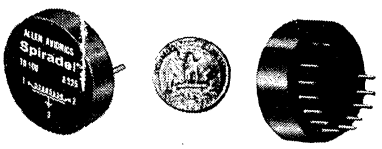




"D"	"R"
1.20"	.400"
1.60"	.600"
2.00"	.800"
2.50"	1.050"
3.25"	1.425"
3.75"	1.675"

*Patented and patents applied for.

FIXED AND TAPPED



FOR IMMEDIATE DELIVERY!

SPIRADEL is a small diameter, distributed constant delay line, featuring higher delay to rise time ratio and excellent pulse fidelity. Its new shape offers greater package design versatility than most other delay lines available, and the entire unit is encapsulated for maximum environmental protection.

SPIRADEL is designed for operation from −55°C up to +105°C. Bandwidth is from DC to frequency f = .35/rise time.

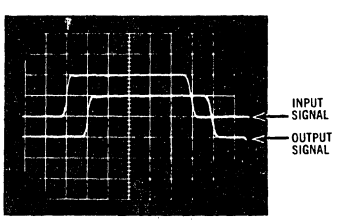
FIXED DELAY

FIXED SPIRADEL covers a delay range of 20 to 6000 nanoseconds. Any delay within this range may be selected. Time delay to rise time ratios range up to 30 to 1. Any impedance from 50 to 1000 ohms is available. Standard delay tolerance is 5%, although tighter tolerances can be held.

TAPPED DELAY

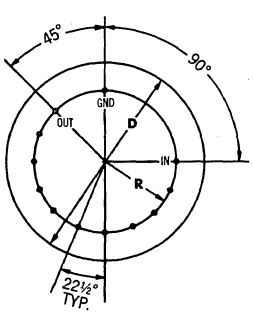
TAPPED SPIRADEL covers a delay range of 20 to 1000 nanoseconds. Any delay within this range may be selected. Total delay tolerance is ±5%. Tap delay shall be multiples of 10% of total delay ±5% or 2 nanoseconds, whichever is greater.

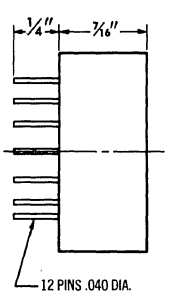
TO ORDER STANDARD UNIT:
SPECIFY SPIRADEL (FIXED or TAPPED), TIME DELAY, IMPEDANCE & DIAMETER



Actual oscilloscope presentation photo of input and output pulses of 100 ns. Spiradel, illustrating excellent pulse fidelity.

TAPPED DELAY





TAPPED DELAY

STANDARD HEIGHT: 7/16"

Time Delay (Nanoseconds)	Rise Time (Nanoseconds) Maximum	Diam. Inches
50 OHMS IMPEDANCE		
50	12.0	2.00
100	15.0	2.50
150	17.0	3.25
200	20.0	3.25
250	23.0	3.75
300	25.0	3.75
350	27.0	3.75
400	29.0	3.75
75 OHMS IMPEDANCE		
25	6.0	1.60
50	9.0	1.60
100	12.0	2.00
150	15.0	2.50
200	17.0	2.50
250	20.0	3.25
300	23.0	3.25
350	25.0	3.25
400	27.0	3.75
450	29.0	3.75
500	31.0	3.75
150 OHMS IMPEDANCE		
20	6.0	1.60
30	8.0	1.60
40	9.0	1.60
50	9.5	1.60
60	10.0	1.60
70	10.5	1.60
80	11.0	1.60
90	11.5	1.60
100	12.0	1.60
150	15.0	2.00
200	17.0	2.00
250	19.0	2.50
300	21.0	2.50
350	23.0	2.50
400	25.0	2.50
450	27.0	3.25
500	29.0	3.25
600	33.0	3.25
700	37.0	3.25
800	42.0	3.75
900	46.0	3.75
1000	50.0	3.75
325 OHMS IMPEDANCE		
100	16.0	1.60
150	20.0	1.60
200	24.0	1.60
250	25.0	2.00
300	26.0	2.00
350	28.0	2.00
400	31.0	2.00
450	33.0	2.50
500	35.0	2.50
550	36.0	2.50
600	37.0	2.50
650	39.0	3.25
700	41.0	3.25
750	43.0	3.25
800	44.0	3.25
850	46.0	3.25
900	48.0	3.25
950	50.0	3.25
1000	52.0	3.25

TAP VALUES ARE MULTIPLES OF 10% OF ABOVE DELAYS

ARTRONIC INSTRUMENT COMPANY

MILITARY GRADE

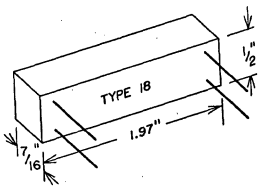
DELAY LINES

TYPE 18

Rise Time: 20% to 25% of delay time

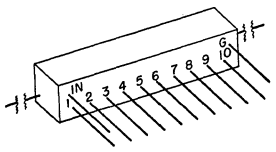
Leads: #22 AWG tinned copper, 1½" long

Delay (μsec)	Type 18H Impedance (ohms)	Type 18L Impedance (ohms)
0.05	125	62
0.1	250	62
0.2	500	50
0.25	625	62
0.3	750	75
0.4	1000	100
0.5	1250	125
0.6	1500	150
0.7	1750	175
0.75	1875	188
0.8	2000	200
0.9	2250	225
1.0	2500	250
1.5	1875	375
2.0	2500	500
2.5	3125	625
3	1875	750
4	2500	1000
5	3125	1250
6	1500	
7	1750	
8	2000	
9	2250	
10	2500	



TYPE 18 AND TYPE 22

Delay Tolerance: 2%
Thermal Coefficient of Delay: 0.003%/°C to 0.01%/°C
Test Voltage: 800 vDC
Working Voltage: 400 v, DC or pulse
Temperature Range: −65°C to 125°C
Ordering Information: Part numbers are given by designating first the type number and letter, and then the delay, e.g., 22L-0.75. Intermediate values of delay and impedance can also be furnished.



TYPE 22

10 Taps, equally spaced

Rise Time: 15% to 20% of total delay time

Dimensions: ½" x ½" x 2½"

Leads: #22 AWG tinned solid wire, 1¼" long

Leads on end faces are spare ground leads to provide added mounting rigidity. They may be clipped off if not needed, since a third ground lead is provided on the long face.

Delay (μsec)	Type 22H Impedance (ohms)	Type 22L Impedance (ohms)
0.05	100	50
0.1	200	50
0.2	400	100
0.25	500	50
0.3	600	60
0.4	800	80
0.5	1000	100
0.6	1200	120
0.7	1400	140
0.75	1500	150
0.8	1600	160
0.9	1800	180
1.0	2000	200
1.5	3000	300
2.0	2000	400
2.5	2500	500
3	3000	600
4	2000	800
5	2500	1000
6	3000	1200
7	1400	
8	1600	
9	1800	
10	2000	
12	2400	
15	3000	

PRECISION, RUGGEDNESS, RELIABILITY

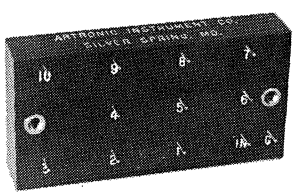
These four series of military grade delay lines are encapsulated in an epoxy casting resin, which is poured under vacuum and cured to a solid, void-free block of high-temperature plastic. All components and wires are solidly supported against shock and vibration and completely protected from moisture and salt spray. All four series meet the requirements of MIL-STD-202.

The remarkable performance and stability of these very compact delay lines is due to the extraordinary care taken in the design and manufacturing processes. Phase characteristics are individually adjusted for optimum pulse performance, to give fast-rising, noise-free output pulses with minimum overshoot and distortion. A complete system of inspections and tests at every stage of construction and assembly assures the utmost in quality and reliability.

OTHER TYPES AND CUSTOM DESIGNS ALSO AVAILABLE

SERIES L — 10 Taps

Rise Time: 7% to 8% of Total Delay



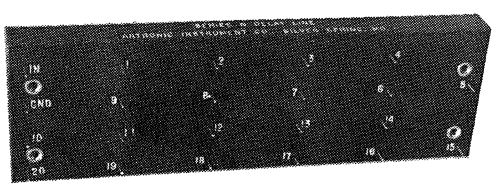
BANDWIDTHS IN MHz

Delay (μsec)	Characteristic Impedance (Ohms)				
	50	200	500	1,000	2,000
0.1	110				
0.2	58	58			
0.3	39	39			
0.4	29	29			
0.5	23	23	23		
0.6	19	19	19		
0.7	16	16	16		
0.8		14	14		
0.9		13	13		
1.0		11	11	11	
2.0		5.8	5.8	5.8	5.8
3.0		3.9	3.9	3.9	3.9
4.0			2.9	2.9	2.9
5.0			2.3	2.3	2.3
6.0			1.9	1.9	1.9
7.0			1.6	1.6	1.6
8.0				1.4	1.4
10				1.1	1.1
15				0.7	0.7
20					0.6
25					0.5
30					0.4

Size: ½" x 1.5" x 2.9"
Mounting: Two 6-32 tapped inserts

SERIES N — 20 Taps

Rise Time: 3% to 4% of Total Delay



Size: ½" x 2" x 6.4" Mounting: Four 6-32 Tapped Inserts

BANDWIDTHS IN MHz

Delay (μsec)	Characteristic Impedance (Ohms)				
	50	200	500	1,000	2,000
1	39	39			
1.5	26	26			
2	19	19			
2.5	15	15	15		
3		13	13		
4			9.7	9.7	
5			7.8	7.8	7.8
6			6.5	6.5	
8			4.8	4.8	4.8
10			3.9	3.9	3.9
12				3.2	3.2
15				2.6	2.6
20				1.9	1.9
25				1.5	1.5
30					1.3
40					0.9
50					0.7
75					0.5
100					0.4

SERIES L AND SERIES N

Delay Tolerance: 2%
Delay Temp. Coeff.: 0.003%/°C to 0.01%/°C
Test Voltage: 800 vDC
Working Voltage: 400 vDC max
Pulse Voltage: 400 v peak max
Temperature Range: −65°C to 125°C
Connections: 22 gauge pins, 3/16" long

Designed to plug into printed wiring boards for dip-soldering into place, these high-performance units are readily adaptable to other types of circuit construction, since the 22 gauge pins may be easily formed to fit lugs or terminal posts. The pins are laid out on the standard 0.1" printed circuit grid.

Careful control of the attenuation characteristic and the provision of special phase-compensating circuits result in superlative pulse performance. The tables give the cut-off frequencies of the delay lines which are available in each series. Part Numbers: Give series, impedance, and delay; e.g., N-1000-40.

THE ARTRONIC INSTRUMENT COMPANY
Phone: 949-1131 (Area Code 301) 11232 Triangle Lane, Silver Spring, Md. 20902

Bliley

If you buy quality

BLILEY GLASS DELAY LINES FOR DIGITAL STORAGE

Digital glass memories have recently found wide application as an ultrasonic storage device in computers and associated digital processing equipment. Bliley ultrasonic digital delay lines meet this requirement with bit rates as high as 30M bits/sec and access times as low as one microsecond. Although digital lines operate at one-half the period of the center frequency, the recommended bit rate is approximately two-thirds of the center frequency.

Digital lines operate in the RZ or return to zero mode which is the least demanding on external circuitry. Additional circuitry is required for NRZ operation to obtain increased storage capacity or BIPOLAR operation for increased signal to noise ratio. Most digital lines utilize low temperature coefficient glass as the delay medium to obtain good delay time stability with temperature change as indicated in Figure 1.

Attenuation depends upon delay time, operating frequency, required signal to noise ratio, terminating impedance, input and output admittance conditions and pulse shape. The most efficient operation of a digital line is achieved at its point of minimum attenuation (center frequency) although it may operate satisfactorily at any point throughout its 3 db bank pass. To reduce loss level, ceramic transducers are used up to 20 MHz and quartz transducers from 20 MHz to 30 MHz.

Typical digital response characteristics are shown in Table I, and Table II indicates the present design range parameters for glass lines.

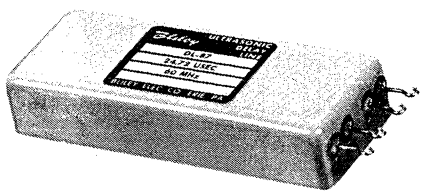
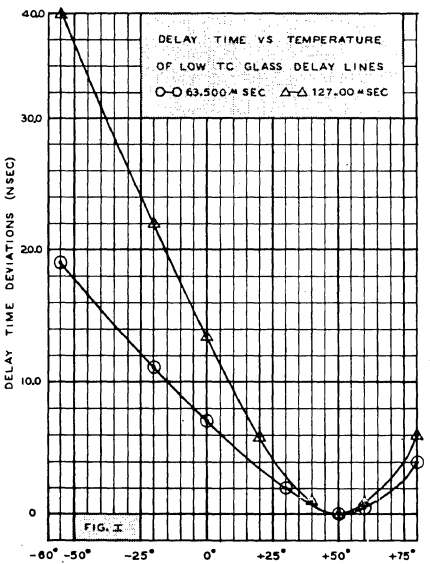


FIG. 1



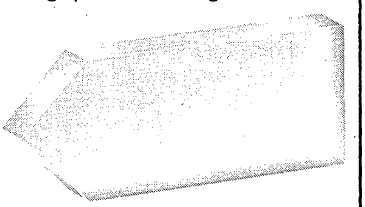


TABLE I. TYPICAL DIGITAL CHARACTERISTICS

Delay Time (μsec)	Pulse Width (nsec)	Atten. (max.) (db)	S/N (min.) (db)	Term. Imp. (ohms)	Max. Delay Change Temp. 10-80°C (nsec)
1.700	85	22	25	50	3.0
10.000	12	30	20	50	2.0
26.500	80	26	20	100	2.0
26.500	30	26	20	100	2.0
52.800	30	35	20	50	4.0
50.000	25	32	20	50	4.0
63.500	18	70	25	50	5.0
63.500	75	32	20	50	5.0
63.400	50	38	25	100	5.0
98.700	84	26	20	100	8.0
140.400	84	26	20	100	10.0
200.000	75	36	20	50	17.0
250.000	25	50	20	50	21.0

TABLE II. DIGITAL DESIGN RANGE

Center Frequency	3.0 MHz	to	30.0 MHz
Input Pulse Width	167 nsec.	to	16.7 nsec.
Delay Time	1.0 μsec.	to	300 μsec.
Signal to Noise Ratio	15 db	to	25 db
Termination Impedance	1500 ohms	to	15 ohms
Attenuation: Ceramic Transducers	20 db	to	40 db
Quartz Transducers	30 db	to	80 db
Delay Time Tolerance at 25°C	±0.2% (1-20 μsec.)	to	±5 nsec. (10-300 μsec.)
Delay Time Stability 0 to +80°C	(0.2% @ 1 μsec. 0.01% @ 10 μsec.)	to	0.01% (10-300 μsec.)

Bliley is equipped to manufacture a broad range of custom-designed delay lines. Our experienced staff will welcome an opportunity to analyze your specifications and prepare quotations for your requirement. Literature will be sent promptly upon request.

BLILEY ULTRASONIC DELAY LINES FOR RF APPLICATIONS

Ultrasonic delay lines are widely used in conventional RF systems such as video pulse integrators and moving target indicators in radar applications. This type of ultrasonic delay line is available over the range from 1 microsecond to 4500 microseconds.

In general, low TC glass is used for the short delay time range, with frequency temperature characteristics as shown in Figure 1. Long lines, which use fused quartz as the delay medium, have a temperature coefficient of minus 75 ppm per degree C.

Long delay lines may be specified with carrier frequencies in the range from 10 MHz to 40 MHz. Spurious signal attenuation shown in Table III applies only to frequency range 25-40 MHz. Best attenuation of spurious signals is achieved in medium delay time ranges and at higher carrier frequencies. Dependent upon loss level requirements, bandwidth may be estimated from 50% to 65% of carrier frequency. Loss and bandwidth characteristics are interdependent and are controlled by choice of terminations, carrier frequency and transducer capacity as shown in Table IV.

TABLE III. LONG DELAY LINES

Delay Time Range (μsec)	30-400	200-700	300-1400	500-1600	600-2000	1400-2700	600-3300	1300-4500
Spurious db Down	50	55	60	55	55	50	45	45
3rd Time Signal db Down	40	45	55	—	—	—	—	—

TABLE IV. SHORT DELAY LINES

Group	Freq. Range (MHz)	Delay Time Range (Microseconds) Ringing Single Ended	Delay Time Range (Microseconds) Absorber Double Ended	Max. Temp. Coeff. (ppm/°C)	Bandwidth as percent of carrier (with 93 ohm termination)	Loss level (db) with different termination 50 ohm	93 ohm	1000 ohm
A	5-60	.75-60	.75-30	−100	30		45	28
	60-100	.75-60	.75-30	−100	15		50	33
B	5-60	.75-40	.75-20	+85	35		43	27
	60-100	.75-40	.75-20	+85	15		48	31
C	5-60	.75-40	.75-20	+20	35		43	27
	60-100	.75-40	.75-20	+20	15		48	31
D	5-30	1.00-60	1.00-30	−100	40 (50 ohm) term.)	12		
E	5-30	1.00-40	1.00-20	+20	40 (50 ohm) term.)	12		

Bliley

For further information call (814) 838-3571 or TWX 510-696-6886

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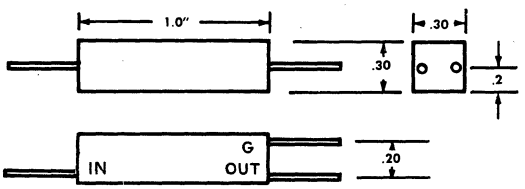
DELAY LINES

A



Lead Dia. = .032

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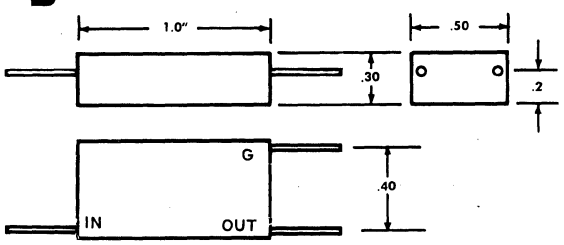

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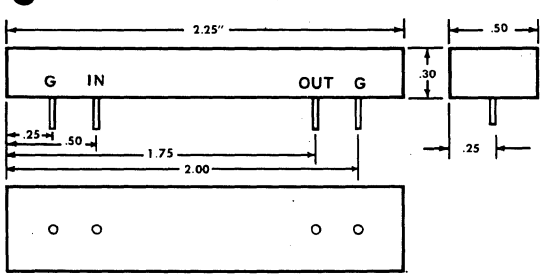

Lead Dia. = .032

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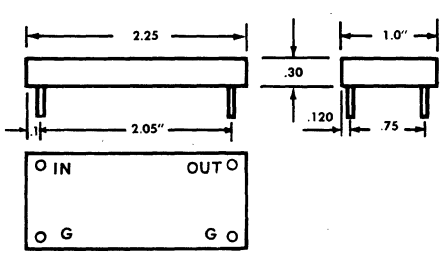

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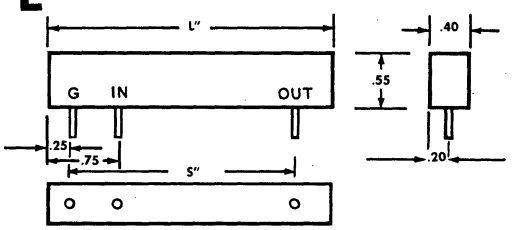

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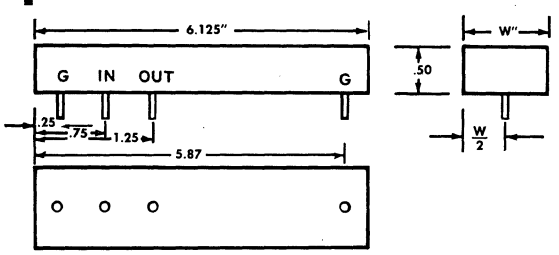

Lead Dia. = .032

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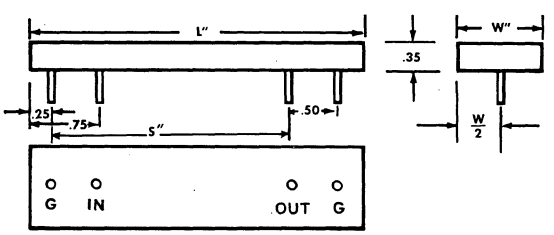

Lead Dia. = .032

The condensed version of our catalog items are listed here showing the most widely used sizes and types available for prompt shipment. Space prohibits the full listing of the many specials and the variations available.

CAUTION: Before finalizing your design, it is highly recommended you contact our Engineering Staff for their expert guidance, founded on our vast experience and up-to-date technology — a phone call can save you valuable time and money.

bel **BEL FUSE INC.** 203 Van Vorst Street • Jersey City, N. J. 07302 / (201) HE 2-0463 TWX 710-730-5301

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NANOSECONDS

Part Number — Impedance ±10%				DELAY TIME ±5% nsec	RISE TIME nsec	CONFIGURATION	LEAD SPACING "S" INCHES	LENGTH "L" INCHES	WIDTH "W" INCHES
93Ω	200Ω	500Ω	1000Ω						
0420-0001-93	0420-0001-02	0420-0001-05	0420-0001-10	1	4.0	A	—	1.0	.3
0420-0002-93	0420-0002-02	0420-0002-05	0420-0002-10	2	4.0	A	—	1.0	.3
0420-0003-93	0420-0003-02	0420-0003-05	0420-0003-10	3	4.0	A	—	1.0	.3
0420-0004-93	0420-0004-02	0420-0004-05	0420-0004-10	4	4.0	A	—	1.0	.3
0420-0005-93	0420-0005-02	0420-0005-05	0420-0005-10	5	4.0	A	—	1.0	.3
0420-0010-93	0420-0010-02	0420-0010-05	0420-0010-10	10	4.0	A	—	1.0	.3
0420-0015-93	0420-0015-02	0420-0015-05	0420-0015-10	15	4.0	B	—	1.0	.5
0420-0020-93	0420-0020-02	0420-0020-05	0420-0020-10	20	4.0	B	—	1.0	.5
0420-0025-93	0420-0025-02	0420-0025-05	0420-0025-10	25	5.0	C	—	2.25	.5
0420-0030-93	0420-0030-02	0420-0030-05	0420-0030-10	30	6.0	C	—	2.25	.5
0420-0035-93	0420-0035-02	0420-0035-05	0420-0035-10	35	7.0	C	—	2.25	.5
0420-0040-93	0420-0040-02	0420-0040-05	0420-0040-10	40	8.0	C	—	2.25	.5
0420-0045-93	0420-0045-02	0420-0045-05	0420-0045-10	45	9.0	C	—	2.25	.5
0420-0050-93	0420-0050-02	0420-0050-05	0420-0050-10	50	9.0	C	—	2.25	.5
0420-0055-93	0420-0055-02	0420-0055-05	0420-0055-10	55	10.0	D	—	2.25	1.0
0420-0060-93	0420-0060-02	0420-0060-05	0420-0060-10	60	10.0	D	—	2.25	1.0
0420-0065-93	0420-0065-02	0420-0065-05	0420-0065-10	65	11.0	D	—	2.25	1.0
0420-0070-93	0420-0070-02	0420-0070-05	0420-0070-10	70	12.0	D	—	2.25	1.0
0420-0075-93	0420-0075-02	0420-0075-05	0420-0075-10	75	12.0	D	—	2.25	1.0
0420-0080-93	0420-0080-02	0420-0080-05	0420-0080-10	80	13.0	D	—	2.25	1.0
0420-0085-93	0420-0085-02	0420-0085-05	0420-0085-10	85	13.0	D	—	2.25	1.0
0420-0090-93	0420-0090-02	0420-0090-05	0420-0090-10	90	14.0	D	—	2.25	1.0
0420-0095-93	0420-0095-02	0420-0095-05	0420-0095-10	95	14.0	D	—	2.25	1.0
0420-0100-93	0420-0100-02	0420-0100-05	0420-0100-10	100	15.0	D	—	2.25	1.0
0420-0125-93	—	—	—	125	15.0	G	2	3.00	.75
—	0420-0125-02	—	—	125	18.0	G	2.8	3.8	.625
—	—	0420-0125-05	0420-0125-10	125	20.0	E	1.20	1.8	.4
0420-0150-93	—	—	—	150	15.0	G	2	3.0	1.0
—	0420-0150-02	—	—	150	20.0	G	2.8	3.8	.625
—	—	0420-0150-05	0420-0150-10	150	22.0	E	1.20	1.8	.4
0420-0175-93	—	—	—	175	20.0	G	2	3.0	1.0
—	0420-0175-02	—	—	175	20.0	G	2.8	3.8	.625
—	—	0420-0175-05	0420-0175-10	175	30.0	E	1.20	1.8	.4
0420-0200-93	—	—	—	200	20.0	G	2	3.0	1.0
—	0420-0200-02	—	—	200	20.0	G	2.8	3.8	.625
—	—	0420-0200-05	0420-0200-10	200	30.0	E	1.20	1.8	.4
0420-0250-93	—	—	—	250	32.0	G	2	3.0	1.0
—	0420-0250-02	—	—	250	35.0	G	2.8	3.8	.625
—	—	0420-0250-05	0420-0250-10	250	40.0	E	1.20	1.8	.4
0420-0300-93	—	—	—	300	40.0	G	5.125	6.125	1.5
—	0420-0300-02	—	—	300	40.0	G	2.8	3.8	.925
—	—	0420-0300-05	0420-0300-10	300	45.0	E	2.20	3.0	.4
0420-0400-93	—	—	—	400	45.0	G	5.125	6.125	1.5
—	0420-0400-02	—	—	400	45.0	G	2.8	3.8	.925
—	—	0420-0400-05	0420-0400-10	400	50.0	E	2.20	3.0	.4
0420-0500-93	—	—	—	500	65.0	G	5.125	6.125	1.5
—	0420-0500-02	—	—	500	65.0	G	2.8	3.8	.925
—	—	0420-0500-05	0420-0500-10	500	70.0	E	2.20	3.0	.4
—	0420-0600-02	—	—	600	75.0	G	2.8	3.8	1.5
—	—	0420-0600-05	0420-0600-10	600	75.0	E	2.20	3.9	.4
—	0420-0700-02	—	—	700	85.0	G	5.125	6.125	.8
—	—	0420-0700-05	0420-0700-10	700	85.0	E	2.20	3.9	.4
—	0420-0800-02	—	—	800	85.0	G	5.125	6.125	.8
—	—	0420-0800-05	0420-0800-10	800	95.0	E	3.40	4.25	.4
—	0420-0900-02	—	—	900	95.0	G	5.125	6.125	.8
—	—	0420-0900-05	0420-0900-10	900	100.0	E	4.40	5.25	.4
—	0420-1000-02	—	—	1000	110.0	G	5.125	6.125	.8
—	—	0420-1000-05	0420-1000-10	1000	110.0	E	4.40	5.25	.4
—	0420-1500-02	—	—	1500	150.0	F	—	6.125	2.0
—	—	0420-1500-05	0420-1500-10	1500	150.0	F	—	6.125	.8
—	0420-2000-02	—	—	2000	200.0	F	—	6.125	2.0
—	—	0420-2000-05	0420-2000-10	2000	200.0	F	—	6.125	.8
—	0420-2500-02	—	—	2500	250.0	F	—	6.125	2.0
—	—	0420-2500-05	0420-2500-10	2500	250.0	F	—	6.125	.8
—	0420-3000-02	—	—	3000	300.0	F	—	6.125	2.0
—	—	0420-3000-05	0420-3000-10	3000	300.0	F	—	6.125	1.2
—	0420-3500-02	—	—	3500	350.0	F	—	6.125	3.0
—	—	0420-3500-05	0420-3500-10	3500	350.0	F	—	6.125	1.2
—	0420-4000-02	—	—	4000	400.0	F	—	6.125	3.0
—	—	0420-4000-05	0420-4000-10	4000	400.0	F	—	6.125	2.0
—	0420-4500-02	—	—	4500	450.0	F	—	6.125	3.0
—	—	0420-4500-05	0420-4500-10	4500	450.0	F	—	6.125	2.0
—	0420-5000-02	—	—	5000	500.0	F	—	6.125	3.0
—	—	0420-5000-05	0420-5000-10	5000	500.0	F	—	6.125	2.0

bel BEL FUSE INC. 203 Van Vorst Street • Jersey City, N. J. 07302 / (201) HE 2-0463 TWX 710-730-5301

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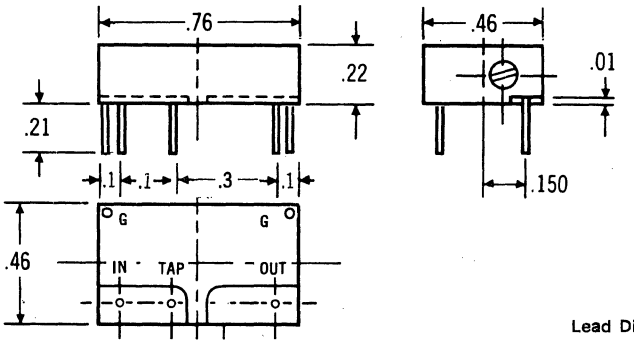
DUAL-IN-LINE VARIABLE DELAY LINES

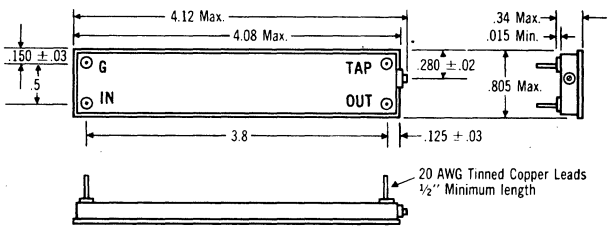
DV Series



BEL introduces the first variable delay line compatible with IC Dual-In-Line packaging featuring: • Hermetic Seal-O-Ring construction • Precious metal contacts • Resolution — MIN 2% (for high reliability performance)

Lead Dia. = .020

NV Series
PV Series

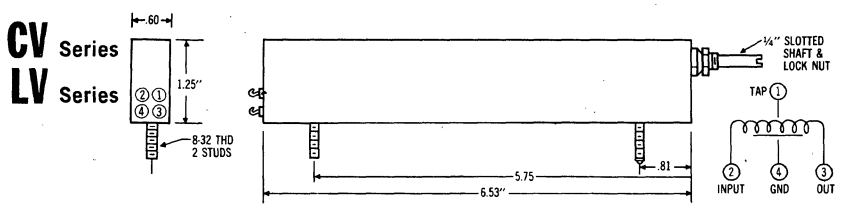


VARIABLES

These precision hermetically sealed variables are available in a wide range of delays and impedances. Both may be provided with various mounting and terminal configurations to suit most applications.

NV Series in Metal Case
PV Series in Epoxy Case

CV Series
LV Series



VARIABLES

These precision hermetically sealed variables are available in a wide range of delays and impedances. Both may be provided with various mounting and terminal configurations to suit most applications.

Part Number	Td Range	Rise Time	Impedance ±10%	Style
0430-0040-05	0-40 nsec	15 nsec	500 ~	NV
0430-0050-02	0-50 nsec	12 nsec	200 ~	
0430-0150-10	0-150 nsec	55 nsec	1000 ~	
0430-0250-05	0-250 nsec	60 nsec	500 ~	
0430-0250-04	0-250 nsec	55 nsec	400 ~	
0433-0040-05	0-40 nsec	10 nsec	500 ~	PV
0433-0050-02	0-50 nsec	10 nsec	200 ~	
0433-0150-10	0-150 nsec	45 nsec	1000 ~	
0433-0250-05	0-250 nsec	45 nsec	500 ~	
0433-0250-04	0-250 nsec	45 nsec	400 ~	
0431-0450-10	0-450 nsec	70 nsec	1000 ~	CV
0431-0500-10	0-500 nsec	75 nsec	1000 ~	
0431-0700-05	0-700 nsec	110 nsec	500 ~	
0431-0750-05	0-750 nsec	110 nsec	500 ~	
0431-1000-05	0-1000 nsec	135 nsec	500 ~	
0448-0005-01	0-5 nsec	5 nsec	100 ~	DV
0448-0020-02	0-20 nsec	15 nsec	200 ~	
0448-0030-03	0-30 nsec	20 nsec	350 ~	
0448-0040-05	0-40 nsec	25 nsec	500 ~	
0432-0250-01	0-250 nsec	35 nsec	100 ~	LV

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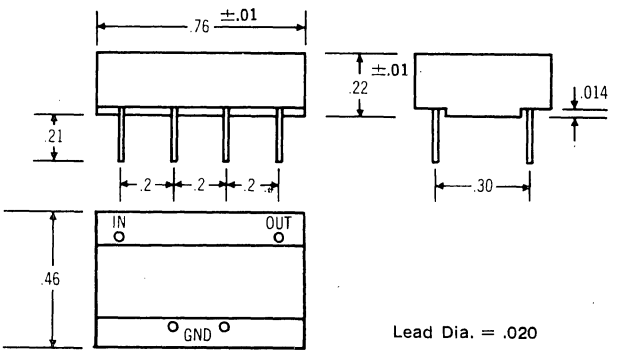
DUAL-IN-LINE DELAY LINES

- Delays from 1-1000 nanoseconds.
- Band Width to 60 mhz.
- Impedance 50 to 1000 ohms.
- Resistive Terminations if desired.
- Tapped Delay Lines available.
- Several separate lines in one case.
- Contact Bel Engineering for special applications.



Lead Dia. = .020

Time Delay nsec ±5%*	Impedance ±10%					
	50Ω	75Ω	100Ω	200Ω	500Ω	1000Ω
5	0440-0005-50 Tr = 5	0440-0005-75 Tr = 5	0440-0005-01 Tr = 5	0440-0005-02 Tr = 6	0440-0005-05 Tr = 6	0440-0005-10 Tr = 6
10	0440-0010-50 Tr = 10	0440-0010-75 Tr = 8	0440-0010-01 Tr = 6	0440-0010-02 Tr = 7	0440-0010-05 Tr = 5.5	0440-0010-10 Tr = 7
15	0440-0015-50 Tr = 10	0440-0015-75 Tr = 12	0440-0015-01 Tr = 8	0440-0015-02 Tr = 8	0440-0015-05 Tr = 6	0440-0015-10 Tr = 8
20	0444-0020-50 Tr = 10	0440-0020-75 Tr = 20	0440-0020-01 Tr = 10	0440-0020-02 Tr = 10	0440-0020-05 Tr = 6	0440-0020-10 Tr = 10
30	0444-0030-50 Tr = 12	0440-0030-75 Tr = 20	0440-0030-01 Tr = 18	0440-0030-02 Tr = 12	0440-0030-05 Tr = 8	0440-0030-10 Tr = 15
40	0440-0040-50 Tr = 17	0444-0040-75 Tr = 20	0440-0040-01 Tr = 18	0440-0040-02 Tr = 20	0440-0040-05 Tr = 10	0440-0040-10 Tr = 20
50	0444-0050-50 Tr = 18	0444-0050-75 Tr = 20	0440-0050-01 Tr = 20	0440-0050-02 Tr = 20	0440-0050-05 Tr = 20	0440-0050-10 Tr = 30
60	0444-0060-50 Tr = 23	0444-0060-75 Tr = 20	0444-0060-01 Tr = 18	0440-0060-02 Tr = 20	0440-0060-05 Tr = 25	0440-0060-10 Tr = 35
70	0444-0070-50 Tr = 23	0444-0070-75 Tr = 22	0444-0070-01 Tr = 19	0440-0070-02 Tr = 22	0440-0070-05 Tr = 30	0440-0070-10 Tr = 40
80	0444-0080-50 Tr = 28	0444-0080-75 Tr = 22	0444-0080-01 Tr = 19	0440-0080-02 Tr = 25	0440-0080-05 Tr = 34	0440-0080-10 Tr = 45
90	0444-0090-50 Tr = 30	0444-0090-75 Tr = 23	0444-0090-01 Tr = 20	0440-0090-02 Tr = 26	0440-0090-05 Tr = 36	0440-0090-10 Tr = 47
100	0444-0100-50 Tr = 35	0444-0100-75 Tr = 23	0444-0100-01 Tr = 20	0440-0100-02 Tr = 28	0440-0100-05 Tr = 37	0440-0100-10 Tr = 50
125	0444-0125-50 Tr = 45	0444-0125-75 Tr = 40	0444-0125-01 Tr = 22	0444-0125-02 Tr = 30	0440-0125-05 Tr = 40	0440-0125-10 Tr = 55
150	0444-0150-50 Tr = 50	0444-0150-75 Tr = 35	0444-0150-01 Tr = 27	0444-0150-02 Tr = 30	0440-0150-05 Tr = 45	0444-0150-10 Tr = 60
200	0444-0200-50 Tr = 55	0444-0200-75 Tr = 50	0444-0200-01 Tr = 37	0444-0200-02 Tr = 40	0444-0200-05 Tr = 40	0444-0200-10 Tr = 60
300			0444-0300-01 Tr = 57	0444-0300-02 Tr = 60	0444-0300-05 Tr = 55	0444-0300-10 Tr = 60
400				0444-0400-02 Tr = 60	0444-0400-05 Tr = 65	0444-0400-10 Tr = 70
500				0444-0500-02 Tr = 110	0444-0500-05 Tr = 95	0444-0500-10 Tr = 95
600				0440-0600-02 Tr = 110	0444-0600-05 Tr = 100	0444-0600-10 Tr = 125
700				0444-0700-02 Tr = 120	0444-0700-05 Tr = 110	0444-0700-10 Tr = 140
800					0444-0800-05 Tr = 120	0444-0800-10 Tr = 140
900					0444-0900-05 Tr = 135	0444-0900-10 Tr = 180
1000					0444-1000-05 Tr = 150	0444-1000-10 Tr = 185

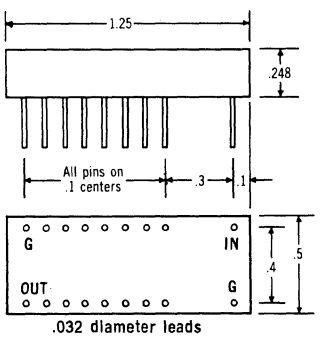
or 1 nsec (whichever is greater)

bel BEL FUSE INC. 203 Van Vorst Street • Jersey City, N. J. 07302 / (201) HE 2-0463 TWX 710-730-5301

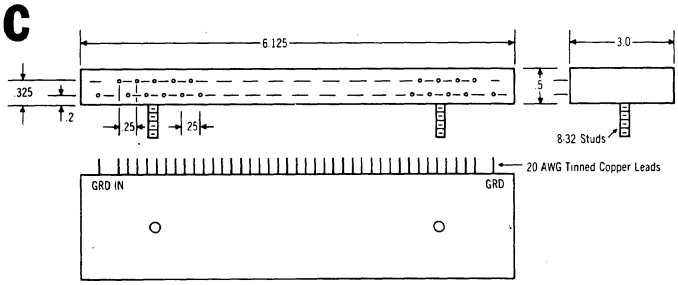
bel defining a degree of excellence

TAPPED DELAY LINES

A



C



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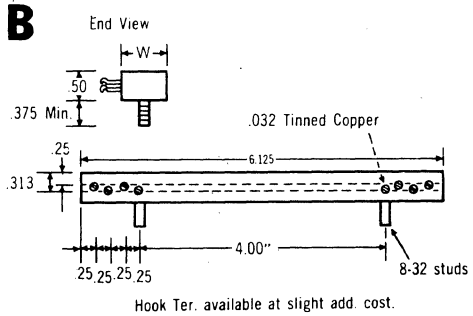
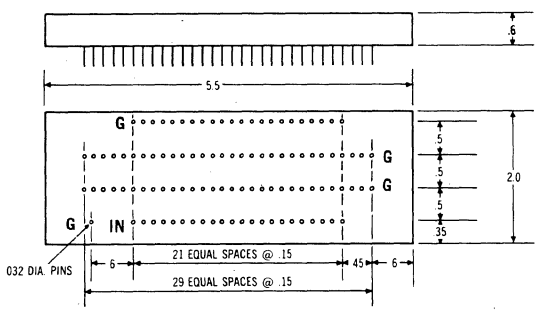


Hook Ter. available at slight add. cost.

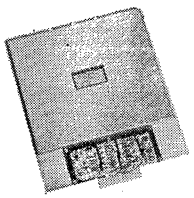
D

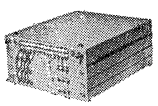


Part No.	Delay nsec	Tr nsec	No. of Taps	Delay/Tap nsec	Impedance	Width "	Style
0414-0155-01	15	5	15	1	100 ~	½	A
0414-0155-02	15	5	15	1	200 ~	½	A
0414-0155-03	15	5	15	1	500 ~	½	A
0414-0131-01	100	15	20	5	500 ~	.8	B
0414-0447-01	200	25	20	10	500 ~	.8	B
0414-0448-01	300	35	20	15	500 ~	.8	B
0414-0449-01	400	45	20	20	500 ~	.8	B
0414-0131-02	500	55	20	25	500 ~	.8	B
0414-0450-01	600	60	20	30	500 ~	.8	B
0414-0451-01	700	70	20	35	500 ~	.8	B
0414-0452-01	800	80	20	40	500 ~	.8	B
0414-0453-01	900	90	20	45	500 ~	.8	B
0414-0131-03	1000	100	20	50	500 ~	.8	B
0404-0454-01	1000	30	100	10	100 ~	2.0	D
0414-0455-01	2000	200	20	100	500 ~	.8	B
0404-0456-01	3000	300	20	150	500 ~	.8	B
0404-0457-01	4000	400	20	200	500 ~	.8	B
0404-0458-01	5000	500	20	250	500 ~	.8	B
0404-0459-01	7500	750	20	375	500 ~	1.5	B
0404-0460-01	10,000	1000	20	500	500 ~	1.5	B
0404-0461-01	12,500	750	25	500	500 ~	3	C
0404-0462-01	15,000	900	30	500	500 ~	3	C
0404-0463-01	17,500	1100	35	500	500 ~	3	C
0404-0464-01	20,000	1200	40	500	500 ~	3	C

bel **BEL FUSE INC.** 203 Van Vorst Street • Jersey City, N. J. 07302 / (201) HE 2-0463 TWX 710-730-5301

DELAY LINE COMPUTER MEMORIES DELCOMS





THE DELAY LINE COMPUTER MEMORY (DELCOM) offers the **Lowest Price Per Bit** of any high speed memory device. Computer Devices Corp. offers convenient standard packages for all practical storage capacities from 10 bits to 20,000 bits in single delay line units as well as multi delay line units* with massive storage capacities. All Delcoms are compatible with DTL and T²L logic. Normal power requirements are +12 and −12 VDC and +5 VDC. However, Delcoms are tailored to your bit rate, delay, input-output logic and power requirements.

MODEL SERIES	MAXIMUM STORAGE (BITS)	MAXIMUM (Hz) BIT RATE	SIZE INCHES
MS 2219	1,300	2.6	3.25 x 4 x 1
MS 777	1,500	2.3	3.50 x 6.37 x .5
MS 772	4,000	2.2	4.50 x 6.25 x 1.12
MS 773	8,000	2.0	8 x 10.50 x .62
MS 2150	16,000	2.0	11 x 14 x .75
MS 775	20,000	2.0	12 x 15 x .75
*MA 2254	10,000	2.0	6.50 x 4 x 3.50
*MA 2255	24,000	2.0	8 x 5 x 2.75
*MA 2256	250,000	2.0	19 x 14 x 17

*Examples of multi delay line units.

ADDRESSABLE RANDOM ACCESS MEMORY

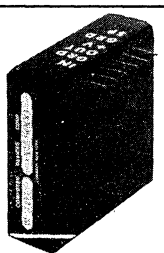
M4000 Series

- Random Access
- Binary coded address
- Average access time 512 μsec
- Integrated circuits throughout
- Storage modularly expandable without limit
- Immune to primary power failure
- Visual display available

STORAGE

One basic unit stores either 1024 — 12 bit words expandable in 2 bit steps per module or 2048 — 6 bit words expandable in 1 bit steps per module.

Other models with capacity of up to 16,384 words of any length.



KEYED OSCILLATOR

For Precision Gating
Frequencies from 0.5 to 25 MHz

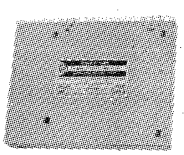
The 0G5000 is a square wave oscillator which can be precisely gated by means of a control voltage. The leading edge of the 1st output pulse occurs within 3 nanoseconds of the gating or keying signal. It will respond to a gate width equal to one output frequency cycle or greater. Size: 2.0x1.7x.62".

CONTROL SIGNAL is ground to −4V or −5V DC with rise time of less than 10% of output period length.

OUTPUT SIGNAL is ground to +4V DC from DTL or T²L logic gates. Duty cycle: 50% ±10%. Period accuracy: Better than ±1%.

DIGITAL DELAY LINES FOR DIGITAL AND CW APPLICATIONS

MAGNETOSTRICTIVE DELAY LINES are extremely stable with temperature, with stabilities of up to .5 PPM/°C achievable. Although primarily used in digital applications at bit rates of up to 1 MHz RZ or 2 MHz NRz, they also delay CW signals with center frequencies from 200 KHz to 1 MHz with a bandwidth of 20%. Insertion loss is about 60 db.



MODEL	DELAY (μsec)	SIZE (INCHES)
ML 545	up to 23 μsec	1 x 5 x .375
MT 767	1,000	3.5 x 4.0 x .46
MT 762	2,000	4.0 x 5.0 x .50
MT 763	4,000	6.0 x 7.0 x .50
MT 764	8,000	9.5 x 10.5 x .75
MT 765	16,000	10.5 x 11.5 x .56

MULTIPLE OUTPUT DELAY LINES

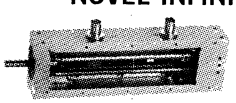
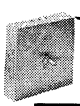
Multi-tap Delay Lines are supplied with as many tap points as desired and are useful as word generators and correlators.

MODEL	TOTAL DELAY μsec	NO. OF TAPS	TAP SPACING μsec	SIZE
ML718	15	12	1.25	1.75 x 8 x .50
ML790	16	16	1.0	1.75 x 8 x .50
ML791	20.3	14	1.45	1.75 x 8 x .50
ML883	28	24	1.0	3 x 9.37 x .50

SEE VARIABLE DELAY LINE SECTION FOR VARIABLE MAGNETOSTRICTIVE DELAY LINES

COMPUTER DEVICES CORP.
63 AUSTIN BOULEVARD COMMACK, N. Y. 11725
(516) 543-4220

VARIABLE DELAY LINES

	MODEL	DELAY RANGE	RISE TIME OR FREQ. RESP.	IMPEDANCE OHMS	SIZE INCHES
DUAL-IN-LINE COMPATIBLE VARIABLE DELAY LINES	V1570-1	0 - 10 Nsec	2 Nsec	100	.25 x .75 x 1.5
Sealed in plastic case. Temp. coeff. less than 50 PPM/°C. .020" P.C. mounting pins.	V1570-2	0 - 20	4	100	.25 x .75 x 1.5
	V1570-3	0 - 40	8	100	.25 x .75 x 1.5
	V1570-4	0 - 80	16	100	.25 x .75 x 1.5
	V1570-5	0 - 160	32	200	.25 x .75 x 1.5
	V1570-6	0 - 320	64	200	.25 x .75 x 1.5
MIL VERSION Hermetically sealed in a metal case.	V1768-1	0-10 Nsec	2 Nsec	100	.25 x .87 x 1.6
	V1768-2	0-20	2	100	.25 x .87 x 1.6
	V1768-3	0-40	2	100	.25 x .87 x 1.6
MINIATURE DISTRIBUTED VARIABLE Nanosecond Range Hermetically sealed in a metal case. Distributed parameter with temperature coefficient of less than 150 PPM/°C. .030" P.C. mounting pins.	DV900-11	0 - 20 Nsec	7 Nsec	1000	.31 x .62 x 1.75
	DV900-12	0 - 20	7	500	.31 x .62 x 1.75
	DV900-13	0 - 50	17	1000	.31 x .62 x 1.75
	DV900-14	0 - 50	17	500	.31 x .62 x 1.75
	DV900-15	0 - 100	33	1000	.31 x .62 x 1.75
	DV1446-1	0 - 50	18	2000	.31 x .62 x 1.75
	DV900-21	0 - 20 Nsec	3.5 Nsec	1000	.3 x .62 x 3.50
	DV900-22	0 - 20	3.5	500	.3 x .62 x 3.50
	DV900-23	0 - 50	9	1000	.3 x .62 x 3.50
	DV900-24	0 - 50	9	500	.3 x .62 x 3.50
	DV900-25	0 - 100	17	1000	.3 x .62 x 3.50
	DV900-26	0 - 100	17	500	.3 x .62 x 3.50
	DV900-27	0 - 250	42	1000	.3 x .62 x 3.50
	DV900-28	0 - 350	60	1000	.3 x .62 x 3.50
	DV1446	0 - 100	20	2000	.3 x .62 x 3.50
MINIATURE LUMPED VARIABLE Nanosecond Range Hermetically sealed in a metal case. Lumped constant parameter. Temperature coefficient less than 50 PPM/°C. .030" P.C. mounting pins.	V447-1	0 - 55 Nsec	15 Nsec	150	.31 x 1 x 1.25
	V447-2	0 - 100	30	50	.31 x 1 x 1.25
	V447-3	0 - 150	25	150	.31 x 1 x 2.45
	V447-4	0 - 250	30	50	.31 x 1 x 2.45
	V447-5	0 - 300	30	150	.31 x 1 x 3.45
	V447-6	0 - 500	60	50	.31 x 1 x 3.45
MICROSECOND RANGE VARIABLE Hermetically sealed in a metal case. Lumped or distributed constant parameters for longer delays and special applications.	V172	0 - .55 μsec	.08 μsec	1000	.5 x 1.5 x 4.5
	V703	0 - .95	.07	500	.75 x 1.87 x 7
	DV219	0 - 1.0	.11	1000	.62 x 1.25 x 6.5
	V443	0 - 3.0	.25	200	.62 x 2 x 4.5
NOVEL INFINITE RESOLUTION  with input and output impedance of equal value. Voltage standing wave ratio less than ½ db to 45 MHz.	DV575-1	2 - 25 Nsec	70 MHz	200	1 x 1.25 x 5.37
	DV575-2	2 - 50	70	100	1 x 1.25 x 5.37
	DV575-3	2 - 50	70	200	1 x 1.25 x 5.37
	DV575-4	2 - 50	70	93	1 x 1.25 x 5.37
	DV575-5	2 - 25	70	50	1 x 1.25 x 5.37
	DV575-6	2 - 50	70	93	1 x 1.25 x 5.37
ONE TURN VARIABLE  Lumped parameter multi position switch provides resolution of 100:1.	V168-1	0 - .2 μsec	.015 μsec	100	4 x 4 x 1.25
	V168-2	0 - 1.5	.08	1000	4 x 4 x 1.25
	V168-3	0 - 3.0	.15	1000	4 x 4 x 1.25
INFINITE RESOLUTION VARIABLE provides absolutely stepless delay change to high frequency signals. Ideal phase shifter.	DV1556-1	2 - 33 Nsec	28 to 32 MHz	93	.5 x 1 x 3.5
	DV1556-2	2 - 40 Nsec	26 to 30 MHz	93	.5 x 1 x 3.5
MAGNETOSTRICTIVE DIGITAL VARIABLE For delay of radar pulses or digital data. These units utilize the magnetostrictive delay line and are supplied with electronics to faithfully reconstruct the delayed input data.	MV994	2 - 18 μsec	2 MHz	300/3000	1 x 5 x .5
	MV781	2 - 30	2	300/3000	1 x 9 x .5
	MV785-1	0 - 1 Msec	2	100	19 x 17 x 3.5
	MV785-2	0 - 10 Msec	2	100	19 x 17 x 5.25
	MV785-3	0 - 100 Msec	2	100	19 x 17 x 10.5
LOW FREQUENCY ANALOG VARIABLE DELAYS Decade switched. Lumped parameter. Temperature stability less than 40 PPM/°C, VSWR less than ±½ db; phase linearity ±¼%.	AV175	0 - .15 Msec	to 30 KHz	500	9 x 3 x 6
	AV287	0 - .50	20	1000	19 x 3.5 x 12
	AV206	0 - 1.0	20	600	19 x 3.5 x 12
	AV731	0 - 5.0	5	1000	19 x 5.25 x 15
	AV211	0 - 10.0	2.5	600	19 x 5.25 x 15

COMPUTER DEVICES CORP. specializes in the design and production of variable delay devices and will custom design units to meet your specific requirements. If the Delay Lines in this partial listing do not fill your need, please call.

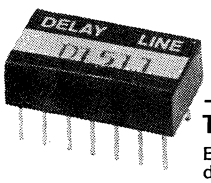
This condensed catalogue information is only meant to serve as a guide. Before finalizing on a design it is most prudent to utilize the experience, ingenuity and up-to-date information of our Engineering Staff. Expert guidance, which can save you hours of searching, is as close to you as your telephone —

516-543-4220

COMPUTER DEVICES CORP.

FIXED AND TAPPED DELAY LINES

DUAL-IN-LINE THINLINE — NANOSECOND SUB-MINIATURE LINES



.21 inch thickness and pin arrangement makes these lines compatible with dual-in-line packaging. Encapsulated in plastic.

MODEL	IMPEDANCE OHMS	DELAY	RISE TIME OR FREQ. RESP.	SIZE INCHES
D1521-1	Available in 50, 93 and 100 ohms	50 Nsec	20 Nsec	Dual-In-Line Pin Spacing .21 x .39 x .7
D1521-4		25	10	
D1521-7		10	4	
D1521-10		5	2	
D1551-1	200	100 Nsec	10 Nsec	Dual-In-Line Pin Spacing .21 x 1.0 x 1.5
D1551-2		150	15	
D1551-3		200	20	
D1551-4		250	25	
D1551-5		300	30	

TAPPED DELAYS

Each line provides 10 tap delays spaced at equal intervals.

D1511-1	100	10 Nsec	3 Nsec	Dual-In-Line Pin Spacing .21 x .39 x .7	
D1511-2		20	6		
D1511-4		40	13		
D1511-6		60	20		
D1511-8		80	26		
D1511-10		100	33		

MANY TAPS PER LINE

50 taps	D1543	100	150 Nsec	13 Nsec	.25 x .8 x 5.2
50 taps	D1544	100	300	20	.25 x 1.0 x 5.3
30 taps	D1545	100	90	8	.25 x .8 x 3.2

MINIATURE LUMPED CONSTANT

Hermetically sealed in a metal container. Delay tolerance ±5%.

Temperature stability less than 50 PPM/°C. P.C. Mounting.

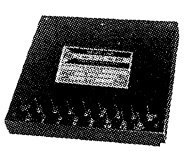
D647- — — 0	Available in 93, 330, 500 and 1000 ohms	.05 μsec	Available with 3 delay to rise time ratios in 3 case sizes 4:1 .30 x 1.0 x 1.25 8:1 .30 x 1.0 x 2.45 12:1 .30 x 1.0 x 3.45
D647- — — 1		.10	
D647- — — 2		.25	
D647- — — 3		.50	
D647- — — 4		.75	
D647- — — 5		1.00	
D647- — — 6		1.45	
D647- — — 7		2.90	
D647- — — 8		4.35	

INEXPENSIVE DISTRIBUTED CONSTANT DELAYS

Plastic encapsulated units with a temperature coefficient of 150 PPM/°C. P.C. Mounting. Many other models available including the nanosecond range.

DD679- — — 1	Available in 330, 500 and 1000 ohms	.1 μsec	Available with delay to rise time ratios of: In 2 case sizes 5:1 .37 x .5 x 4.5 10:1 .37 x 1.0 x 4.5
DD679- — — 2		.2	
DD679- — — 3		.3	
DD679- — — 4		.4	
DD679- — — 5		.5	
DD679- — — 6		.6	
DD679- — — 7		.7	
DD679- — — 8		.8	
DD679- — — 9		.9	
DD679- — — 10		1.00	

ATC TRANSPONDER AND BEACON CODING DELAY LINES



Standard 1.45 μsec tap spacings plus other special delay points are provided. Hermetically sealed steel cased, plastic encapsulated and PC mounted units are offered.

D1560	400	10.15 μsec	.33 μsec	.55 x 2.25 x 3.62
D1365	180	20.3	.5	.87 x 3.5 x 3.5
D1000	330	20.3	.5	.35 x 2 x 4
D120	180	25.0	.55	.75 x 5 x 4.37
D298A	500	25.3	.6	1.62 x 2.87 x 4.25
D637	180	20.3	.3	2.37 x 2.75 x 3.18
D1190	400	20.3	.4	.63 x 4 x 5
D1191	500	24.65	.5	.63 x 4 x 5
D1210	500	8.0	.5	.5 x 1 x 4

LOW FREQUENCY ANALOG DELAY LINES

Fixed and multi-tapped delays with high accuracy and flat response VSWR ±½ db; phase linearity ±¼ %.

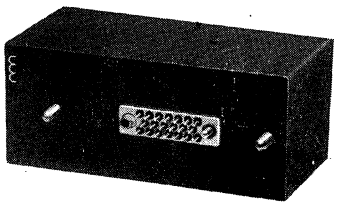
DA921	2000	420 μsec	100 KHz	14 x 2 x 1
DA563	1000	500	30	7 x 2.5 x 2
DA301	600	1,000	20	19 x 3.5 x 9
DA261	500	5,000	5	19 x 5.25 x 10
DA607	500	20,000	3.5	19 x 7 x 15
DA177	1000	100,000	.2	19 x 21 x 12

SEE VARIABLE DELAY LINE SECTION FOR VARIABLE ANALOG DELAY LINES

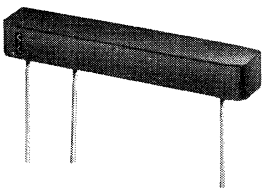
MANY OTHER MODELS AND SPECIALTY Delay Lines are available. If exactly what you want is not listed, please call.

COMPUTER DEVICES CORP.
63 AUSTIN BOULEVARD COMMACK, N. Y. 11725
(516) 543-4220

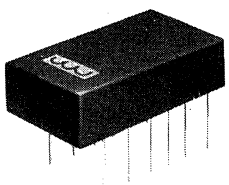
Columbia Components Corporation Delay Lines



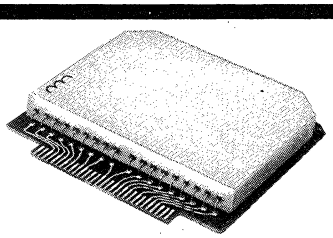
Q-Lines (Lumped Constant)
State-of-the-art design and packaging technology enables CCC to offer delay to rise time ratios of up to 100:1, with the smallest envelope sizes possible. Coupled with extremely low attenuation, distortion and operating temperature ranges of −55°C to +125°C make CCC Q-Lines ideal for a wide range of applications.
Write for data sheet DL-6-368



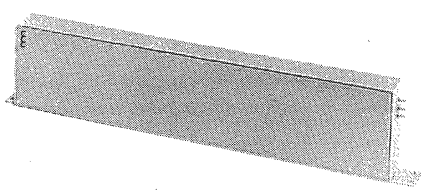
Minilines (Distributed Constant)
Economically priced delay lines featuring low profile envelopes which are ideal for printed circuit mounting and applications requiring high package density. Delays up to 2 μsec, impedances for 100 to 1,000 ohms and rise times as low as 2.5 nanoseconds are available and meet all applicable portions of MIL-D-23859A.
Write for data sheet DL-4/5-368



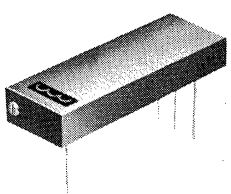
Dual-In-Line (Mates with standard) DIP Socket)
Series DU nanosecond delay lines offer the ultimate in hi-density packaging commensurate with fast rise time. Designed for frequencies up to 125 MHz., at impedances of 100 and 200 ohms, with minimum distortion and insertion loss, this series offers uncompromising speed and accuracy in Computer, Radar and Pulse train positioning applications.
Write for data sheet DL-10-270



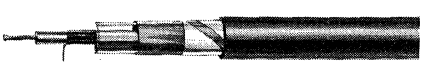
Transponder and Beacon Coder Delay Lines
Tap delay spacing of 1.45 microseconds with special tap delays designed for the various systems are available as off shelf and customer designed items. These lines have minimum volume and weight for airborne use and are normally supplied wired to printed circuit cards. These delay lines exhibit high delay accuracy and unsurpassed temperature stability — normally 10 ppm/°C.



Electrically Variable Delay Lines (E.V.D.L.)
Sophisticated voltage variable devices for applications such as Aperture Phase Correction in color television signal generation. Or as a Phase Modulator where the modulating voltage is used as the device bias. CCC E.V.D.L.'s are being used at frequencies up to 50 MHz by major producers of studio broadcasting equipment throughout the world.



Varilines (Mechanically Variable Delay Lines)
Columbia manufactures a wide range of precision variable delay lines encompassing delay ranges of from 0 to 20 nanoseconds, to 0 to 15 microseconds in impedance ranges of 50 to 2,000 ohms. These units can be supplied continuously variable or may be decade switched, and suitable for printed circuit applications.
Write for data sheet DL-1-368



Magnetic Core Delay Cable
Economical low-loss, high impedance delay elements for use in pulse work demanding extremely fast rise times. These delay cables can be supplied in calibrated lengths with molded-on end terminations, ready for installation or may be obtained in bulk. Delivery is usually from stock.
Write for data sheet DL-7-368

For special applications, quotations and delivery information, please call or write. Ask for complete catalog.

COLUMBIA COMPONENTS CORP. A SUBSIDIARY OF COMPUTER INSTRUMENTS CORP.

60 MADISON AVENUE, HEMPSTEAD, NEW YORK 11550 / (516) 483-8200 / TWX 510-222-4189

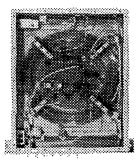
military & commercial

DELAY LINES

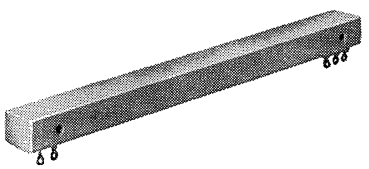
WITH OR WITHOUT CIRCUITRY

MAGNETOSTRICTIVE ★ LUMPED CONSTANT ★ ULTRASONIC ★ DISTRIBUTED CONSTANT ★ DISPERSIVE STRIP

MAGNETOSTRICTIVE DELAY LINES — Fixed and variable delays to 10,000 microseconds. Fixed — FMS Series; Variable — VM Series.

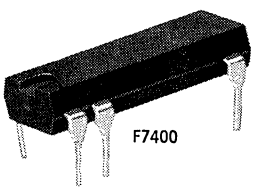


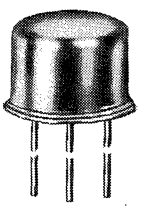
FIXED MAGNETOSTRICTIVE DELAY LINE — Up to 10,000 bits of data for memory storage. Circuitry compatible with all microcircuit logic. Choice of data format: RZ, NRZ or Bipolar.



ULTRASONIC DELAY LINES — Replaces most quartz or glass lines. Offers superior performance, lower attenuation and smaller size at less cost. Frequencies to 30 MHz. Delays to 200 usec and greater.

SUBMINIATURE DELAY LINES

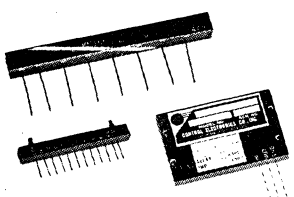




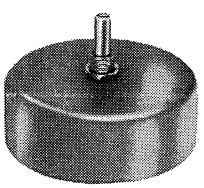
F-TO-5

TO-5 and micrologic packaged delay lines from 0.01 to 0.64 and longer delays. Ideal for timing transistors and other circuit components.

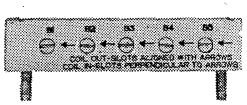
LUMPED CONSTANT DELAY LINES — Many shapes available including miniature types with pin connectors for PC Boards, connector fingers for plug-in units...multi-tapped units...terminal-ended units, etc. Delays from 0.05 usec to 500 usec for standard units. Delay to risetime ratios up to 100:1. Temperature stability to 50 ppm/C°.



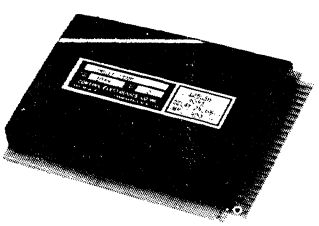
COMPACT FIXED DELAY LINES FOR PC BOARDS — Extremely high density packaging. Typical Unit: 25:1 delay-to-rise-time ratio in a volume of 2 cubic inches.



VARIABLE DELAY LINE Resolution of 1 part in 120. Delay up to 10 usec. 1″ x 3½″.

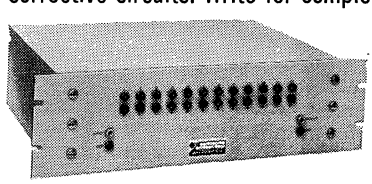


UNIQUE BINARY CODED SECTIONAL DELAY LINE — Uses miniature transfer switches. Also available with terminals for remote switching.



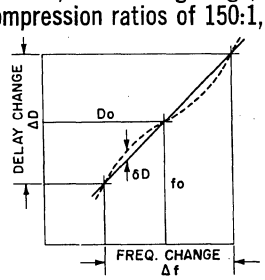
IFF MULTI-TAP DELAY LINES Standard IFF delay lines with taps every 1.45 usec. High density packaging available for airborne transponder use.

AUDIO, HIGH FREQUENCY & DISTRIBUTED CONSTANT DELAY LINES — With unusual circuits, extreme delays, high frequency application, rapid rise times, conforming waveform circuits and corrective circuits. Write for complete details.



AUDIO DELAY CABINET — Relay rack mounted cabinet houses 25 millisecond delay with taps at every ms. Units can be cascaded for longer delays.

DISPERSIVE STRIP DELAY LINES — Delay varies with frequency. A prime application is in Pulse Compression Radar Systems, eliminating large, expensive filter components. Compression ratios of 150:1, typical.



$\Delta D \cdot \Delta f$ = COMPRESSION RATIO OR DISPERSION FACTOR

$\frac{\Delta f}{fo}$ = BANDWIDTH %

fo = MIDBAND FREQUENCY

Do = MIDBAND DELAY

A subsidiary of Bell Electronic Corp.

For all your Delay Line requirements, contact:

CONTROL ELECTRONICS COMPANY, INC.

153 Florida Street, Farmingdale, L.I., N.Y. 11735 • (516) 694-0125

DATA DELAY DEVICES
253 CROOKS AVE., CLIFTON, N.J. 07011 | Tel. (201) 772-1106

SHORT FORM CATALOG

DELAY LINES

STEP VARIABLE

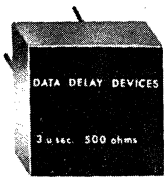
DESCRIPTION
L-C networks in tandem, with precise delay increments and low attenuation. Use as delay syntesizers for evaluation of Worst-Case design analysis; as time delay standards and Phase measuring devices. Meets Military specifications. Type 510 and 511 use a single 10 positions switch.

SPECIFICATIONS
ACCURACY: ± 2% of setting. ATTENUATION and *TIME DELAY see table. *RISE TIME: 2% of time delay or less. TEMPERATURE COEFFICIENT: ± 50 PPM/°C. DISTORTION: Less than 3% for pulse signals on most types. Essentially no harmonic distortion for sine wave signals. SIZE: 8 x 3.5 x 4.5 (20.32 x 8.89 x 11.43 cm) Max. for type 510 and 511. 16.75 x 5.25 x 5.5 (41.54 x 13.33 x 13.97 cm) Max. for type 1510 and 1511 (Rack-Mount Panel available on request).

*other can be provided on request.

RISE TIME = 2% IMPEDANCE = 600 Ω				RISE TIME = 2% IMPEDANCE = 1000 Ω			
Type no.	Total Delay (us)	Delay Step (us)	Attn. db	Type no.	Total Delay (us)	Delay Step (us)	Attn. db
510-A	10.0	1.0	1	511-A	10.0	1.0	.6
510-B	25.0	2.5	1.5	511-B	25.0	2.5	1.0
510-C	50.0	5.0	2.0	511-C	50.0	5.0	1.5
510-D	100.00	10.0	3.5	511-D	100.0	10.0	2.5
510-E	500.00	50.0	4.0	511-E	500.0	50.0	3.0
510-F	1,000.00	100.00	4.5	511-F	1,000.00	100.0	4.0
1510-A	11.0	.1	1	1511-A	11.0	.1	.6
1510-B	110.0	1	3.5	1511-B	110.0	1	2.5
1510-C	1,100.0	10	4	1511-C	1,100.0	10	4.0
				1511-D	11,000	100	6.0

HIGH DENSITY



SPECIFICATIONS
TIME DELAY: 0.35 μs DELAY ACCURACY: ± 3%. RISE TIME: 3% of time delay. IMPEDANCE: up to 4000 ohms. PHASE RESPONSE: 1% up to 3db. FREQUENCY RESPONSE: up to 10 MC. ATTENUATION: Less than 0.1 db/μs TEMPERATURE COEFFICIENT: 1000 PPM/°C.

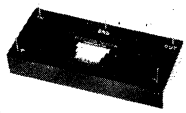
RISE TIME = 3% For other rise times SEE BULLETIN SERIES 100								
TYPE 100A	DELAY (μs)	IMPEDANCE (OHMS)	TYPE 100A	DELAY (μs)	IMPEDANCE (OHMS)	TYPE 100A	DELAY (μs)	IMPEDANCE (OHMS)
525-A	5.25	075	1050E	10.50	400	700-G	7.00	600
350B	3.50	100	1400E	14.00	400	1400G	14.00	600
700-B	7.00	100	2100E	21.00	400	2100G	21.00	600
350-C	3.50	150	2800E	28.00	400	2800G	28.00	600
700-C	7.00	150	700-F	7.00	500	3500G	35.00	600
1050C	10.50	150	1050F	10.50	500	700-H	7.00	1000
350-D	3.50	200	1400F	14.00	500	1050H	10.50	1000
700-D	7.00	200	2100F	21.00	500	1400H	14.00	1000
1050D	10.50	200	2800F	28.00	500	2100H	21.00	1000
1400D	14.00	200	3500F	35.00	500	2800H	28.00	1000
700-E	7.00	400						

CONTINUOUSLY VARIABLE

SPECIFICATIONS
DELAY VARIATION: 0 to 10 shaft rev. ACCURACY: ± 3% or better. BANDWIDTH: f(3db)=.35/TR. IMPEDANCE TOLERANCE: ± 10% or better. OPERATING TEMPERATURE: -60°C to +125°C. TEMPERATURE COEFFICIENT: 50 PPM/°C for type 500. 170 PPM/°C for type 501. CASE: plastic. DIMENSION: 6.5 x 1.56 x 1.12 (16.5 x 3.96 x 2.85 cm). SHAFT: .25 dia. (.635 cm). MOUNTING: 2 - 6 - 32 centered on 1.56 side, spaced 6.25.

TYPE	IMP. (Ω)	DELAY (μs)	TR (μs)	ATT. (db)	RES. (ns)	TYPE	IMP. (Ω)	DELAY (μs)	TR (μs)	ATT. (db)	RES. (ns)
500-A	75	1.25	.12	1.5	2.5	500-F	250	0.50	.05	.5	1.0
500-A1	75	1.50	.15	1.5	3.0	500-F1	250	1.00	.10	2	1.2
500-B	100	1.00	.10	1.0	2.0	500-G	300	0.60	.06	1.2	.6
500-B1	100	1.50	.15	1.5	3.0	500-G1	300	1.25	.12	3	1.0
500-B2	100	2.00	.20	4	2	500-J	450	0.90	.09	2	.7
500-C	120	0.90	.09	1.0	2	501-A	220	0.15	.025	.25	.4
500-C1	120	1.75	.17	3	1.8	501-B	370	0.25	.040	.50	.5
500-D	150	0.62	.060	.9	1.3	501-C	400	0.35	.045	.50	.45
500-D1	150	1.50	.15	1.5	3	501-D	440	0.60	.060	.5	.6
500-D2	150	2.50	.25	9	2.0	501-E	540	0.70	.080	.6	.7
500-D3	150	2.75	.27	9	2.2	501-F	630	1.10	.10	1	.7
500-E	200	2.00	.20	6	1.6						

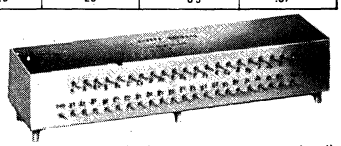
ELECTRICALLY VARIABLE



SPECIFICATIONS
DELAY VARIATION: 30% or more of total delay. DELAY TRACKING: ± 4%, ± 1% if control signal is sawtooth. DELAY/VOLTAGE LINEARITY: Normally non-linear. FREQUENCY RESPONSE: 5 MHz. Max. DELAY/RISE TIME RATIO: 10/1 (other to specification). MAXIMUM CURRENT: 50 MA. IMPEDANCE VARIATION: Less than 4%. VOLTAGE SWING: 0-20V max. ATTENUATION: Less than 2db over the voltage swing. SIZE 5 x 1.25 x 1.25 (12.7 x 3.17 x 3.17 cm) max. CASE TYPE: Epoxy. TERMINALS: #18 gauge pins, .25 long.

P/N	DELAY CHANGE (μs)	MAX. DELAY (μs)	MIN. DELAY (μs)	VOLTAGE RANGE	IMPEDANCE (Ω)	MAX. RISE-TIME (μs)
300-A	10	33	23	20	150	4.1
300-B	4.8	21	16.2	20	220	2.8
300-C	3.2	15	11.8	20	300	2.0
300-D	2.0	10	8	20	500	1.3
300-E	1.6	7	5.4	20	700	.91
300-F	1.0	4.5	3.5	20	85	.67

AUDIO



SPECIFICATIONS
TOTAL DELAY: See table. TAP DELAY: Normal IN and OUT (100 taps can be accommodated). DELAY ACCURACY: ± 3% (± ½% on request). IMPEDANCE: 200 to 10,000 ohms. ± 5%. ATTENUATION: 6 db or better. PHASE RESPONSE: ± 1% over bandwidth. TEMPERATURE RANGE: -55°C to +125°C. TEMPERATURE COEF.: ± 50 PPM/°C (± 15 PPM/°C on request). WORKING VOLT.: 200 WVDC (400 WVDC on request). CASE: Vertically sealed metal. SIZE: 5.75 x 3 x 2 (14.6 x 7.67 x 5.10 cm). MOUNTING: 4 - 10 - 32 x .25 studs, spaced 3.5 x 2. TERMINALS: Glass-to-metal or press-fit.

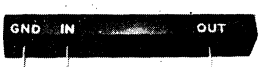
PART NO. 7000-	DELAY (μs)	RISE-TIME (μs)	BW (KHZ)	IMPEDANCE (Ω)	PART NO. 7000-	DELAY (μs)	RISE-TIME (μs)	BW (KHZ)	IMPEDANCE (Ω)
100A	100	4	0-80	500	800B	800	32	0-10	1000
100B	100	4	0-80	1000	1000A	1000	40	0-8	500
200A	200	8	0-40	500	1000B	1000	40	0-8	1000
200B	200	8	0-40	1000	2000A	2000	80	0-4	500
400A	400	16	0-20	500	2000B	2000	80	0-4	1000
400B	400	16	0-20	1000	4000A	4000	160	0-2	500
800A	800	32	0-10	500	4000B	4000	160	0-2	1000

LOW COST

SPECIFICATIONS
TEMPERATURE RANGE: -55°C to -105°C. WORKING VOLTAGE: 200 VDC. CASE: Nickel plated brass, glass to metal end seals.

PART NO. 2000-	DELAY ± 3%	RISE TIME	D.C. RES. OHMS	IMPEDANCE OHMS ± 5%	MAX. ATTEN.	LENGTH (INCHES)
100A	100 ns	30 ns	7	500	4%	1
200A	200 ns	70 ns	10	500	2%	1
200C	200 ns	70 ns	17	1000	2%	1
300A	300 ns	100 ns	5	500	1%	1
300C	300 ns	100 ns	12	1000	2%	1
400A	400 ns	100 ns	15	500	3%	1.5
400C	400 ns	100 ns	15	1000	3%	1.5
500B	500 ns	120 ns	14	700	2%	1.5
1000D	1000 ns	200 ns	36	1400	3%	1.5
1100E	1100 ns	280 ns	30	1500	2%	1.5

COMPUTER DELAY LINES



SPECIFICATIONS
TEMPERATURE RANGE: -55°C to +125°C. DISTORTION: 5% Max. DC WORKING VOLTAGE: 200 VDC. CASE EPOXY. SIZE L x .45 x .33 max.

PART NO. 1000-	DELAY ± 2%	RISE TIME	RES. D.C. OHMS	IMP. OHMS 10%	LENGTH MAX. (IN)	PART NO. 1000-	DELAY ± 2%	RISE TIME	RES. D.C. OHMS	IMP. OHMS 10%	LENGTH MAX. (IN)
25A	25ns	20ns	3.5	500	2	400A	400ns	44ns	41	500	3
50A	50ns	22ns	6	500	2	450A	450ns	46ns	46	500	3
100A	100ns	24ns	11	500	2	500A	500ns	50ns	51	500	3
125A	125ns	25ns	13.5	500	2	600A	600ns	56ns	61	500	5.25
200A	200ns	31ns	21	500	2	700A	700ns	62ns	71	500	5.25
225A	225ns	32ns	23.5	500	2	800A	800ns	68ns	81	500	5.25
250A	250ns	35ns	26	500	2	900A	900ns	74ns	91	500	5.25
300A	300ns	37ns	31	500	2	1000A	1000ns	80ns	100	500	5.25

DUAL-IN-LINE DELAY LINES SERIES 1502

SPECIFICATIONS
- Standard 14 lead I.C. case
- 50 vdc test voltage
- Td/tr ≥3/1
- Taps available

P/N 1502	Td (NS)	Ro (ohms)	P/N 1502	Td (NS)	Ro (ohms)	P/N 1502	Td (NS)	Ro (ohms)
-1	5	100	-19	80	200	-37	60	300
-2	10	100	-20	5	250	-38	80	300
-3	15	100	-21	10	250	-39	100	300
-4	20	100	-22	15	250	-40	10	350
-5	40	100	-23	20	250	-41	20	350
-6	5	150	-24	30	250	-42	30	350
-7	10	150	-25	40	250	-43	40	350
-8	15	150	-26	50	250	-44	50	350
-9	20	150	-27	60	250	-45	80	350
-10	30	150	-28	80	250	-46	100	350
-11	50	150	-29	100	250	-47	10	400
-12	5	200	-30	5	300	-48	20	400
-13	10	200	-31	10	300	-49	30	400
-14	15	200	-32	15	300	-50	40	400
-15	20	200	-33	20	300	-51	10	500
-16	30	200	-34	30	300	-52	20	500
-17	40	200	-35	40	300	-53	30	500
-18	60	200	-36	50	300			

DUAL-IN-LINE DELAY LINES SERIES 1500 & 1501

SPECIFICATIONS
- Td/Tr ≥ 3/1 and 2/1 series 1501 & 1500 respectively
- Test voltage – 100 vdc for series 1500; 50 vdc for series 1501
- Longer cases available for longer delays

P/N 1500	Td (NS)	Ro (ohms)	H (INS.)	P/N 1500	Td (NS)	Ro (ohms)	H (INS.)	P/N 1500	Td (NS)	Ro (ohms)	H (INS.)
-1	10	125	3/16	-8	10	250	1/8	-15	20	280	1/8
-2	10	150		-9	20	250		-16	30	280	
-3	15	200		-10	25	250		-17	10	300	
-4	15	220		-11	15	270	3/16	-18	20	300	
-5	25	220		-12	25	270		-19	30	300	
-6	10	240	1/8	-13	35	270		-20	40	300	
-7	15	240	1/8	-14	10	280	1/8	-21	50	300	

P/N 1501	Td (NS)	Ro (ohms)	H (INS)	P/N 1501	Td (NS)	Ro (ohms)	H (INS)	P/N 1501	Td (NS)	Ro (ohms)	H (INS)
-1	10	100	1/8	-21	30	300	1/8	-41	10	400	1/8
-2	20	100		-22	40	300		-42	20	400	
-3	30	100		-23	50	300	3/16	-43	30	400	
-4	10	150		-24	60	300		-44	40	400	3/16
-5	20	150		-25	70	300		-45	50	400	
-6	30	150		-26	80	300		-46	60	400	
-7	40	150		-27	90	300		-47	70	400	
-8	10	200		-28	100	300		-48	80	400	
-9	20	200		-29	120	300		-49	90	400	
-10	30	200		-30	140	300		-50	100	400	
-11	40	200		-31	10	350	1/8	-51	110	400	
-12	50	200		-32	20	350		-52	20	500	
-13	60	200		-33	30	350		-53	30	500	
-14	10	250		-34	40	350	3/16	-54	40	500	
-15	20	250		-35	50	350		-55	50	500	
-16	30	250		-36	60	350		-56	60	500	
-17	40	250		-37	70	350		-57	70	500	
-18	50	250		-38	80	350		-58	80	500	
-19	10	300		-39	90	350		-59	90	500	
-20	20	300		-40	100	350					

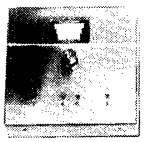
LOW FREQUENCY OSCILLATORS

SPECIFICATIONS
OPEN-CIRCUIT VOLTAGE: 1.5 VRMS. FREQUENCY ACCURACY: ± 0.1% or ± 1HZ (whichever is greater). POWER: +12 VDC, 0.5 MA. DISTORTION: Less than 1%. OUTPUT LOADING: 1 Meg-Ohm Min. (if less specify). TEMPERATURE COEFF.: 0.016%/°C (others on request). TEMPERATURE RANGE: -25°C to +85°C. ENCAPSULATION: Epoxy resin. TERMINALS: (4) No. 18 gauge pins, 1.10 x 1.10 spacing. SIZE: 1.5 x 1.5 x .5 (3.81 x 3.81 x 1.27 cm).

MODEL	FREQ. (HZ)	MODEL	FREQ. (HZ)	MODEL	FREQ. (HZ)
LF010-A	1,000	LF010-H	7,000	LF010-P	14,000
LF010-B	1,600	LF010-J	8,000	LF010-Q	15,000
LF010-C	2,000	LF010-K	9,000	LF010-R	16,000
LF010-D	3,000	LF010-L	10,000	LF010-S	17,000
LF010-E	4,000	LF010-M	11,000	LF010-T	18,000
LF010-F	5,000	LF010-N	12,000	LF010-U	19,000
LF010-G	6,000	LF010-O	13,00	LF010-V	20,000

CONTINOUSLY VARIABLE DELAY LINES SERIES 600

P/N 601	Ro (ohms)	Td (US)	Tr (US)	RES (NS)	ATT (db)
-1	50	3.50	.25	1.8	1.5
-2	55	1.67	.15	2.0	.8
-3	66	4.00	.40	3.2	1.5
-4	75	2.44	.18	1.8	1.2
-5	75	4.30	.40	3.0	1.7
-6	82	1.20	.10	1.5	.5
-7	95	2.82	.26	2.2	1.4
-8	100	1.74	.12	1.8	1.0
-9	110	.83	.08	1.1	.5
-10	110	3.00	.30	2.1	1.6
-12	150	.60	.06	.8	.5
-13	150	1.21	.09	1.8	.7
-14	160	2.1	.19	1.5	1.2
-11	133	2.0	.15	1.6	1.0
-15	186	1.41	.14	1.1	1.2
-16	200	.87	.06	1.8	.5
-17	220	1.52	.13	1.3	1.1
-18	260	1.01	.10	1.0	1.1
-19	305	1.09	.1	.8	1.0



FEATURES
- Continuously variable
- High resolution, 0.15 Ns
- Long delay, 4.3 US
- One turn delay adjustment
- Low attenuation
- High fidelity of pulse reproduction

P/N 602	Ro (ohms)	Td (US)	Tr (US)	RES (NS)	ATT (db)
-1	436	.25	.025	.2	.15
-2	460	.31	.030	.28	.15
-3	520	.49	.038	.33	.3
-4	636	.59	.057	.40	.5
-5	720	.74	.072	.55	1.0

DECADE INDUCTORS

DESCRIPTION
For audio and low frequencies. Used in prototype, lab. standards, wave filters, equalizers, tuned circuits and related applications. Switches are Make before Break and constructed of ceramic stator-and-rotor members with ball-and-socket detent. Contacts silver alloy.

SPECIFICATIONS
ACCURACY: ± .25% at 1KHZ (other freq. on request). DC RESISTANCE: Approx. 40 ohms per H. TEMPERATURE COEFFICIENT: ± 26 PPM/°C between 16°C and 32°C. MAX. VOLTAGE: 130 VRMS. MAXIMUM CURRENT:*. TERMINALS: Type 400 soldering lugs on .75 spacing. Type 1400 jack-top binding posts on standard .75 in. spacing. CASE DIMENSIONS: Type 400 8 x 3.5 x 4 (20.32 x 8.89 x 10.16 cm) Max. Type 1400 16.75 x 8.25 x 5.5 (42.54 x 20.32 x 13.97 cm) max. INDUCTANCE CHANGE WITH AC CURRENT:*. INCREMENTAL INDUCTANCE:*.

*See catalog sheet on Decade Inductors.

TYPE	TOTAL INDUCTANCE	INDUCTANCE INCREMENT	TYPE	TOTAL INDUCTANCE	INDUCTANCE INCREMENT
400 - A	1 mhy	1 mhy	400 - E	10 hy	1 hy
400 - B	10 mhy	1 mhy	1400 - A	1.111 hy	.1 mhy
400 - C	.1 hy	.01 hy	1400 - B	11.11 hy	1 mhy
400 - D	1 hy	.1 hy			

LOW PROFILE FILTERS

CASE Metal flat case to reduce hum pick-up.

PINS Straight pins for PC mounting.

NOTE Filters with other requirements than shown can be supplied. Our technical staff is ready to give you prompt service.

LOW-PASS

P/N 1101	Imp. IN/OUT	PASS-BAND (1db)	PASS-BAND (3db)	STOP-BAND	CASE NO.
-1	10K	DC to 460Hz	600Hz	40db above 750Hz	1
-2	600	DC to 3KHz	3.4KHz	40db above 4.2KHz	1
-3	10K	DC to 4.4KHz	5KHz	43db above 6.3KHz	2
-4	1K	DC to 9KHz	10KHz	43db above 12.8KHz	1
-5	600	DC to 15KHz	18KHz	43db above 23KHz	1
-6	600	DC to 43KHz	50KHz	43db above 64KHz	2

HIGH-PASS

P/N 1102	Imp. IN/OUT	PASS-BAND (1db)	PASS-BAND (3db)	STOP-BAND	CASE NO.
-1	10K	300Hz & above	200Hz	40db below 140Hz	1
-2	10K	600Hz & above	400Hz	40db below 280Hz	1
-3	10K	1.2KHz & above	800Hz	40db below 560Hz	1
-4	10K	3KHz & above	2KHz	40db below 1.4KHz	2
-5	10K	6KHz & above	4KHz	40db below 2.8KHz	2

BROAD BAND-PASS

P/N 1103	Imp. IN/OUT	PASS-BAND	STOP-BAND (36db) BELOW	STOP-BAND (36db) ABOVE	CASE NO.
-1	10K	1KHz to 2KHz	0.5KHz	4KHz	3
-2	10K	2KHz to 4KHz	1KHz	8KHz	3
-3	10K	4KHz to 8KHz	2KHz	16KHz	3
-4	10K	10KHz to 20KHz	5KHz	40KHz	4

MIL SPECS
These filters meet MIL-F-18327C specs. Grade 6, Class R, Life X.

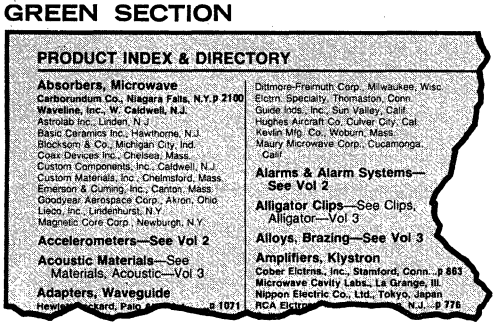
BULLETINS AVAILABLE
REQUEST BY TITLE

DATA DELAY DEVICES
253 CROOKS AVE., CLIFTON, N.J. 07011 Tel. (201) 772-1106

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Wavelins, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
Hewlett-Packard, Palo [illegible] p 1071

Dittmore-Freimuth Corp., Milwaukee, Wisc.
Elctrn. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co., Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn...p 863
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn. [illegible] N.J...p 778

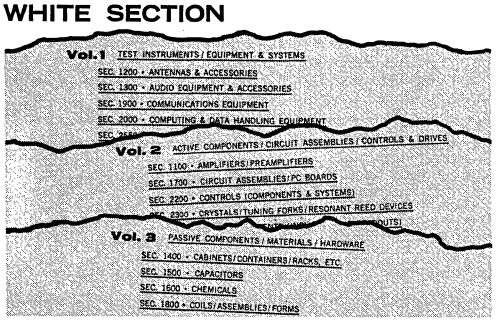
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

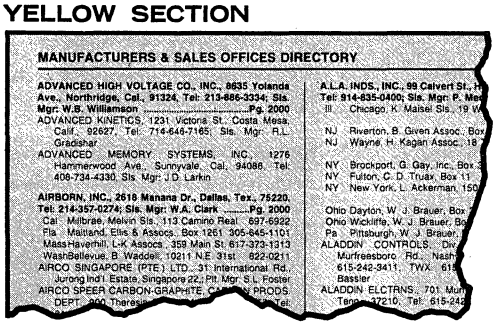
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.S. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel.: 714-646-7165; Sls. Mgr: R.L. Gradshar
ADVANCED MEMORY SYSTEMS, INC., 1275 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

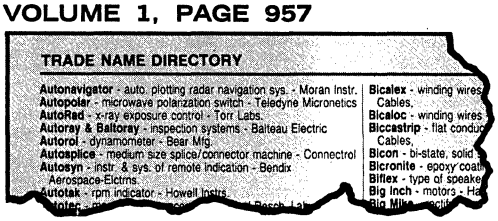
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal Milbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St 617-373-1313
Wash Bellevue, B. Wadder, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22; Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA[illegible] PRODS. DEPT., 900 Theres[illegible] Tel:

A.L.A. INDS., INC., 99 Calvert St., H[illegible] Tel: 914-635-0400; Sls. Mgr: P. Mei
Ill Chicago, K. Maisel Sls., 19 W.
NJ Riverton, B. Given Assoc., Box
NJ Wayne, H. Kagan Assoc., 18
NY Brockport, G. Gay, Inc., Box
NY Fulton, C. D. Truax, Box 11
NY New York, L. Ackerman, 150
Ohio Dayton, W. J. Brauer, Box
Ohio Wickliffe, W. J. Brauer, Bo
Pa Pittsburgh, W. J. Brauer,
ALADDIN CONTROLS, Div. Murfreesboro, Rd., Nashv 615-242-3411, TWX 61 Bassler
ALADDIN ELCTRNS., 701 Mur Tenn. 37210, Tel: 615-242

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible]

Bicalex - winding wires Cables,
Bicaloc - winding wires
Biccastrip - flat conduc Cables,
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha
[illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

If you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

ESC is cutting up!

ESC world's leading producer of delay lines is currently updating its catalogue.

NEW ADDITIONS WILL INCLUDE:

1. Completely revised standard lumped constant delay lines featuring higher delay to rise time ratios, lower attenuation and tailored to MIL-D-23859.
2. Low temperature coefficient (30 PPM/°C max.) delay lines (Series D, E, and F).
3. Low profile series in case heights of .110" max. (Series FM).
4. Delay to rise time ratios of 100, 150, 200 and 250:1 (Series HP).
5. A new series of LC lines suitable for printed circuit board mounting (Series PC).
6. Td/Tr ratios exceeding 10:1 for many of our continuously variable delay lines.
7. New series of Programmably adjustable delay lines (Series PM).
8. New miniature continuously variable lines compatible with DIL (Dual in Line packaging) (Series 900).
9. Economical nanosecond lines in DIL packages (Series EC, EP, EL).
10. Tapped delay lines (Series T).
11. Extended ranges in Millisecond lines.

Call or write for literature
or to discuss your requirements • See Sales Representative List

ESC ELECTRONICS CORPORATION

534 BERGEN BOULEVARD • PALISADES PARK, N. J. 07650 • (201) 947-0400

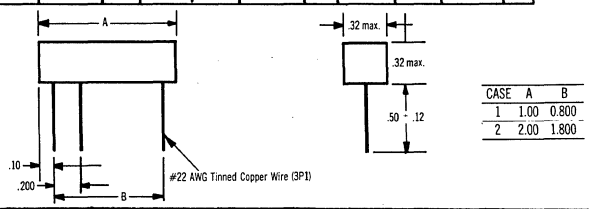
World's Leading Producer of Delay Lines TWX 710-991-9780

KAPPA electromagnetic delay lines

miniature nanosecond delay line

KM Series SPECIFICATIONS
Operating Temperature: —55°C to +125°C
Temperature Coefficient: 100 ppm/°C
Attenuation: 0.5 db maximum
Dielectric Strength: 100VDC
Meets MIL-D-2389A
Distortion (typical): ±10%; with an input rise time of 20% of specified rise time of 1 nsec. whichever is greater.

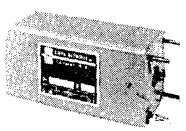
IMPEDANCE 100 ±10%				IMPEDANCE 200 ±10%				IMPEDANCE 500 ±10%			
Model No.	Delay nsec. ±5%	Rise Time nsec. Max.	Case	Model No.	Delay nsec. ±5%	Rise Time nsec. Max.	Case	Model No.	Delay nsec. ±5%	Rise Time nsec. Max.	Case
KMA10	10	2.5	1	KMB10	10	2.5	1	KMD100	100	30	1
KMA20	20	6.0	1	KMB20	20	6	1	KMD150	150	45	1
KMA30	30	8.5	1	KMB30	30	8.5	1	KMD200	200	60	1
KMA40	40	12	1	KMB40	40	12	1	KMD300	300	80	1
KMA50	50	15	1	KMB50	50	15	1	KMD400	400	55	2
KMA60	60	12	2	KMB60	60	12	2	KMD500	500	70	2
KMA80	80	16	2	KMB80	80	16	2	KMD600	600	80	2
KMA100	100	20	2	KMB100	100	20	2	KMD1200	1200	250	2



CASE	A	B
1	1.00	0.800
2	2.00	1.800

typical delay lines

STANDARD LUMPED CONSTANT DELAY LINES Series LC

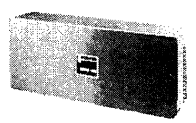


Delay: 50 Nanoseconds to 1 second
Bandwidth: DC to 250 MHz
Rise Time: As low as 2 Nanoseconds
Impedance: 25 ohms to 50 K ohms

STANDARD DISTRIBUTED CONSTANT DELAY LINES Series DC

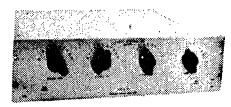
Delay Range: to 3 usec.
Standard Tolerance: ±5% on Delay
Delay-to-Rise-Time Ratio: 11 maximum
Distortion: ±5% (typical), ±10% max.

PRECISION AUDIO DELAY LINES Series A



Delay Range: From 500 usec to 1 sec.
Bandwidth: 70 KHz (maximum)
Delay Linearity: nominally within ±0.25% available to within ±0.05%

PRECISION DECADE DELAY UNITS Series DK



Variable delays available between input and output terminals in decade steps. Each decade has eleven (11) switch contacts and ten (10) delay increments so that the dial values overlap.

DELAY TRIMMERS: TINY TRIM® SERIES

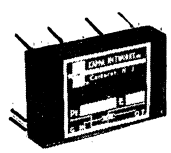
Size: ¼ Cubic Inch

PART NUMBER	SHIFT RANGE @3.58 MHz DEG.	DELAY (Nano-sec)	RISE TIME (Nano-sec)	IMPED-ANCE (ohms)
TT20D	25	20	5	500
TT30G	38	30	7.5	390
TT40D	50	40	10	500
TT50C	64	50	12.5	390
TT50C	75	60	15	330

TRANSPONDER LINES Series C

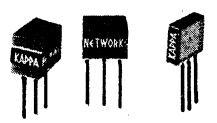
Tap Spacing: 1.45 usec., or as required
Tap Tolerance: ±.05, or as required
Delay-to-Rise-Time Ratio: 100 maximum
Temperature Stability: 50 ppm. °C or less

LOW DISTORTION LINES Series D



Distortion at Output: 2% maximum
Distortion at Taps: Less than 5% at any tap
Distortion Limit: As low as 0.1% if required
Delay Range: Up to 100 usec.

ULTRA MINIATURE DELAY LINES Series T

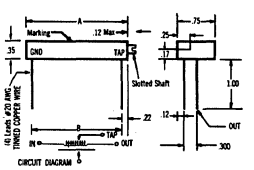


Delay Range: to 200 nsec.
Delay/Rise Time: 10 maximum
Attenuation: .2 db maximum
Fully encapsulated

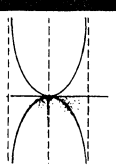
minitrim® delay line

Ideal for P.C. Board Mounting
Kappa Minitrim delay lines are designed for circuits requiring precise delay adjustments.

SPECIFICATIONS
Attenuation: less than .5 db
Resolution: less than 1 nsec.
External termination: (not supplied)
Dielectric Strength: 300VDC
Operating temperature: —55°C to +125°C O Ring shaft seal
High Impedance tap: (variable)

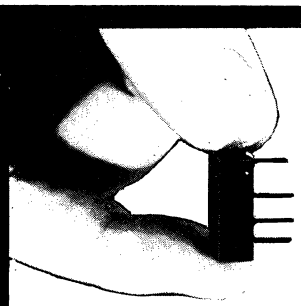


MODEL	Delay* (nsec)	Char. Impedance (ohms)	Approximate TD/TR Ratio	"A" Dim	"B" Dim	Approx. # of Revolutions
MT10	10	100	4:1	2.25	1.800	6
MT20	20	100	7:1	4.00	3.500	12
MT50	50	200	4:1	2.25	1.800	6
MT75	75	1000	4:1	2.25	1.800	6
MT100	100	200	7:1	4.00	3.500	12
MT125	125	500	4:1	2.25	1.800	6
MT150	150	1000	7:1	4.00	3.500	12
MT250	250	500	7:1	4.00	3.500	12



KAPPA NETWORKS, INC.
DELAY LINE SPECIALISTS • ELECTRIC WAVE FILTERS • MANUFACTURING ENGINEERS
165 ROOSEVELT AVENUE • CARTERET, NEW JERSEY 07008 • TEL. (201) 541-4226

KAPPA electromagnetic delay lines

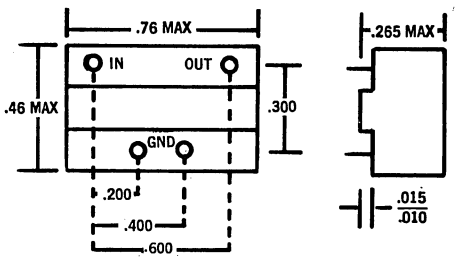


dip lines

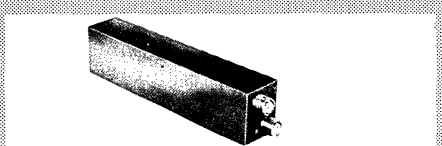
DELAY (ns)	RISE TIME (ns)	IMPEDANCE (ohms)
10	2.5	50
20	4.5	100
30	6	150
40	8	200
50	10	100
75	15	150
100	20	200
125	25	250
150	30	300
200	40	400

DIP lines SPECIFICATIONS:
Tap Delays: 10 equally spaced
Pulse Attenuation: 5% maximum
Distortion: 10% maximum
Operating Temperature: −55°C to +125°C
Temperature Coefficient of Delay: 100 ppm/°C

dual in-line delay lines for p.c. board mounting



video delay lines



Kappa Video delay lines yield a greater delay-bandwidth from fewer components than conventional units, and their performance more nearly approaches constant delay at all transmitted frequencies than conventional (m-derived) delay lines. We have illustrated only some of the many Video lines available from Kappa.

SPECIFICATIONS
Delay Range: to 10 usec.
Impedance: 75 ohms ± 2%
Linear Delay Bandwidth: to 14MHz

Part No.	Delay ± 2%	Insertion Loss	Freq. Response	Description	Size	or ⅞" sq. by
10A50B	78 ns.		±0.1db to 7MHz	Video cable simulators replace both 75 ohm cable and attenuation equalizers	1.5 x 2 x 8	5"
10A100B	157		±0.1db to 7MHz		1.5 x 2 x 8	8"
10A150B	235		±0.1db to 7MHz		1.5 x 2 x 8	11"
10A200B	314		±0.1db to 7MHz		1.5 x 2 x 8	14"
10A250B	392		±0.1db to 7MHz		1.5 x 2 x 8	18"
15A100	.890	3 db	±0.2db to 7MHz	5 segments: 750,80, 40,20	.5 x 2.5 x 8	
20A606	1.188	0.75db	3db @ 8MHz	tapped	.8 x 6 x 9	
20A717	2.5	2 db	50 nsec for total rise time delay	10 segments: .25ea.	1.0 x 4.5 x 11	
20A705	3.16	2 db	3db @ 5MHz	13 taps: every .226	3 x 3 x 7	
20A700	2.8	6 db	5db @ 5MHz	untapped	9.3 x 2.6 x 1.16	

atc

Kappa is a major supplier of delay lines for Beacon Decoding Networks, Airborne Computers, Dme, IFF Coding and Decoding, Radar and other air traffic control applications.

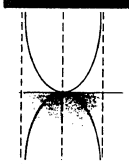
One example of delay lines supplied has a time delay of 2 lines of 10.15 usec each, rise time 0.3 usec, impedance 400 ohms, attenuation 2 db, with 60 taps housed in a 4.75" x 4.5" x 7" package.

sonar

Typical of the many delay lines supplied for sonar applications is Kappa Part Number A104G which has a delay of 1,000 usec, a delay linearity of ± 0.15% to frequency of 15,000 cps, with an impedance of 4,700 ohms, insertion loss of 1 db, with 75 taps housed in a 4" x 4½" x 7" package.

computer

Kappa has designed and produced literally hundreds of different models of computer delay lines. These range from 7 nsec to 1000 nsec time delay, impedance from 50 ohms to 500 ohms, from untapped to units having 60 taps, all in the smallest physical packages available.



KAPPA NETWORKS, INC.

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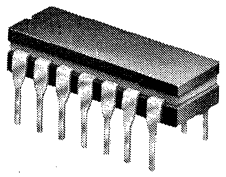
RCL *electromagnetic delay lines*

DIP DELAY LINES FIXED DUAL-IN-LINE PACKAGES

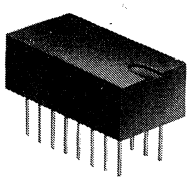


RCL Series DP-100 "Standard" DIP

Designed to fit standard Commercial DIP pin spacings. Both series completely interchangeable in all electrical specifications . . . pin spacings are precisely the same both in width and length.

TC: 200 PPM/°C OR Better than 50 PPM/°C
Maximum number of taps: 10 (Taps may be added to suit special requirements)
Maximum of delay: 500 nanoseconds
Maximum impedance: 500 ohms
Available in 14 pin or 16 pin packaging

- Meets or exceeds all applicable sections of MIL-D-23859A
- Figures of merit ranging from 2 to 5
- Hermetically sealed construction
- Precious metal terminals available



Delay Time Range: 10 nanoseconds to 500 nanoseconds with maximum number of 2 taps
Impedance Range: 50-500 ohms
Figure of Merit: 2 to 5

Case sizes: (For DP300 Series)
14 pin . . . .775 (length) x .450 (max.) (width) x .300 (max.) above PCB
16 pin . . . .885 (length) x .450 (max.) (width) x .300 (max.) above PCB

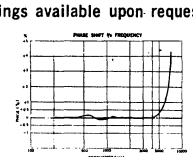
RCL Series DP-300 "Coffin" DIP

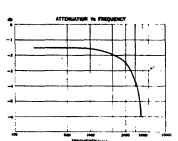
AUDIO DELAY LINES Series L1100

RCL Audio Delay Lines are custom designed and manufactured to the most stringent specifications. The electrical performance, due to advanced design techniques, plus classical and synthesis network theories, insures the ultimate in precision performance.

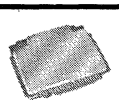
ENGINEERING FEATURE:
Envelope delay of better than 0.1% in the mid-frequency region, and 0.2% in the 6 Db fall off. The frequency characteristic is maximally flat with 0.1% frequency ripple.

Typical Delay range up to 10 milliseconds
Typical Delay-Bandwidth product up to 30
Typical Impedance 500 ohms to 1,000 ohms
Typical Attenuation 0.001 to 0.003 per microsecond.
Units are normally housed in standard rack type mounting cabinets.
A typical example of electrical performance for a delay line of 5 milliseconds is indicated in the following graphs:
Any tap spacings available upon request.





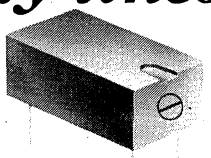
TRANSPONDER-DECODER NETWORKS RCL Series L1200



Taps are available every 1.45 microseconds, or for any other electrical spacing which may be desired.

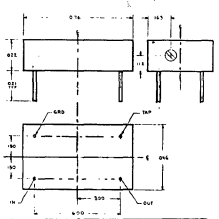
Features:
Dense Packaging
High reliability
Extremely low temperature coefficient of delay over the temperature range of −55°C to +125°C
Accuracy of Delay: 0.1% or better
Figure of Merit: up to 100

VARIABLE DELAY "DUAL-IN-LINES" DIP Series L-1500



RCL offers for the first time, a variable delay line in a Dual-In-Line package.

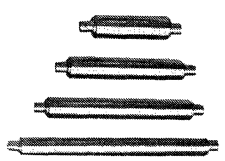
- Hermetically sealed construction
- Precious metal contacts
- Resolution: 2% minimum for highest possible reliability performance



Delay lines meet applicable portion of MIL-D-23859A.
Short run production facilities can produce prototype quantities in exceptionally short lead time.

RCL TYPE #	DELAY RANGE (nsec)	RISE TIME (Max nsec)	IMPED. OHMS (±1%)
L1500	0-5	5	100
L1501	0-20	15	200
L1502	0-30	20	350
L1503	0-40	25	500

VIDEO DELAY LINES (75 OHM CABLE SIMULATORS) RCL Series L1300 and L1400



SPECIFICATIONS:
Bandwidth Series L1300-1 10MHZ
Series L1300-2 7MHZ
Frequency Response Flat, 0 ±.1 db
Impedance .75 ohms
Delay up to 300 ft. standard
Signal Attenuation 2 db to 1.2 db standard (3 db optional)

SERIES L-1300 (FIXED)

RCL Type #	Delay (Nanosec)	Cable Equiv.	Size
1301	25	16 ft.	1.5x.75 O.D.
1302	50	32 ft.	2.5x.75 O.D.
1303	100	64 ft.	4.0x.75 O.D.
1304	140	90 ft.	5.25x.75 O.D.
1305	280	180 ft.	7.0x.75 O.D.

SERIES L1400 (TAPPED)

BANDWIDTH 7 MHZ

RCL Type #	Resolution in feet	Cable Equiv.
1401	25	300 ft.
1402	66	600 ft.

Longer delays available upon request

Developed specifically for TV Broadcast studio work, either black and white, or color. For use either in TV cameras or TV Tape recorders.
REPLACES CUMBERSOME COAXIAL CABLE OR EQUALIZING AMPLIFIERS.
Meet all stringent TV requirements of . . .
. . . frequency response
. . . frequency ripple ratio
. . . group delay linearity (P.P. and mean value).
Available in cylindrical form with BNC connectors or for P.C.B. application.
Standard cable equivalent: 1.56 n Sec. per foot. Belden: Type 8281

Series VL RCL SPECIAL VIDEO DELAY LINES

Designed to equalize and/or synchronize color television signals. These lines are especially designed to fulfill existing stringent specifications in regard to frequency and phase response within the color television frequency band, 405, 525 and 621 line color video systems.

Specialized design feature and test instrumentation are applied. The visual display of frquency and phase response using sophisticated test equipment makes it possible to manufacture video delay lines to precise performance specifications.

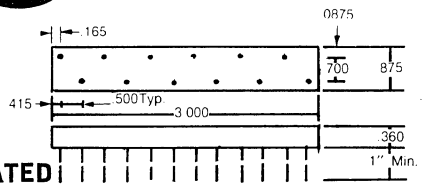
These lines are used in color TV cameras and recorders. In addition, similar delay lines are used for studio work, to either replace or equalize bulky cable lengths. These cable replacements are normally 75 ohm lines with either standard terminals or BNC coaxial plugs.

Precise loss pads are also available for 75 ohm lines equipped with BNC plug and jacks for easy coupling between cables and delay lines.

RCL **ELECTRONICS, INC.**
General Sales Office:
700 South 21st Street, Irvington, N. J. (Area Code 201) 374-3311 • TWX 710-999-5511

RCL *electromagnetic delay lines*

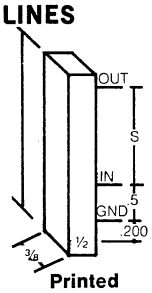
LUMPED CONSTANT DELAY LINES EPOXY ENCAPSULATED



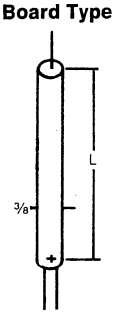
RCL Part No.	Delay nsec.*	Rise Time nsec. (max.)	Impedance ohms (±5%)	Distortion % (max.)	Attenuation % (max.)	Working Volt.	External Taps
L-148	50	5	100	8	10	100	Every 5 nsec.
L-149	100	10	100	8	10	100	Every 10 nsec.
L-150	200	20	100	8	10	100	Every 20 nsec.
L-151	250	20	100	8	10	100	Every 25 nsec.
L-152	300	30	100	8	10	100	Every 30 nsec.
L-153	400	40	100	8	10	100	Every 40 nsec.
L-154	500	50	100	8	10	100	Every 50 nsec.

*Tolerance −2, +3 nsec. or 5% whichever is greater

DISTRIBUTED CONSTANT DELAY LINES



Printed Board Type

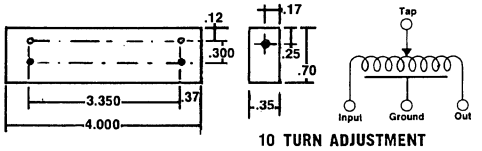


Cylindrical Type

Part No. Cylindrical	Delay μsec (± 5%)	Impedance ohms (± 10%)	Rise Time μsec. max.	Attenuation db max.	Cylindrical "L"	Printed Board "L"	Printed Board "S"
D200-05-C	.05	200	.025	1 db/μsec.	1½"	2"	.7
D200-10-C	.10		.028	or	2¾"	3"	1.7
D200-15-C	.15		.030	.25 db	3½"	3¾"	2.5
D200-20-C	.20		.032	whichever	5"	6"	3.7
D200-25-C	.25		.035	is greater	5¾"	6"	4.7
D500- 1-C	.1	500	.045	1.2 db/μsec.	1"	2"	.7
D500- 2-C	.2		.055	or	1½"	2"	.7
D500- 3-C	.3		.060	.25 db	2"	2"	.7
D500- 4-C	.4		.065	whichever	2¼"	2½"	1.3
D500- 5-C	.5		.075	is greater	3"	3"	1.7
D500- 6-C	.6		.080		3¼"	3½"	2.3
D500- 7-C	.7		.085		3¾"	3¾"	2.5
D500- 8-C	.8		.090		4½"	4¼"	2.9
D500- 9-C	.9		.095		4¾"	4¾"	3.5
D500-10-C	1.0		.10		5½"	5¼"	3.9
D500-11-C	1.1		.12		5¾"	5½"	4.3
D500-12-C	1.2		.13		6"	6"	4.7
D1000- 1-C	.1	1000	.040	1.6 db/μsec.	1"	2"	.7
D1000- 2-C	.2		.045	or	1¾"	2"	.7
D1000- 3-C	.3		.055	.25 db	2¼"	2½"	1.3
D1000- 4-C	.4		.065	whichever	3"	3"	1.7
D1000- 5-C	.5		.070	is greater	3¼"	3½"	2.3
D1000- 6-C	.6		.075		3¾"	3¾"	2.5
D1000- 7-C	.7		.080		4¼"	4¼"	2.9
D1000- 8-C	.8		.085		4¾"	4¾"	3.5
D1000- 9-C	.9		.090		5"	5¼"	3.9
D1000-10-C	1.0		.100		5¾"	5¾"	4.5
D1000-11-C	1.1		.110		6"	6¼"	4.9
D1200- 1-C	.1	1200	.040	1.6 db/μsec.	1¼"	2"	.7
D1200- 2-C	.2		.045	or	1¾"	2"	.7
D1200- 3-C	.3		.050	.25 db	2½"	2½"	1.3
D1200- 4-C	.4		.055	whichever	3"	3"	1.7
D1200- 5-C	.5		.060	is greater	3¾"	3¾"	2.5
D1200- 6-C	.6		.065		4¼"	4¼"	2.9
D1200- 7-C	.7		.070		4¾"	5"	3.7
D1200- 8-C	.8		.075		5½"	5½"	4.3
D1200- 9-C	.9		.080		6"	6¼"	4.9

To order printed circuit unit use Suffix "P" instead of "C".

VARIABLE DELAY LINES

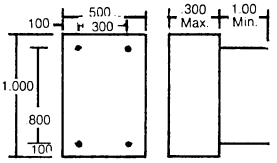


10 TURN ADJUSTMENT

For applications which require adjustable delay time in the operating circuitry. Sealed against moisture and contamination. Adjusting staff equipped with a watertight "O" ring seal.

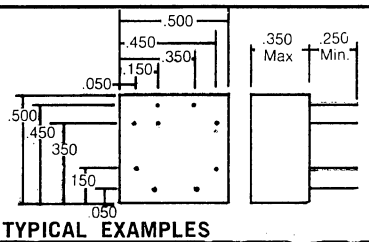
RCL Part No.	Delay Range nsec.	Impedance ohms	Rise Time Max. nsec.
XV1000-450	0-450	1000	75
XV200-200	0-200	200	40
XV750-500	0-500	750	90

Other delays and impedances including 12 turn adjustment available upon request.



MINIATURE DELAY LINES

RCL Part No.	Delay nsec. (±2%)	Rise Time nsec. (max.)	Impedance ohms (±5%)	Distortion % (max.)	Attenuation % (max.)	Working Volt. (max.)
L-142	20	3	100	8	5	100
L-143	25	4	100	8	5	100
L-144	40	6	100	8	5	100
L-145	50	8	100	8	5	100
L-146	75	12	100	8	5	100
L-147	100	20	100	8	5	100



SUBMINIATURE DELAY LINES (Lumped Constant)

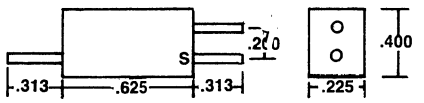
Distortion: 10% all-encompassing
Attenuation: 10%
Working Voltage: 100V.
Temperature Coefficient: 70 ppm/°C max. −55° to +125°C.

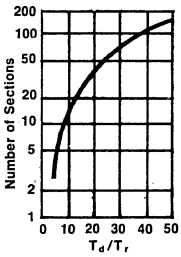
Many other delays available.

TYPICAL EXAMPLES

RCL Part No.	Delay nsec.*	Rise Time nsec. (max.)	Impedance** ohms (±5%)
L-321	50	18	100
L-322	100	46	100
L-371	30	16	100
L-130	4	2.5	50
L-135	16	3	50
L-136	4-4-4-4	3	50
L-141	20	4	50

*±.5 nsec. or 5% whichever is greater.
**Impedances of 75, 93, 120 and 150 ohms also available.





ECONOLINE DELAY LINES

The chart at the left can be used to determine the number of modules required to provide a desired delay and rise time.

1. Determine the delay to rise time ratio by dividing the desired time delay by the desired rise time.
2. Using the chart determine the number of sections required for this T_d/T_r.
3. Divide this number of sections by the total delay to determine the delay per section.

Total delay is the sum of the individual section delays. It can be trimmed to the desired value by selecting the proper value of the last module.

RCL Part No.	Delay nsec (±5%)	Impedance ohms (±5%)	Attenuation db/μsec.	Working Volt. (max.)
EL-10	10	500	1	300
EL-20	20	500	1	300
EL-30	30	500	1	300
EL-40	40	500	1	300
EL-50	50	500	1	300
EL-60	60	500	1	300
EL-70	70	500	1	300
EL-80	80	500	1	300
EL-90	90	500	1	300
EL-100	100	500	1	300
EL-200	200	500	1	300

RCL ELECTRONICS, INC.
General Sales Office:
700 South 21st Street, Irvington, N. J. (Area Code 201) 374-3311 • TWX 710-999-5511

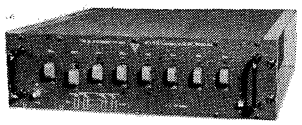
Delay Lines AND Dynamic Analysis

UNIVERSAL AD-YU ELECTRONICS, INC.

249-259 TERHUNE AVENUE • PASSAIC, NEW JERSEY
CABLE: UAD PASSAIC • PHONE (201) 472-5622

WIDE-BAND DELAY STANDARD

Accuracy Traceable To National Bureau Of Standards



TYPE 20A SERIES

Type 20A Series Wide-Band Decade Delay Standard — Bandwidth over 1000 mc. Resolution 1 nanosecond. Characteristic Impedance 50, 75, or 93 ohms. Accuracy 1%. Type 20B1-3 Series Continuously Variable Delay Standard — Bandwidth over 8000 mc; 1% Accuracy. Readability 0.05 ps; infinitesimal resolution.

CONTINUOUS SWEEP TIME DELAY CORRELATOR

TYPE 1050

Produces true and accurate time correlation by using a continuously variable delay line. Wide frequency response. Large dynamic range. Instantaneous and continuous sweeping. Use as narrow-band filter for removing noise. Use to determine transmission time and path of transmission. Use to determine degree of coherence between two random signals. Continuously Variable Time Delay: Zero to 0.18 ms up to 180 ms. Frequency Range: 3 cps to 200 kc. Analog output available for plotting correlation curve; accuracy ±0.4% of full scale.

DECADE DELAY LINES

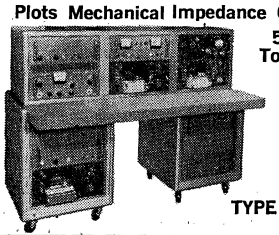
4-Decade Variable, Resolution 1/10000.

TYPE 801-2 SERIES

Absolute stability, no time jitter. Faithful reproduction of input signal. Especially suitable for time correlation study. Delay up to 0.2 sec.; 200 sections. Bandwidth over 200 kc. Variable in four decades. Total Delay: 50 us, 100 us, 500 us, 1000 us, 10 ms, to 200 ms. Impedance 250 ohms to 1k. Rack mount panel.

DYNAMIC ANALYSIS SYSTEM

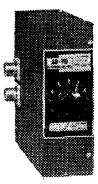
Plots Mechanical Impedance Curve, 50 CPC To 10 KC.



TYPE 1010

140 db dynamic range. Noise level up to 1000 percent without affecting accuracy. Accuracy: Phase ¼°, amplitude ratio ½ db. Sweep rate: 6, 18, 60 minutes or 3 hours. Automatically plots phase and amplitude ratio curve. Fourier response, transfer function, transmissibility, spectral density of random or periodic signals.

STEP VARIABLE DELAY LINES



TYPE 602-3 SERIES

TYPE 611 SERIES

TYPE	TOTAL DELAY	IMPED.	TYPE	TOTAL DELAY	INPUT IMPED.	OUTPUT IMPED.
602b	1.1 us	75 ohms	611a1	8 us	600 ohms	300 ohms
602d4	16.5 us	300 ohms	611a3	32 us	750 ohms	375 ohms
603	27.5 us	600 ohms	611b1	16 us	150 ohms	75 ohms
603b1	11 us	1000 ohms	611b4	12 us	800 ohms	400 ohms

Type 602-3 Series—Equal input and output impedance. Rise Time: Less than 4% of total delay. 11 equal steps. Impedance: 50, 75, 93, up to 1k ohms. Type 611 Series—Total Delay Range: 8 us to 128 us. 5-step variable control. Rack mount construction.

DUAL-CHANNEL SYNCHRONOUS FILTER

0.5° Phase Accuracy, 40 DB Dynamic Range.

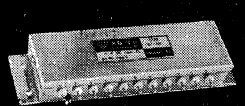
TYPE 1034

Automatically and continuously tracked with the frequency of an external synchronized signal from 2 cps to 10 kc. Phase matched within 0.5 degree over the entire range. Useful for plotting phase and amplitude characteristics between two distorted signals. Isolates noise and distortion up to ten times signal level. Transistorized with rugged construction for reliable operation.

WIDE-BAND FIXED DELAY LINES

TYPE 10T SERIES

Rise Time Less Than 2% Of Total Delay. Type 10T Series Ultra Fast Rise Time Delay Lines. Bandwidth: Over 70 mc. Maximum Signal: Up to 300v. Impedance: 50, 75, 93, 500 ohms. Coaxial connectors for input and output.

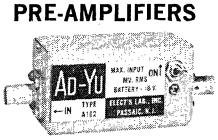


TYPE 8T SERIES

TAPPED DELAY LINES

Up to 100 taps available. Impedance: 50 ohms to 5k. Total Delay: 0.05 to 0.2 sec. Rise time less than 2% of total delay. Meets MIL specifications

ULTRA LOW NOISE PRE-AMPLIFIERS



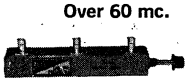
TYPE	GAIN	OUTPUT	BANDWIDTH
A1027A	20±0.3	35 Ohms	0.1c to 1.2mc
A1027B	40±0.5	30 Ohms	3c to 400kc
A1027C	40±0.5	30 Ohms	3c to 400kc

Input Impedance Over 1000 Megohms. Completely transistorized, non-microphonic, completely shielded. Distortion: Less than 1%. Use as pre-amplifier for hydrophones, piezoelectric transducers, capacitance microphones, etc. Use as impedance converter from high impedance source or capacitive source to low impedance coaxial cable.

CONTINUOUSLY VARIABLE DELAY LINES

TYPE 505-9 SERIES

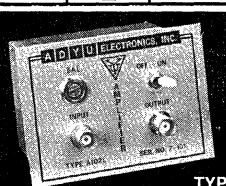
Resolution Time 8×10^{-11} sec., Bandwidth Over 60 mc.



TYPE 551-7 SERIES

Type 505-9 Series — Mechanical Rotation: 345°; Rise Time: 10% of total delay. Impedance: 50 ohms to 1k. Total Delay: 0.05 us up to 10 us. Attenuation: Less than 1 db for most types. Type 551-7 Series — 20 turns mechanical rotation. Small physical size. Suitable for radar IF phase shift. Impedance: 50 ohms to 1k. Useful up to 60 mc. Total Delay: 0.01 us to 10 us.

WIDE-BAND PRE-AMPLIFIERS

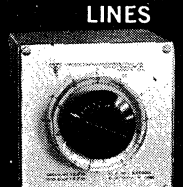


TYPE A1023

Completely Transistorized, Non-Microphonic, No Hum, Completely Shielded. Miniature in size with built-in battery or external power supply. Wideband noise less than 4 microvolts.

TYPE	A102	A102B	A102E	A102J	A102K
GAIN	100	1000	100	100	10,000
BANDWIDTH	1c to 150kc	1c to 200kc	1c to 5mc	1c to 1mc	4c to 500kc

VARIABLE DELAY LINES

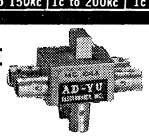


TYPE 521 SERIES

Type 521 Series—60 steps coarse control plus continuously adjustable vernier control. Resolution Time: 8×10^{-11} second. Maximum delay over 30 microseconds. Type 605 Series—60 steps; Type 606-7 Series—120 steps. Time delay accuracy ±1% at any point. Can be used for matched low output impedance.

TYPE	521a	521b	605a	605m	606a	606j	607k	607p
TOTAL DELAY (US)	6	9	0.6	6000	1.2	1200	2400	48000
IMPEDANCE (OHMS)	500	750	75	500	75	1000	500	500

MICROWAVE COAXIAL SWITCH



Type MC-104A — double-pole double-throw; Type MC-104B—single-pole double-throw. DC to 2 kmc with VSWR less than 1.05. Life Expectancy: 15000 operations minimum. 50 ohms input and output impedance.

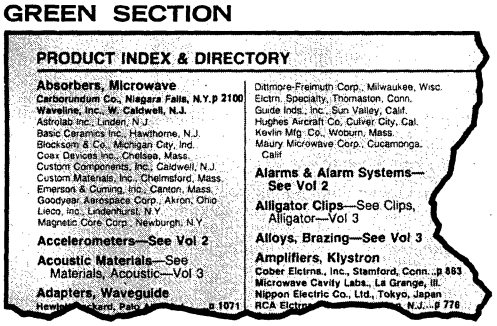
MICROWAVE IMPEDANCE CONVERTER

Type MC-102A, 50 ohms to 73 ohms; Type MC-102B, 50 ohms to 93 ohms. Converts 50 ohms to 73 ohms, 50 ohms to 93 ohms or vice versa. DC to 3000 mc. Low VSWR. 1 watt average, 10 watts peak.

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Wavelinc, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lederhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

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Guide Inds., Inc., Sun Valley, Calif.
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Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

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Cober Elctrns., Inc., Stamford, Conn...p 863
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J....p 776

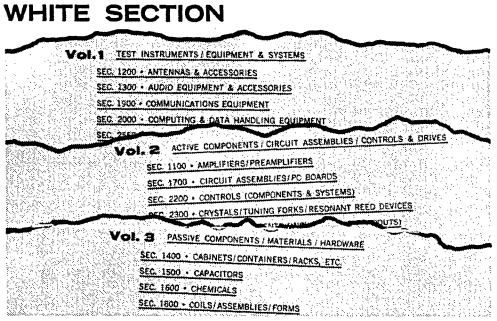
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

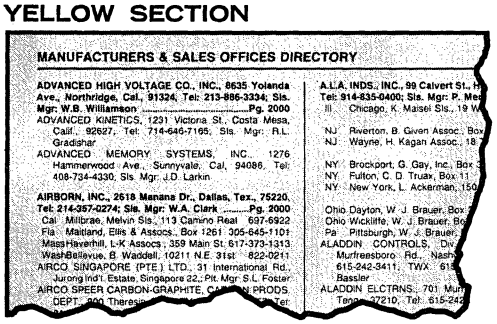
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

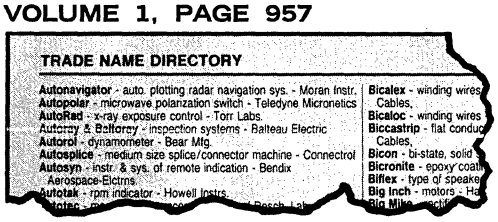
ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324; Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627; Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal, 94086; Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2518 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
MassHaverhill, L-K Assocs., 359 Main St. 617-373-1313
WashBellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Indl. Estate, Singapore 22.; Pit. Mgr S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CARBON PRODS. DEPT., 900 Theresia... Ter:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill Chicago, K. Maisel Sls., 19 W...
NJ Riverton, B. Given Assoc., Box...
NJ Wayne, H. Kagan Assoc., 18...
NY Brockport, G. Gay, Inc., Box...
NY Fulton, C. D. Truax, Box 11
NY New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nashv... 615-242-3411; TWX 61... Bassler
ALADDIN ELCTRNS., 701 Murf... Tenn. 37210; Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Balloray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Electrns.
Autotak - rpm indicator - Howell Instrs...

Bicalex - winding wires, Cables,
Bicaloc - winding wires
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid ...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - H...
Big Mike - ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

SPECIFY "ARNOLD" FOR YOUR **PERMANENT MAGNET**

Arnold permanent magnets are available in all types of Alnico material, in sizes ranging from large castings weighing over 80 pounds to very small sintered parts weighing less than one gram.

Alnico 5 can usually be depended upon to deliver the greatest energy product to the magnetic circuit per weight of magnet material. It is therefore generally the first choice for a magnetic material except where special physical considerations are paramount. Modified or premium grades are also available, such as Arkomax 800, a crystal-oriented material used where size and weight must be reduced without loss of energy.

Special assemblies such as rotors, traveling wave tube magnets, magnetron magnets, etc. may be supplied in an aluminum jacket to facilitate mounting and supply an added protection to the magnet.

Large magnet assemblies may be supplied for focusing mass spectrometer and other measuring applications where a high degree of stability and uniformity of field is required.

Many sizes and types of Alnico magnets are carried in stock for immediate delivery.

ALNICO 8 Available from Arnold in production quantities, Alnico 8 possesses the highest coercive force of all Alnico grades, as well as a high energy product and a relatively low temperature coefficient. It is especially suited for traveling wave tube periodic focusing applications. Gap flux densities greater than 1000 gausses are attainable in tubular-type straight field focusing magnets. Alnico 8 is also recommended for applications which involve strong demagnetizing fields, or where space considerations dictate the use of a short magnet.

ARNOX 5 Arnox 5 is a ceramic permanent magnet material composed of highly oriented barium ferrite. It has many times the energy product of Arnox 3 and is comparable in many applications to Alnico 5. Because of its high coercive force, its use is recommended in applications where a short magnetic length is desirable or where extremely high demagnetizing forces are encountered.

ARNOX 7 is a magnet material which was developed primarily for D.C. motors. It combines high energy with very high resistance to demagnetization over a wide range of temperatures.

ARNOX 8 is a premium quality ferrite magnet with the highest magnetic energy of all Arnox magnet grades. It is used where great magnetic efficiency and space-saving are desired. In addition to the higher flux density available from this magnetic material, it also provides a very high resistance to demagnetization.

SILECTRON C, E, O AND DISTRIBUTED GAP CORES Precision-rolled Silectron strip in 1, 2, 4 and 12 mil thicknesses. They are supplied in a wide variety of shapes, and in sizes from a fraction of an ounce to several hundred pounds. In addition to standard transformer applications, they may also be supplied for special applications such as saturable reactors, instrument transformers and pulse transformers.

Distributed Gap Cores reduce watt loss by 30%, exciting current by 70% and cost by 10% over conventional 12 mil C cores of the same size and weight. Made of the best commercial grades of .012" grain-oriented silicon steel, cores are available in 36 basic sizes for power transformer and reactor applications.

Over 1,000 stock cores are listed in the Arnold Silectron catalog. A wide selection of preferred sizes are stocked for immediate shipment.

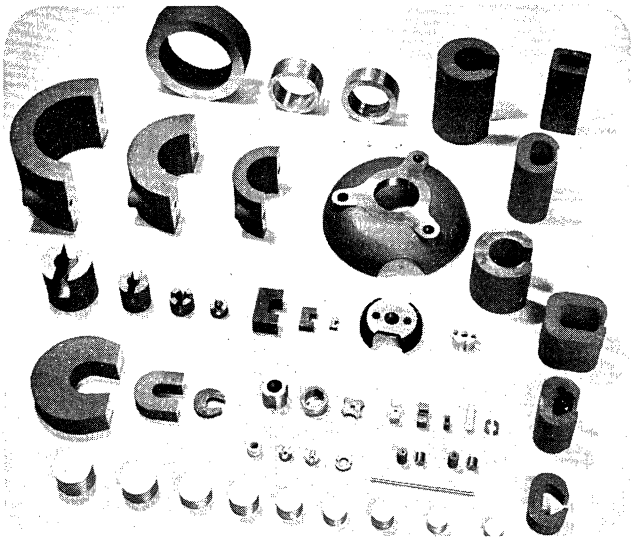
TAPE WOUND CORES OF HIGH PERMEABILITY MATERIALS Arnold tape wound cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, Silectron, or the new rectangular-loop material, Supermendur. All except Supermendur cores are available in standard tape thicknesses of ½, 1, 2, 4 or 12-mils.

Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes produced to individual requirements. Wide selection of Deltamax, Square Permalloy and Supermalloy type 6T cores (aluminum cased, oil filled, heremetically sealed and epoxy coated) carried in stock for immediate shipment.

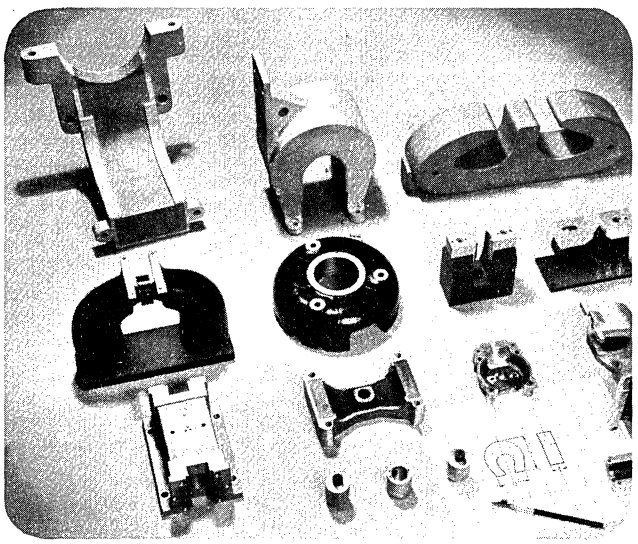
BOBBIN CORES Arnold bobbin cores are available in a wide range of sizes, tape thicknesses, widths and number of wraps to suit the ultimate use of the core in electronic computer assemblies. Magnetic materials usually employed are Deltamax and Square Permalloy in standard thicknesses of 1, ½, ¼ and ⅛ mil. Bobbins are supplied in ceramic or stainless steel.

MO-PERMALLOY POWDER CORES Available in a wide range of sizes, from .140" OD to 5.218" OD. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

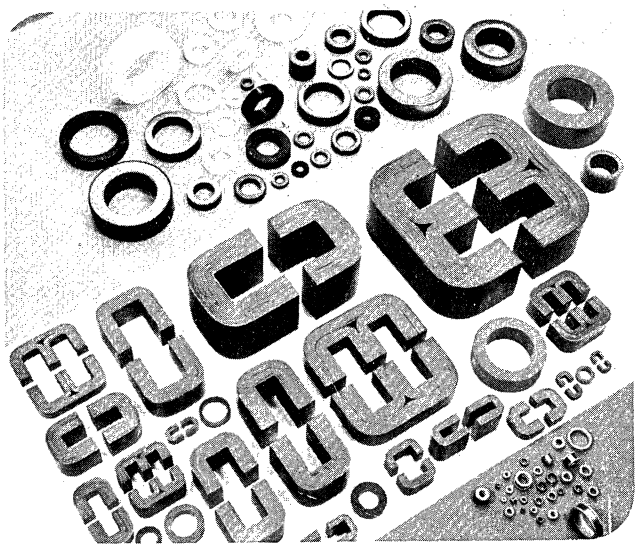
These powder cores are supplied in standard permeabilities of 14, 26, 60 and 125 Mu; high-permeability cores of 147, 160, 173, 205, 250, 300 and 350 Mu are also available in all sizes. They provide constant permeability over a wide range of flux density, and in many cases may be furnished stabilized to provide essentially constant permeability over a specific temperature range. Preferred sizes carried in warehouse stock for immediate shipment.



Typical group of Arnold permanent magnets, both cast and sintered types.

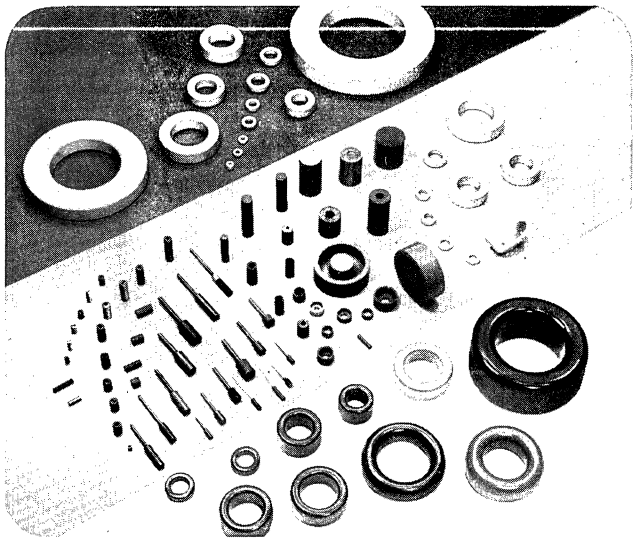


Typical group of permanent magnet assemblies.

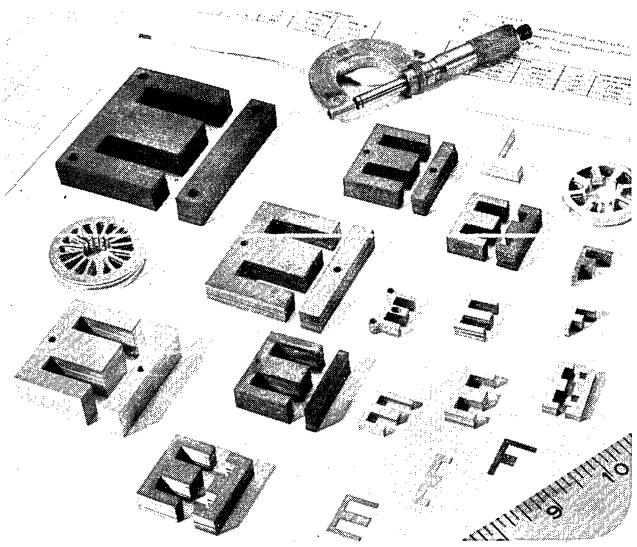


Top to bottom: Tape wound cores, Silectron C, E and O cores, and bobbin cores.

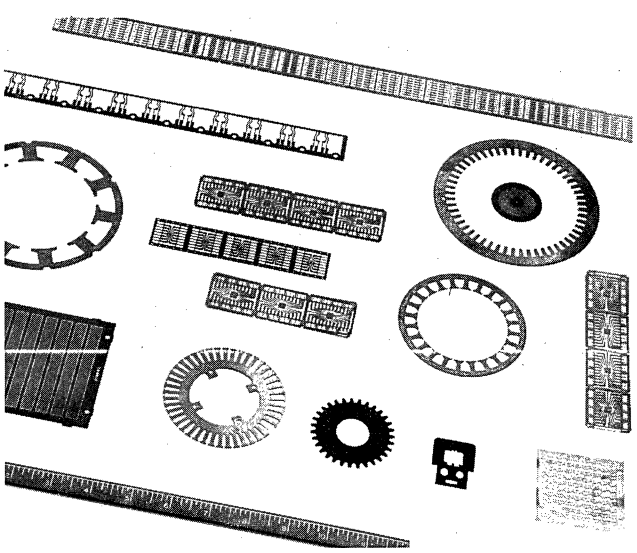
AND OTHER **MAGNETIC MATERIAL** REQUIREMENTS . . .



Powder cores.



Laminations of silicon and nickel-iron.



Chemically etched parts.

IRON POWDER CORES A wide selection of cores is available from simple cylinders to special cores of complicated design. The line includes all standard types of threaded cores, cup, sleeve, slug and cylindrical insert cores as well as a series of iron powder toroids conforming to the standard sizes adopted by the Metal Powder Industries.

SOFT FERRITE CORES Arnold Soft Ferrite cores are available in a wide range of shapes and permeabilities. Threaded cores, slugs, toroids, beads, E, & U-shapes and pot cores are produced in many sizes from standard tooling. Permeabilities range from 40 to 200 for nickel zinc ferrite and 400 to 3000 for manganese zinc ferrite. Higher permeability materials are currently under development.

MSS IRON POWDER CORES MSS powder cores have a very high electrical resistivity combined with a lower magnetostrictive noise than any other commercial iron powder even when cores are operated at saturation flux densities. They are moderately priced and are available in a wide range of sizes.

LAMINATIONS AND FORMED PARTS Arnold produces a wide selection of silicon-steel, nickel-iron and cobalt-iron laminations for motors and transformers. Thin-gauge laminations (1, 2 and 4-mil thicknesses) of high-permeability materials are specialties. A complete line of transformer cans and hardware is available, including Mil-T specification. Many sizes and types of magnetic shields are available or can be fabricated to your exact requirements from Mumetal and other shielding materials. Shielding materials are also available in bulk form, without annealing.

PHOTO-CHEMICAL FABRICATION This technique provides a wide variety of stress-free, burr-free parts. It also provides economical fabrication where expensive tooling is not justified. A wide range of materials is available for applications such as lead frames, recording head laminations, and other applications.

PRECISION FOIL AND STRIP PRODUCTS Thin and Ultra-thin metals and alloys are custom processed in one of the newest and most modern rolling facilities in the world. Materials such as Aluminum, Brass, Copper, Magnetic Alloys, Stainless Steels and others are produced to individual requirements of gage, width, hardness, flatness, grain size, edge and surface condition.

VICALLOY Vicalloy is a carbon-free permanent magnet alloy containing about 10% vanadium, 50% cobalt and the balance iron.

Vicalloy may be fabricated in the form of castings, hot rolled bars and forgings, or cold rolled strip, wire and tubing. After suitable heat treatment, the material is quite readily machinable. Vicalloy is available on special order in bar, strip and thin tape for recording purposes.

2V PERMENDUR A ferromagnetic alloy of cobalt, vanadium and iron that possesses high flux density saturation properties. Its magnetostrictive properties are useful in many transducer applications.

A NEW CUSTOMER SERVICE

Ogallala Electronics, the newest Arnold division, offers a new service designed to meet special requirements for alnico and ceramic permanent magnet and ferrite customers. If you want fast delivery on prototype or production quantities, call today for complete information or costs estimates. Ogallala Electronics can offer you

Close tolerance grinding and shaping
All shapes and sizes
Large inventory of stock parts for immediate delivery
Engineering assistance
Competitive prices
Stringent quality control

Call Howard Harrington, Ogallala Electronics, (308) 284-4093, or write to 601 West First St., P.O. Box 59, Ogallala, Nebraska 69153.

ARNOLD

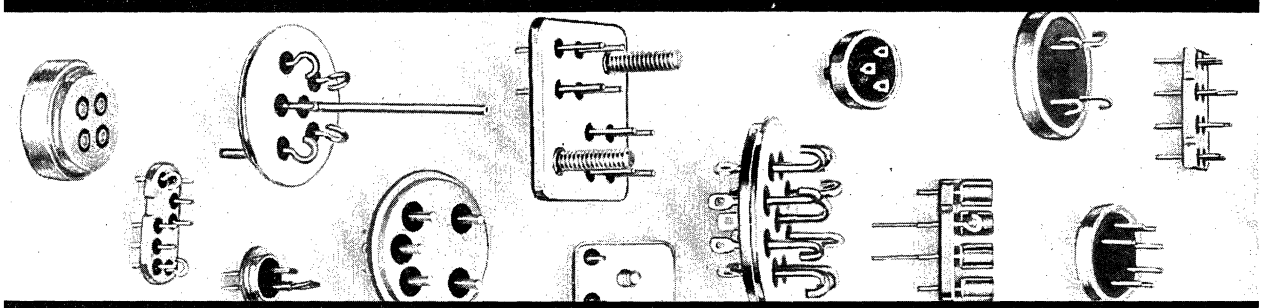
MEMBER COMPANY OF ALLEGHENY LUDLUM INDUSTRIES

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

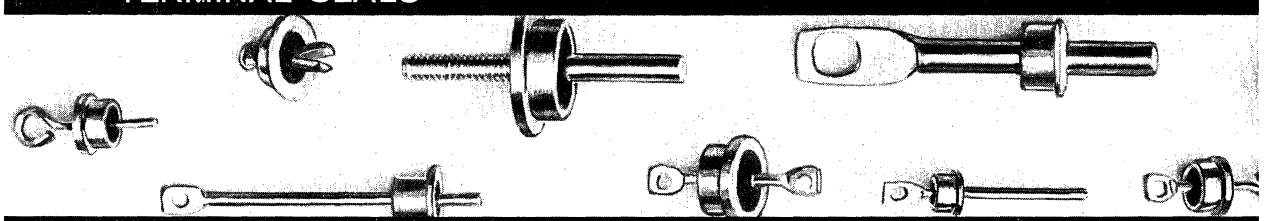
WRITE FOR COMPLETE TECHNICAL DATA

Glass-to-metal PRECISION HERMETIC SEALS

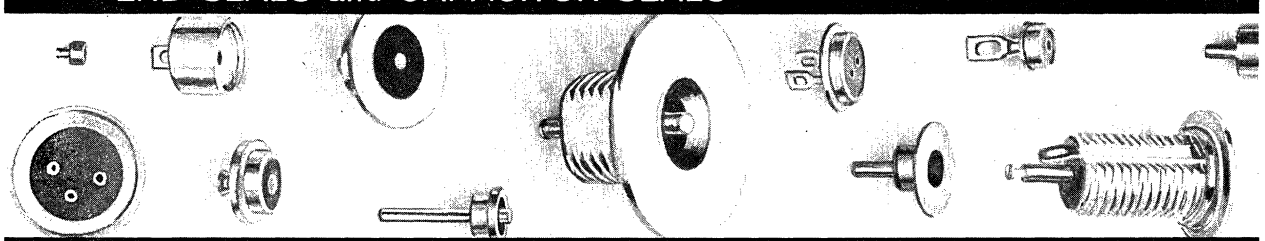
HEADERS



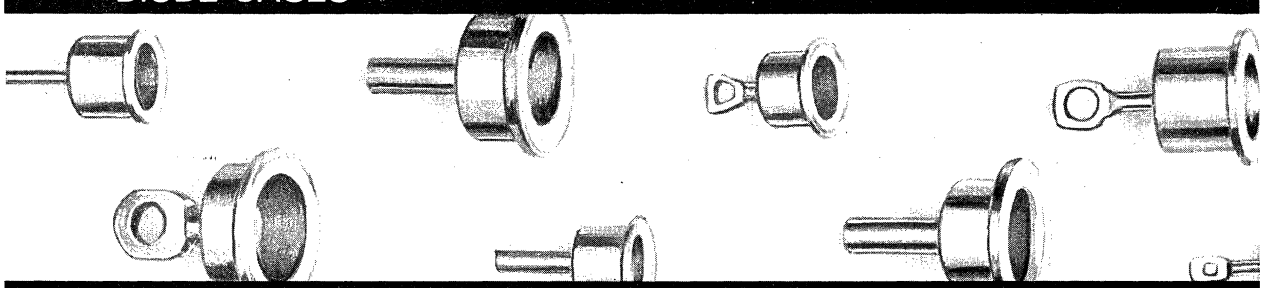
TERMINAL SEALS



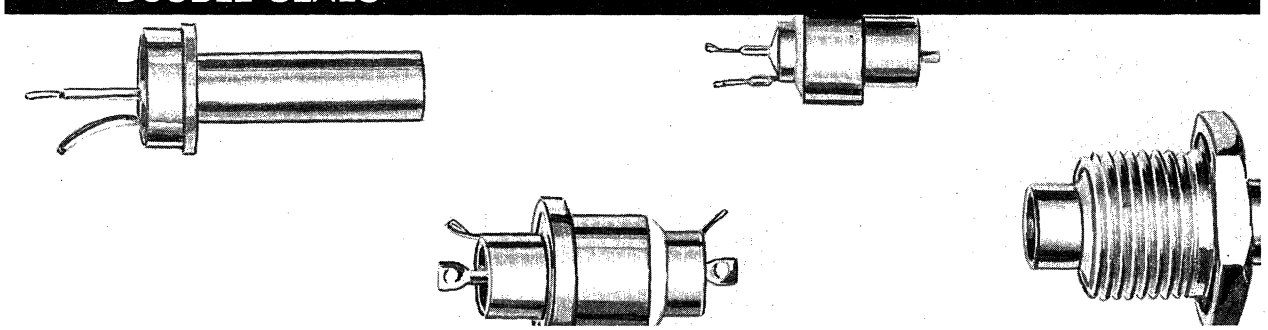
END SEALS and CAPACITOR SEALS



DIODE CASES



DOUBLE SEALS



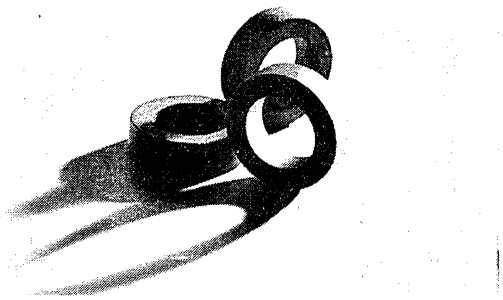
Custom designing to your individual requirements is our special skill. For information call your representative or write direct to Microwave Devices Division, The Bendix Corporation, Hurricane Road, Franklin, Indiana 46131. Phone 317/736-6136.

Bendix Electronics

FERRONICS INCORPORATED

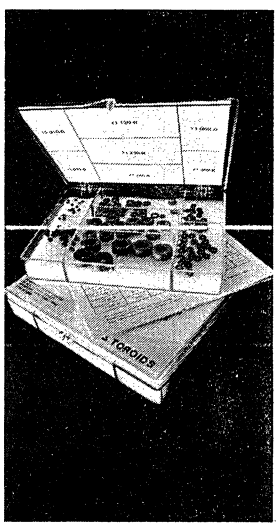
TECHNICAL ACHIEVEMENTS IN FERRITE MANUFACTURING

We've put the whole package together... and you're the big gainer. Starting with the raw oxides through to the finished part, quality control is single sourced. Ferronics offers you TOTAL RESPONSIBILITY and TECHNICAL COMPETENCE.

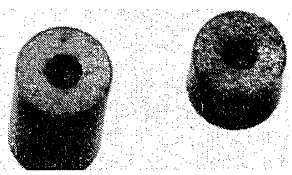


Want consistent performance in a toroid? Look to Ferronics for the answer to this question. We manufacture a complete line — made from a variety of ferrites. Ferronics insures uniform performance from shipment to shipment through stringent quality control programs.

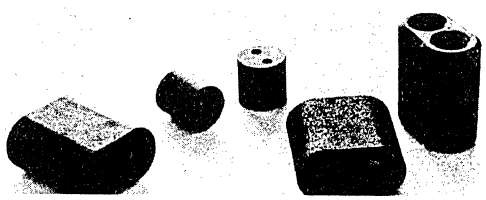
If you have a special transformer problem — come to Ferronics, the problem solver.



Our Ferronikit offers design engineers a variety of sizes and materials of ferrite toroids and shielding beads. The toroid kit contains one material in seven sizes . . . the bead kit has three materials in two sizes. Whether you're a design engineer or a hobbyist these kits will interest you.

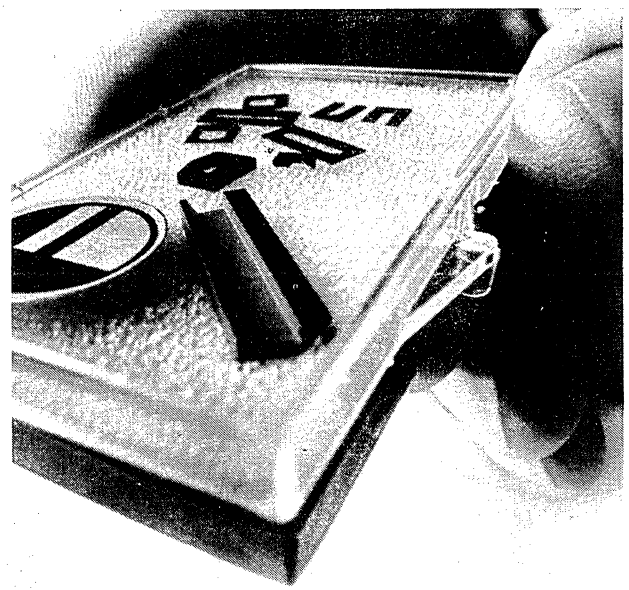


Get rid of static and unwanted noise in your circuits. Take a look at the wide variety of materials and shapes we've designed to help you solve these problems. Single and multi-hole beads and baluns are available for: RF shielding, signal isolation, noise suppression, transient filtering, and transformers.



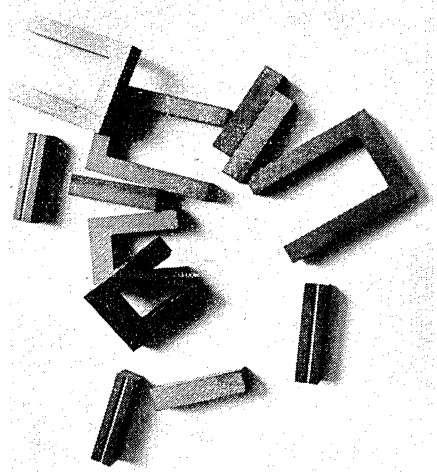
Does your application require a special shape? Ferronics has the equipment and technological know-how to help solve your problem through custom ferrite processing. If your application requires or can utilize a special pressed shape, consider the possibilities. It's an economical approach to uniform product performance.

Need a special non-oriented ceramic magnet? Ferronics will design the shape you need especially to meet your requirements. We're not concerned with short or long runs because our advanced manufacturing capability offers flexibility and ultimate cost reductions.



If you're in the market for Glass or Epoxy bonded recording head pole pieces, Ferronics is the place to stop. These units, integral parts of recording head assemblies, are finding wide usage in drum and disc memory systems, and in video and telemetry recorders.

Single or dual gaps having track widths less than 3.5 mils and gap lengths less than 50μ inches are designed and manufactured to your specifications.



Looking for precisioned machined ferrites or white ceramics? Ferronics can help you solve your problems. Pole pieces for recording head assemblies, U, E, and I cores and multi-track recording head cases are just a few of the products we are producing to your specifications.

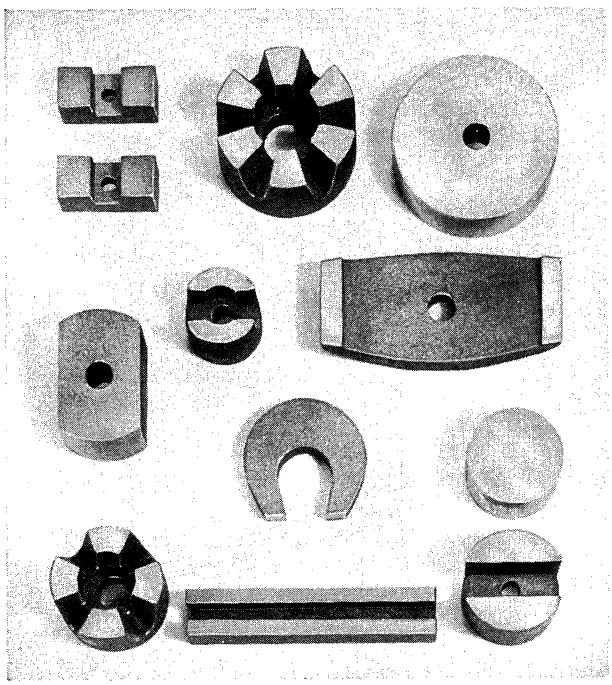
FERRONICS INCORPORATED • 66 NORTH MAIN STREET, FAIRPORT, NEW YORK 14450 • (716) 377-6820

PERMANENT MAGNETS

Many GE permanent magnets are stocked and may be ordered by catalog number. Where a stocked magnet does not meet all the application's requirements, General Electric can design a magnet that does. Engineering design assistance or information on stocked and special magnets is available on request.

ALNICO MAGNETS

- Radio and television speakers
- Telephones
- Refrigerator latches
- Electron tube assemblies
- Motors
- Generators
- Toys and novelties
- Space vehicles and missiles
- Controls



In today's industries, Alnico is still the most widely used permanent magnet material, and the growing family of Alnico grades continues to find new and ever-increasing usage.

This broad acceptance is the result of the wide range of magnetic properties obtainable with Alnico, the high degree of stability with respect to time and temperature, and the vast array of sizes and shapes that can be manufactured economically through General Electric's mass production methods.

The Alnicos are precipitation-hardened alloys made by conventional casting or sintered powder metallurgical techniques and a specialized heat treatment. Precise control of the various Alnico chemistries plus the heat treating process give the material its well-known qualities of high magnetic induction and high resistance to demagnetization.

The family of GE Alnico permanent magnets includes cast Alnico 3, 4, 5, 5DG, 5-7, 6, 8, 9, and sintered Alnico 2, 5, and 8. These various grades offer industry proven magnetic materials with a wide range of magnetic inductions and coercivities (resistance to demagnetization) in the exact shape and size required.

The versatility of Alnico, plus General Electric's advanced research and design and application engineering capabilities, continues to broaden the acceptance of these most widely used magnets.

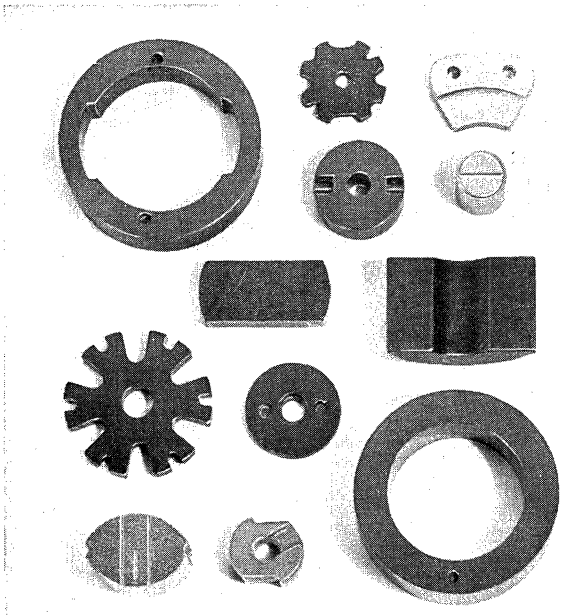
LODEX® MAGNETS

- Hearing aids
- Core meters
- Miniature motors
- Speedometers
- Reed switches
- Timing motors

Lodex, the trade name of General Electric's recently developed magnet material, can be formed economically into precise close-tolerance shapes and small sizes for intricate applications.

A product of GE research and development, Lodex production techniques eliminate form grinding or high-temperature treating. This new magnetic material, consisting of elongated single domain iron cobalt particles in the size of smoke particles uniformly dispersed in a lead matrix, is pressed or extruded (rather than cast or sintered) into its final shape. Such a manufacturing process makes it possible to produce magnet shapes to extremely close physical and magnetic tolerances and to maintain close piece-to-piece magnetic uniformity.

Since its introduction, the family of Lodex magnets has found widespread and growing usage among manufacturers requiring intricate, tight tolerance shapes with a high degree of magnetic uniformity. Designers know that this physical and magnetic uniformity in their applications virtually eliminates the need for final testing of the end product and permits automation in the production process.



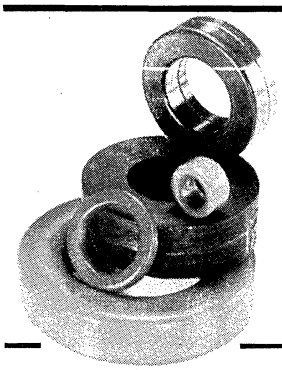
For complete information contact your nearby GE Sales Office, or write to General Electric Co., Section 998-80. Schenectady, N. Y. 12305.

GENERAL ELECTRIC

The INTER-TECHNICAL Group, Inc.

UNITED STATES AGENCY OF THE TELCON METALS GROUP OF COMPANIES

P. O. BOX 23
IRVINGTON-ON-HUDSON, N. Y. 10533
TEL: 914-591-8822
TWX: 710-564-0802



TELCON METALS LTD.

is one of the largest manufacturers of nickel, iron and cobalt alloys for magnetic applications. Their fully integrated facilities provide raw materials and fabricated components covering the whole range of commonly used soft magnetic materials.

HIGH PERMEABILITY TOROIDS — are available in all materials listed in the accompanying table in standard tape thickness.

PHOTO-ETCH — high permeability alloys for recording and playback head laminations are available.

TELCON HIGH PERMABILITY SOFT MAGNETIC ALLOYS AND FABRICATED TOROIDS

80% NICKEL	50% NICKEL	OTHER ALLOYS	ULTRATHIN FOIL
Round TELCON 79 TELCON 40 TELCON 60 TELCON 100 **Square** ORTHO TELCON 79	**Round** RADIOMETAL 50 SUPER RADIOMETAL HYRHO RADIOMETAL **Square** HCR ALLOY	SATMUMETAL PERMENDUR PERMENDUR 24 SUPERMENDUR VICALLOY RADIOMETAL 36 Magnetic Compensating Alloy REMENDUR	As thin as 0.000125" in a wide range of materials including many of those listed and others including Beryllium copper.

HIGH PERMEABILITY FOIL — SURFACE PREPARED FOR CHEMICAL ETCHING

MAGNETIC SHIELDS UP TO 30" DIAMETER FOR CATHODE RAY TUBES & TRANSFORMERS

by Telcon Metals Ltd. and Magnetic & Electrical Alloys Ltd.

An extensive range of standard shields are available for cathode ray tubes, transformers, chokes, photo multipliers, vibrators, high gain amplifiers and other applications. Special patterns also can be produced to meet individual requirements. Shields are available either single or multilayer construction. Technical assistance available on your shielding problems.

TELFORM DEEP DRAWN COMPLEX SHAPES

A NEW CONCEPT IN MAGNETIC SHIELD CONSTRUCTION

Specially developed for quantity production of high efficiency complex shields, new TELFORM construction utilizes precision drawn segments to drastically reduce welded seams. The result is extra close fitting shields with improved shielding characteristics. This new technique is applicable for CRT tubes up to approximately 20" long. No premium charge even though dimensions, finish and appearance are far more uniform throughout batches than conventionally fabricated shields. Rapid delivery after initial tooling. Available in 80%, 50% and 36% nickel-iron alloys up to 0.10" thick.

Extremely Competitive Prices on Custom Shields.
Send for Illustrated Catalog and Ask for a Quotation.

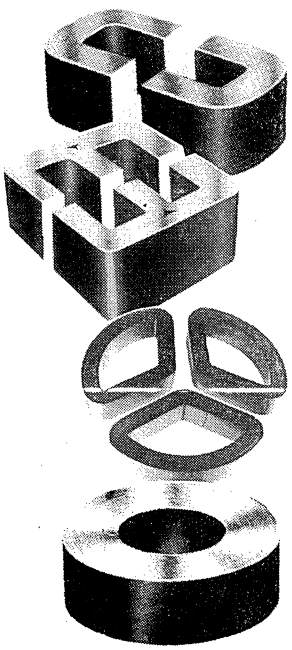
OTHER TELCON PRODUCTS

• Thermostatic Bimetals • High Permeability Strip, Rod & Wire for Component Manufacturing • Glass to Metal Seal Alloys

SUBSTANTIAL SAVINGS CAN BE OFFERED WHEN SHIELDS AND "BRIMAR" CRT's ARE PURCHASED AS ASSEMBLIES. ALSO SEE CRT's DESCRIBED ON EEM PAGE 1998

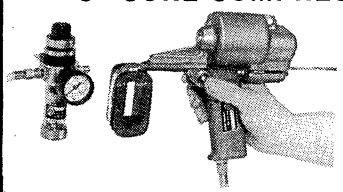
TELMAG E, C and TOROIDAL

Tape-wound cores



- Grain oriented Silicon Steel Cores.
- Made to EIA Spec. RS217 and trade specifications by our British associate TELCON MAGNETIC CORES LTD. . . . one of the largest manufacturers of grain oriented silicon steel components.
- Available in all American standard or special sizes to American core numbers. Popular types available from New York warehouse for immediate delivery.
- Sold at prices that help you solve your constantly rising cost level problem—due to the unique combination of American material and one of the largest manufacturing facilities in the world.
- Now also available "Circular E cores" for improved performance of 3-phase transformers. Savings in weight, larger window area, better cooling and magnetically balanced circuits offer broad advantages over conventional 3-phase cores.
- Toroidal cores available in 2, 4, 6 and 12/13 mil tape thickness. Cores can be supplied impregnated or edge bonded for improved rigidity. Also available gapped or cut. Prices are always calculated by weight; there is no need to accept catalog sizes if your design calls for a special size.

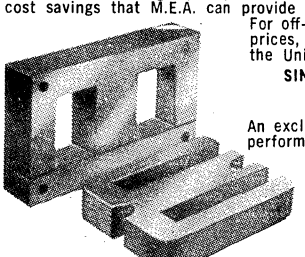
"C" CORE COMPRESSED AIR BANDING TOOL by TELMAG



Manufacturing rejects caused by variations in banding of "C" transformer cores can now be eliminated. The new "C" core Compressed Air Banding Tool provides consistent banding stresses in assembly-line operation. By making cores useful which were formerly rejected, the tool soon pays for itself.

NiFe MAGNETIC LAMINATIONS FOR TRANSFORMERS & CHOKES

by Magnetic & Electrical Alloys Ltd. . . . one of the largest commercial manufacturers of high quality NiFe alloy laminations in Europe. To find out the cost savings that M.E.A. can provide let us quote on your next requirement. For off-the-shelf delivery at the lowest quantity prices, many std. laminations are stocked in the United States.



SINGLE "E" LAMINATIONS TO REPLACE "EI187" AND "EE24-25" TYPES IN 6 MIL AND 8 MIL

An exclusive M.E.A. development that increases performance, reduces material cost, reduces labor cost. No modification of bobbin, clamps or other parts required, and when the final lamination has been inserted into the bobbin, the single "E" is practically self-clamping. End result is a 50% saving in assembly cost.

BERYLLIUM COPPER PRECISION SPRINGS

Highest quality beryllium copper springs, *micro-processed* from 100% laboratory-certified stock for superior performance. All standard products available from stock!

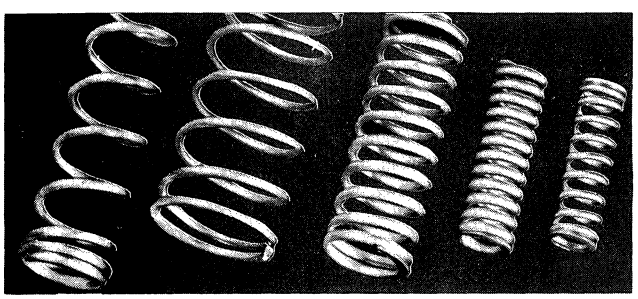
Instrument Specialties precision springs are made from extra quality beryllium copper made to our specifications.* Every lot is tested to be sure that each lot meets these stringent specifications. The exact lot appropriate for the design and application of a particular spring is then selected to meet individual requirements.

Springs are hardened in accordance with the individual requirements of each particular application to develop a *balanced* combination of precise tolerances, high yield strength, ductility, conductivity, stability and long life. Every step in the manufacturing process is controlled by experienced craftsmen using specially designed equipment and relying on over 30 years of experience in the production of the highest quality beryllium copper precision springs.

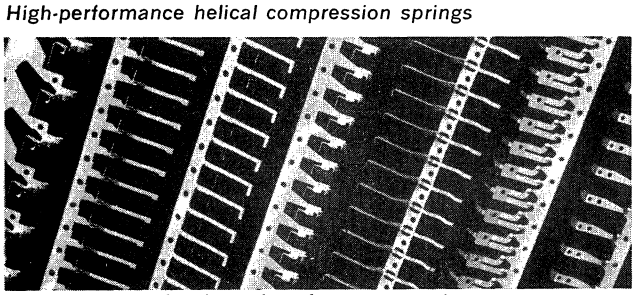
*Beryllium copper used is Alloy No. 25, conforming to ASTM-B194 and Federal QQ-C-533a Alloy 172.

COMPLETE ENGINEERING AND DESIGN SERVICE

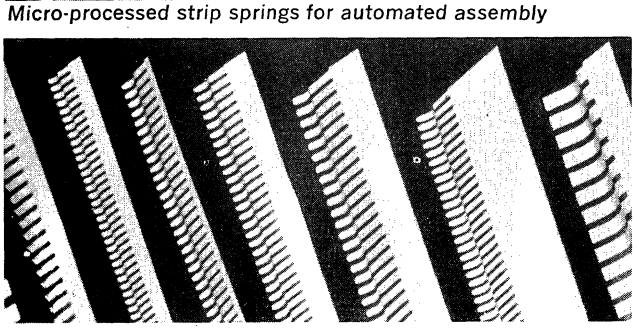
Instrument Specialties is recognized as the leader in the industry; our engineers are available at all times to assist you in solving your problems in the application of beryllium copper springs. Our extensive knowledge and long experience enable us to recommend better parts at lower costs. Prototype quantities can be produced quickly and economically. Just call or write today, or contact any of our representatives.



High-performance helical compression springs



Micro-processed strip springs for automated assembly



Micro-processed finger contact strip springs

Micro-Processed Coil Springs

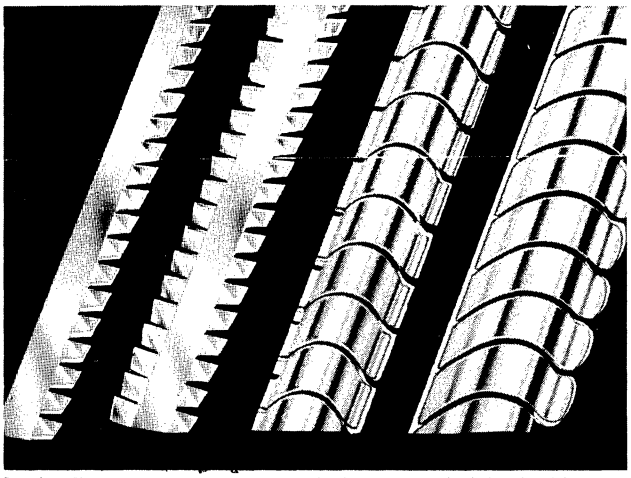
Micro-processed helical compression springs for use as balance weights, brush springs, clutch springs and many other applications. Fabricated from high-strength, heat-treatable beryllium copper and formed on specially designed coiling machines, I/S coil springs offer long life, uniformity and high stability. Two to ten times closer tolerances reduce adjusting and testing after assembly. Pitch, length and number of coils are accurately controlled to meet exacting requirements, and are subjected to exacting load tests.

Strip Springs

Micro-processed flat springs in easy-to-handle strip form are available for automated production, such as rapid positioning in plastic molds or other assemblies. Each length is handled and positioned only once. Individual springs can be separated with finger pressure with no trace of burr. Soldering, welding, plating, tinning, riveting can be performed while the entire strip is intact. Tangling is eliminated. (Also available with CONTIPS® precious metal contacts and Selective Plating.)

Finger contact shielding strips

Micro-processed finger contact strip springs for grounding and shielding in high-frequency equipment and for forming large-diameter contact rings are offered in a wide variety of configurations. Various lengths to 16"; widths, contours and hole locations can be specified for many catalog items. Standard finish is "bright finished" (tarnish resistant). A wide variety of electroplated finishes can be specified, depending on surface conditions. Finger contact strips are also available with CONTIPS® precious metal contacts.

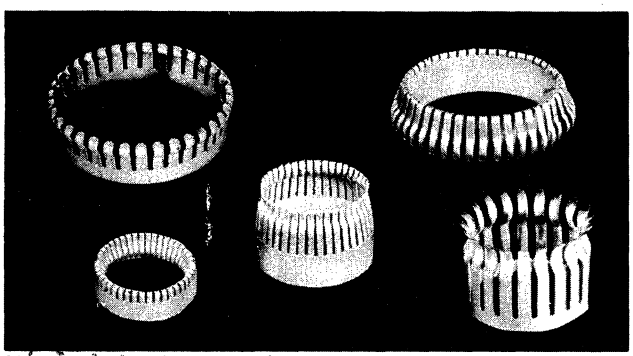


Sticky-Fingers—a new concept in instant RFI/EMI shielding

Sticky-Fingers® Self-Adhesive Shielding

Sticky-Fingers®, a high-performance finger contact strip with its own self-adhesive, provides an extremely tight, instant bond to shield against RFI/EMI in all types of metal cabinets and electronic enclosures. Installed by simply peeling off protective paper backing and placing strip in position, Sticky-Fingers adhere instantly; bond permanently. Soldering or mechanical fastenings are completely eliminated. Sticky-Fingers' adhesive meets MIL Specs for salt spray, shock and humidity cycle tests, and is unaffected in temperature ranges from −65 F to 160 F. Shielding effectiveness is greater than 108 dB at 10 GHz, and 70 dB at 200 kHz magnetic.

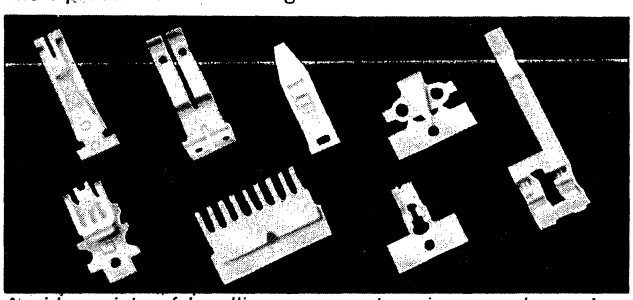
Sticky-Fingers are optionally supplied with a Magnefil® insert strip for even greater shielding at the magnetic end of the frequency spectrum.



Micro-processed contact rings

Micro-processed contact rings

Precision micro-processed contact rings are offered in a wide variety of sizes and shapes and in standard finishes for tube cavities, tuning and shielding applications. Contact rings are supplied in diameters from 0.160″ up, in male or female configurations. Almost any number of fingers can be specified. Micro-processing assures precise uniformity to unusually close tolerances. Contact rings are supplied in "bright finished" (tarnish resistant). A wide variety of electroplated finishes can be specified, depending on surface conditions. Contact rings can also be supplied with CONTIPS® precious metal contacts which do not affect spring qualities.

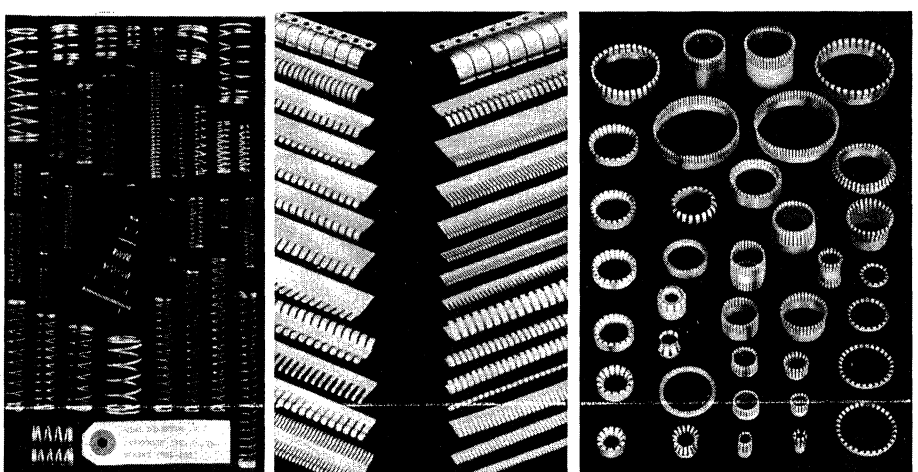


A wide variety of beryllium copper stampings can be custom-designed and produced to meet most any specific requirement

Custom Flat Springs and Stampings

Instrument Specialties is equipped to supply custom machining and heat treating to meet specialized customer requirements.

Included are welded spring assemblies, riveted contact springs, inlaid or overlaid strip precision metal springs and other stampings, whether of a spring nature or not.



Engineering design kits for development work

Engineering design kits

Instrument Specialties can supply design engineers with engineering design kits of selected beryllium copper spring samples for use in development work. Each kit contains a comprehensive assortment of beryllium copper springs. Each sample is selected and tagged for proper identification. Each design in the kit can be readily duplicated for prototype or production requirements.

Kits are available as follows:

Coil springs, 50 samples
CAT. No. 97-44 ..... $15.00

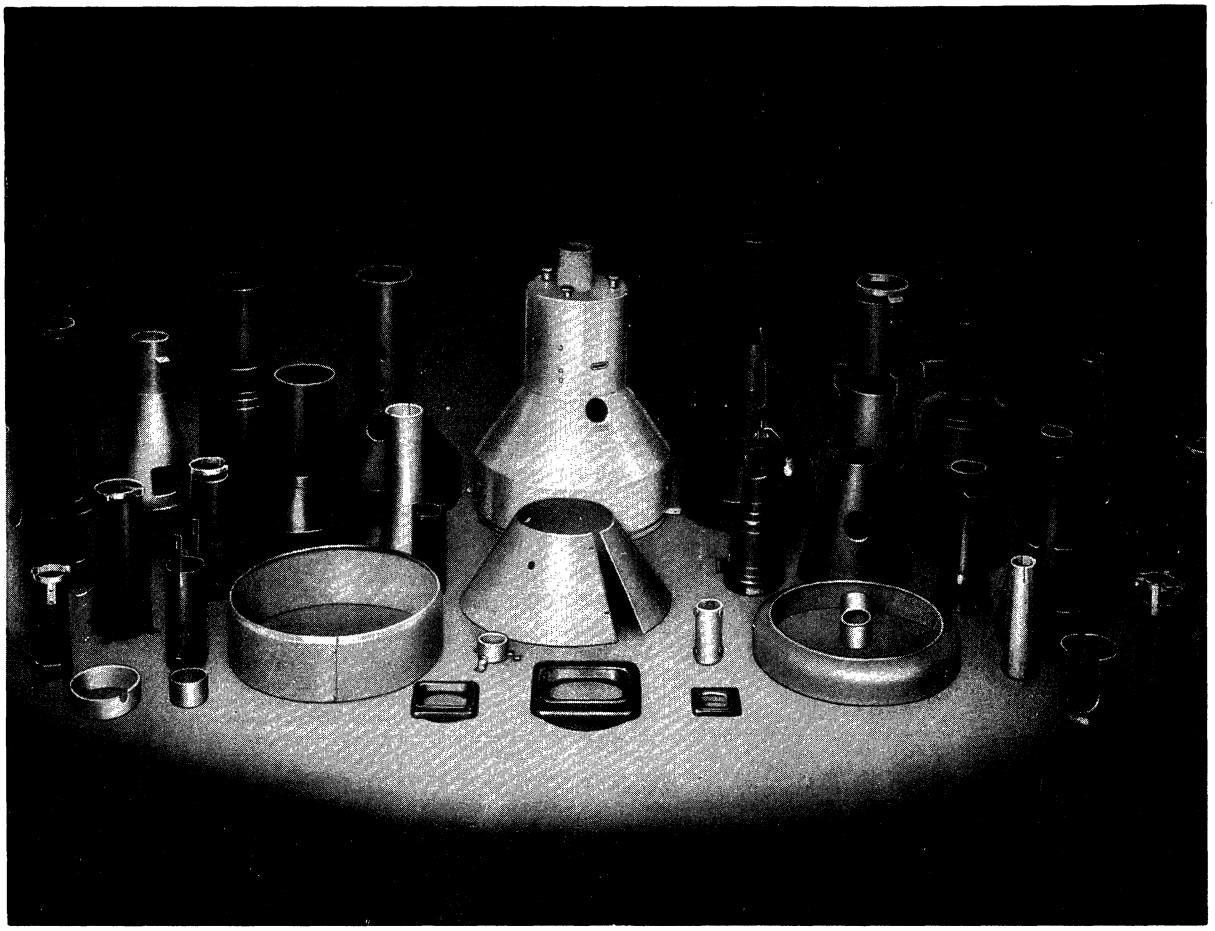
Finger contact strips, 34 samples
CAT. NO. 97-272 ..... $25.00

Contact rings, 36 samples
CAT. NO. 97-273 ..... $15.00

Write for Free Catalog Today!

INSTRUMENT SPECIALTIES COMPANY, INC.

276 Bergen Boulevard, Little Falls, N.J. 07424
Phone: 201-256-3500 TWX: 710-988-5732



MILLEN MAGNETIC SHIELDS

MU-METAL and/or **NICOLOI** annealed after fabrication. Stock shields or custom-made.

Typical of the MILLEN line of magnetic shields are:

CATALOG NUMBER	FACE DIAMETER	NECK DIAMETER	LENGTH	TYPICAL TUBE
SHIELDS FOR CATHODE RAY TUBES				
80801-C	11 1/32	1 31/64	3 1/4	1EP1
80802-A	2 3/16	1 9/16	5 1/4	2BP1
80803-B	3.45	2	9 7/16	3KP1
80805-F	6 1/8	1 7/8	13 7/16	5UP1
SHIELDS FOR MULTIPLIER PHOTOTUBES				
80801-B	1.500	1.500	3 5/8	1P21
80802-E	2 5/16	2 5/16	5 7/16	6810-A
80803-J	3 1/2	2 1/2	4 7/16	6363
80805-M	5 15/32	2 19/32	5 11/16	6364
SHIELDS FOR CHARGE STORAGE TUBES				
80803-L	3 7/16	3 7/16	12 1/4	6499
80805-N	5 1/2	3 1/4	14	6866

MILLEN

INDUSTRIAL ELECTRONICS MASTER DATA BOOK

Comprehensive Coverage of

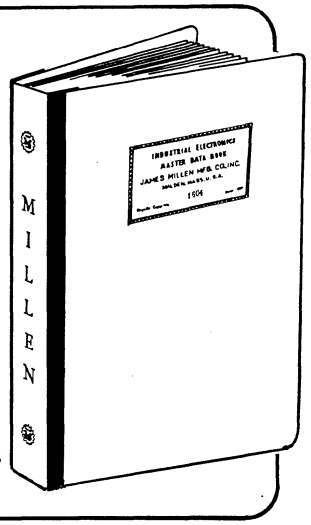
MILLEN PRODUCTS

with

Dimensional Drawings

Available to:

Industry Personnel
Qualified Engineers
Purchasing Agents
Design Draftsmen



JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN, MASSACHUSETTS, U.S.A.

MAGNETIC SHIELDS FOR CATHODE RAY TUBES

TUBE TYPES	MILLEN SHIELD	(INCHES) FACE DIAMETER INSIDE	(INCHES) NECK DIAMETER INSIDE	LENGTH (INCHES)	TUBE BASE CLAMP	ANODE HOLE	CONTACT CUTOUT	MIN. D.C. FIELD REDUCTION IN GUN AREA 2.5 Gauss	1.0 Gauss	USE WITH MILLEN BEZEL #	SOCKET SHIELD BEZEL ASSEMBLY
1CP-	80801-A	1.38	1.38	2.75	NONE	0	0	335	290	80071	90091-A
1EP-	80801-C	1.34	1.48	3.25	NONE	0	0	415	340	80071-B	80091-C
2AP-	80802-D	2.19	1.56	5.25	1.37	0	0	425	400	80072	80092-D
2BP-	80802-A	2.19	1.56	5.25	1.47	0	0	425	400	80072-B	80092-A
3AP-	80803-B	3.45	2.00	9.44	1.64	0	0	500	450	80073	80093-B
3ABP-	80803-K	3.45	3.45	8.75	NONE	2	0	405	375	80073-C	80093-K-1
3ACP-	80803-E	3.45	2.37	7.94	2.25	1	0	500	450	80073-C	80093-E-1
3ADP-	80803-H	3.45	2.50	8.44	1.50	1	1	425	400	80073-C	80093-H
3AHP-	80803-MB	3.06 x 1.62	1.69	8.00	NONE	0	0	425	400	80173-B	80093-MB
3AQP-	80803-D	3.45	1.75	7.62	1.50	0	0	425	400	80073	80093-D
3ASP-	80809-MA	3.06 x 1.62	1.69	7.50	NONE	1	0	550	500	80173-B	80093-MA
3AYP-	80803-M	3.06 x 1.62	1.69	7.50	NONE	0	0	550	500	80173-B	80093-M
3BP-	80803-C	3.45	2.37	7.94	2.25	0	0	425	400	80073-C	80093-C-1
3BDP-	80803-M	3.06 x 1.62	1.69	7.50	NONE	0	0	550	500	80173-B	80093-M-2
3BGP-	80803-MA	3.06 x 1.62	1.69	7.50	NONE	1	0	550	500	80173-B	80093-MA-2
3BFP-	80803-R	3.45	1.25	12.13	1.50	1	0	500	435	80073-C	80093-R-1
3DP-	80803-C	3.45	2.37	7.94	2.25	0	0	425	400	80073	80093-C
3FP7-	80803-E	3.45	2.37	7.94	2.25	1	0	500	450	80073	80093-E
3GP-	80803-A	3.45	2.00	9.44	1.69	0	0	500	450	80073	80093-A
3JP7-	80803-E	3.45	2.37	7.94	2.25	1	0	500	450	80073-C	80093-E-1
3KP-	80803-B	3.45	2.00	9.44	1.64	0	0	500	450	80073	80093-B
3MP-	80803-F	3.45	1.75	6.44	1.50	0	0	425	400	80073	80093-F
3RP-	80803-D	3.45	1.75	7.62	1.50	0	0	425	400	80073	80093-D
3SP-	80803-M	3.06 x 1.62	1.69	7.50	NONE	0	0	550	500	80173-B	——
3WP-	80803-G	3.45	1.75	9.44	1.50	0	0	550	500	80073-C	80093-G-1
3XP-	80803-M	3.06 x 1.62	1.69	7.50	NONE	0	0	550	500	80173-B	80093-M
3YP-	80803-MC	3.06 x 1.62	1.69	5.75	NONE	0	0	550	500	80173-B	80093-MC
S.C.3042	80805-A	6.12	1.87	15.50	1.69	0	0	550	500	80075-M	80095-A-2
S.C.3093	80805-K	6.12	2.50	15.75	2.25	0	1	425	400	80075-C	80095-K
S.C.3377	80803-S	3.6 x 3.6	2.00	12.13	NONE	1	1	550	500	80174-A	NONE
S.C.3561	80805-U	4.37 x 6.37	4.37	18.25	NONE	1	0	550	500	NONE	NONE
4KP-	80804-A	3.6 x 3.6	1.56	9.69	1.47	0	0	550	500	NONE	NONE
4MP-	80803-U	3.6 x 3.6	2.00	12.13	NONE	1	1	550	500	80174-A	80093-U
5ABP-	80805-H	6.12	2.50	15.00	2.25	1	0	600	540	80075-B	80095-H
5ADP-	80805-H	6.12	2.50	15.00	2.25	1	0	600	540	80075-B	80095-H
5AFP-	80805-D	5.50	4.50	16.00	NONE	3	2	500	460	80075-B	80095-D
5AGP-	80805-J	6.12	2.50	16.38	2.25	1	1	550	500	80075-B	80095-J
5AHP-	80805-W	5.13	2.38	7.25	1.50	1	2	500	450	80075	NONE
5AMP-	80805-K	6.12	2.50	15.75	2.25	0	1	550	500	80075-B	80095-K
5AQP-	80805-H	6.12	2.50	15.00	2.25	1	0	600	540	80075-B	80095-H
5ATP-	80805-K	6.12	2.50	15.75	2.25	0	1	550	500	80075-B	80095-K
5AUP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5AWP-	80805-C	5.50	2.69	15.00	NONE	2	1	600	540	80075-B	80095-C
5AXP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5BDP-	80805-C	5.50	2.69	15.00	NONE	2	1	600	540	80075-B	80095-C
5BFP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5BGP-	80805-V	6.13	2.50	16.38	2.25	1	1	600	540	80075-B	80095-V
5BHP-	80085-A	5.44	2.38	16.00	2.25	1	1	600	540	80075-B	80095-A4
5BNP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075	NONE
5BTP-	80805-33-B	5.63	2.63	10.50	NONE	1	0	550	500	80075-B	NONE
5CP-	80805-B	6.12	2.50	15.50	2.25	1	0	600	540	80075	80095-B
5CAP-	80085-A	5.44	2.38	16.00	2.25	1	1	600	540	80075-J	80095-A4
5CBP-	80085-B	5.44	2.38	18.25	2.25	1	1	600	540	80075-J	80095-B5
5CEP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5CKP-	80805--Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5DWP-	80085-C	5.44	2.38	18.50	2.25	1	1	600	540	80075-J	80095-C4
5DYP-	80805-W	5.13	2.38	7.25	1.50	1	2	500	450	80075-B	NONE
5FP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5GP-	80805-A	6.12	1.87	15.50	1.69	0	0	550	500	80075	80095-A
5HP-	80805-A	6.12	1.87	15.50	1.69	0	0	550	500	80075	80095-A
5JP-	80805-G	6.12	1.87	14.25	1.69	1	4	600	540	80075	80095-G
5LP-	80805-E	6.12	1.87	14.56	1.62	1	0	600	540	80075	80095-E
5MP-	80805-F	6.12	1.87	13.44	1.50	0	0	600	540	80075	80095-F
5NP-	80805-A	6.12	1.87	15.50	1.69	0	0	550	500	80075	80095-A
5RP-	80805-C	5.50	2.69	15.00	NONE	2	1	600	540	80075-B	80095-C
5SP-	80805-D	5.50	4.50	16.00	NONE	3	2	500	450	80075-B	80095-D
5UP-	80805-F	6.12	1.87	13.44	1.50	0	0	600	540	80075	80095-F
5WP-	80805-Y	6.12	6.12	11.00	NONE	1	0	350	330	80075-B	NONE
5XP-	80805-C	5.50	2.69	15.00	NONE	2	1	600	540	80075-B	80095-C
5YP-	80805-J	6.12	2.50	16.38	2.25	1	1	550	500	80075-B	90095-J

JAMES MILLEN MFG. CO., INC.
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MALDEN, MASSACHUSETTS, U.S.A.

PERFECTION MICA COMPANY

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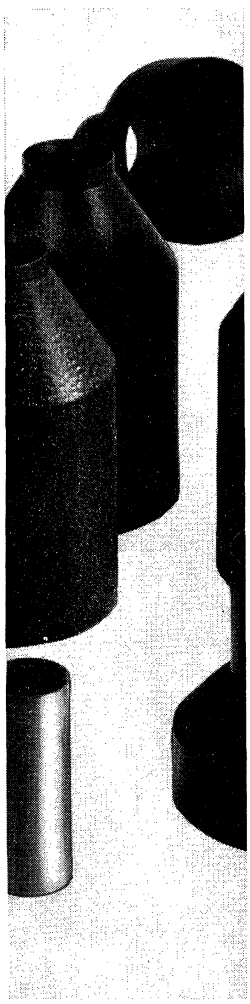
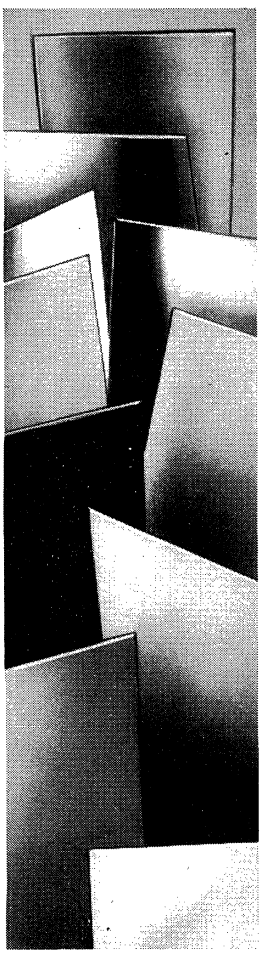
Research through Production for all your magnetic shielding needs

Magnetic Shield Division has the total magnetic shielding capability to assist you in solving any shielding problem. 80% of current shield designs originated with MSD and this design and engineering experience is available to you for research, planning and fabrication.



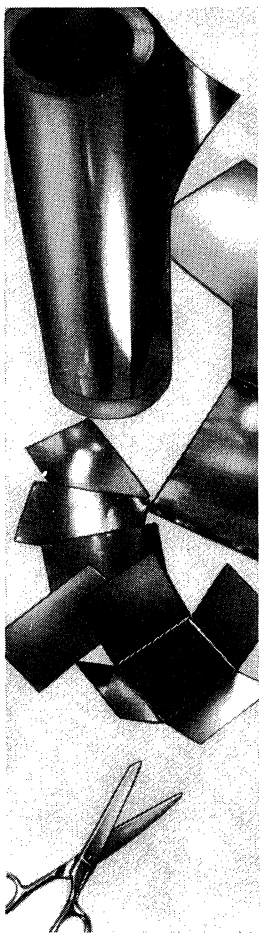
FABRICATION

Netic and Co-Netic Magnetic Shields can be fabricated in any size, shape and quantity, from a miniature tube to a shielded room.



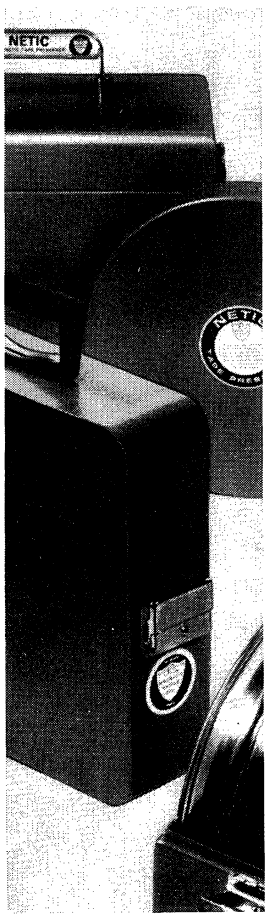
SHEET STOCK

For fabrication in your plant or ours. Low cost shielding solutions are provided by fully hydrogen annealed Perfection Annealed stock which normally requires no further heat treatment.



FOIL

Netic and Co-Netic Foils are ideal for prototype evaluation and production applications. Available in both plain and adhesive backing, they can be easily shaped in minutes to fit your needs.



TAPE PRESERVER CONTAINERS

Used world-wide to protect against loss of valuable tape data. Round and rectangular portable units include the new, smartly designed "Executive." Stacked, sectionalized units for permanent storage are also available.

TECHNICAL ASSISTANCE

The concentration of design experience and engineering knowledge that has provided over 80% of the magnetic shield designs now in use is yours to assist you in solving an engineering, R & D or production problem. Phone (312) 766-7800.

FAST, CONVENIENT DELIVERY. Some items from stock. Fabricated items 3-4 weeks.

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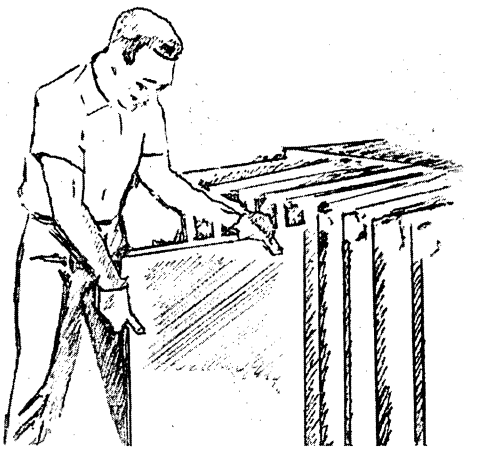
Netic & Co-Netic Alloys STOCKING GUIDE

NETIC, CO-NETIC — Netic is basically used in fields of high intensity because this shielding alloy will not saturate easily, but it will achieve only medium attenuation. CO-NETIC is basically used in fields of low intensity in order to utilize its high attenuation characteristics. When to use NETIC, CO-NETIC, or combination depends on the attenuation required, and the magnitude and type of field to be shielded against.



PHYSICAL DATA ON SHIELDING ALLOYS
(STRESS ANNEALED CONDITION)

	CO-NETIC AA	NETIC S3-6
Density (grams/cm³)	8.21	7.8
Coefficient of expansion Per Degree C. (20°/100°)	12.42×10^{-6}	13.10×10^{-6}
Tensile strength (lbs/in² x 10³)	57.1	40.0-45.0
Yield point (lbs/in² x 10³)	28.5	28.0
Hardness-Rockwell B	60/75	20/40
Modulus of elasticity (lbs/in² x 10⁶)	22.50	29.5
Melting point (°F)	2680	2775
Shear point x (10³ PSI)	42.75	35.0
Elongation (2" sec.)	35%	—
Thermal conductivity (cal/sec/cm²/cm/°C)		
at 20°C	.138	.126
at 100°C	.134	.126
Tolerance on thickness	±.004	±.004

NETIC S3-6 ALLOY SHEET

Thickness	Width	Maximum Number Sheet Per Crate
.014"	30"	20
.020"	30"	18
.025"	30"	14
.031"	30"	12
.049"	30"	8
.062"	30"	6
.095"	30"	4

Stock Shipped Same Day As Ordered

CO-NETIC AA ALLOY STRESS ANNEALED SHEET*

Thickness	Width	Maximum Number Sheet Per Crate	Thickness	Width	Maximum Number Sheet Per Crate
.014"	30"	20	.040"	30"	8
.020"	30"	18	.050"	30"	8
.025"	30"	14	.062"	30"	6
.031"	30"	12	.095"	30"	4

*Stress Annealed for Ease of Fabrication. Must be Final Annealed for Maximum Attenuation Characteristics.

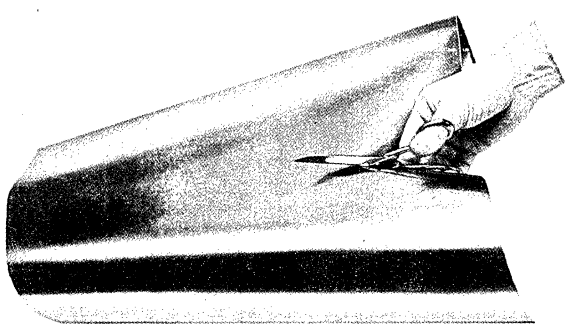
CO-NETIC AA ALLOY PERFECTION ANNEALED SHEET**

Thickness	Width	Maximum Number Sheet Per Crate	Thickness	Width	Maximum Number Sheet Per Crate
.014"	30"	20	.031"	30"	12
.020"	30"	18	.040"	30"	8
.025"	30"	14	.050"	30"	8

**Perfection Annealed Stock Has Been Fully Hydrogen Annealed. No Further Annealing Necessary for Prototype and Production Fabrication If Severe Forming and Drawing Is Not Involved.

Stock Shipped Same Day As Ordered

Foil



No Backing — Shipped Same Day As Ordered.

Adhesive Backed—Shipped Within One (1) Week After Ordered.

Thickness Tolerance ±.001".

Both CO-NETIC AA and NETIC Foils Can Be Slit to Any Desired Width with or without Backing. Shipped One (1) to Two (2) Weeks After Order.

All foil has been Perfection Annealed for maximum attenuation. No further heat treating is necessary to maintain optimum shielding parameters.

NETIC PERFECTION ANNEALED FOIL

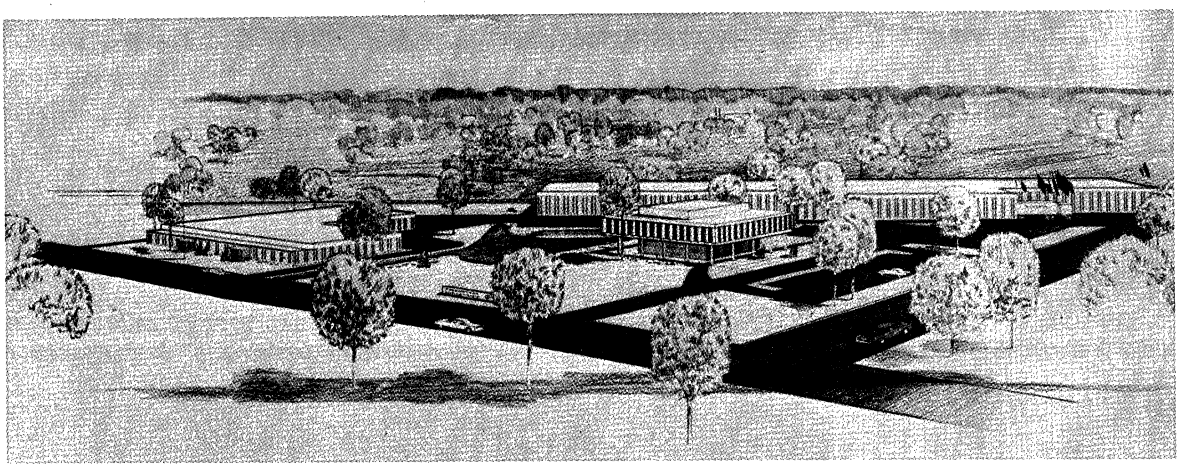
Thickness	Width	Maximum Length Per Carton In Feet
.004"	15"	100
.004"	15"	50
.004"	4"	100
.004"	4"	50

CO-NETIC AA PERFECTION ANNEALED FOIL

Thickness	Width	Maximum Length Per Carton In Feet
.010"	15"	100
.010"	15"	50
.010"	4"	100
.010"	4"	50
.006"	15"	100
.006"	15"	50
.006"	4"	100
.006"	4"	50
.004"	15"	100
.004"	15"	50
.004"	4"	100
.004"	4"	50
.002"	4"	100
.002"	4"	50

Thermotech®

"Where new ideas take shape in plastics"



People make the difference at THERMOTECH

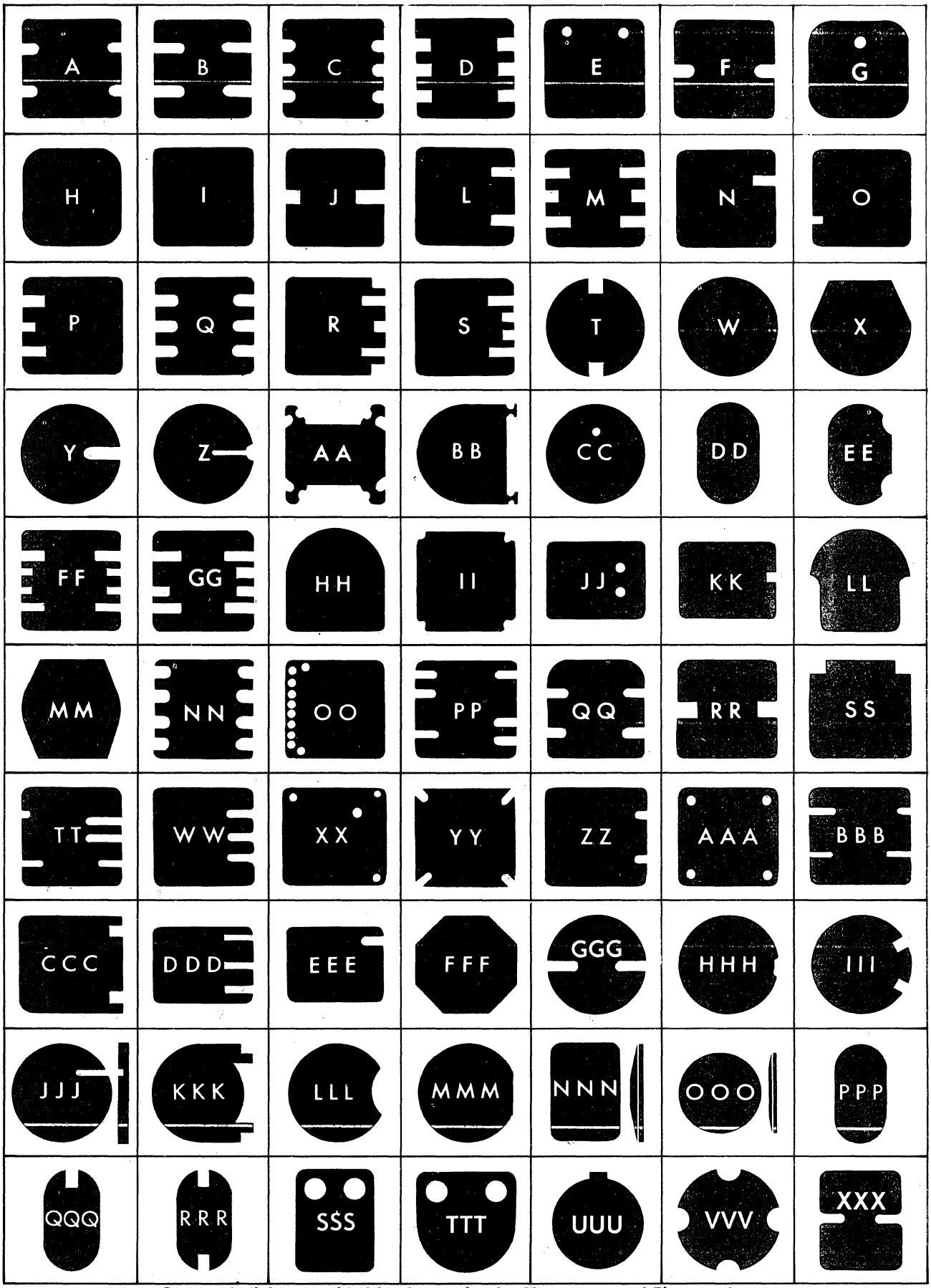
In Precision . . . The Thermotech difference starts at the beginning of every job with a thoughtful, all-the-way-through analysis of your parts requirements by designers, production estimators and make-ready engineers. And that difference carries through to tough-minded quality control people being very hard to please, before, during and after production runs. We care. And because we do, you get parts that always perform to spec, all the time, flawlessly.

In Performance . . . Whatever the parts requirement, from micro specialization to stock inventory item . . . and whether the run is a few hundred or in the millions . . . Thermotech leads the industry in on-time delivery, low rejection rates and cost reduction. Short Interval Scheduling gives us unique control over all the variables in a production run, enables us to keep in constant touch with your order, keep it on target, on time.

In Productivity . . . No other single-source supplier offers you Thermotech's kind of production strength: A whole generation of dedicated pioneering in methods, materials and designs, backed up by an array of sophisticated test equipment and specialized presses unmatched in the industry. All now housed in 130,000 sq. ft. of modern, environmental-controlled facilities which give our Molding Group people the ultimate in service resources.

The net, net: Our growing list of customers throughout the world is a positive response to Thermotech's ability to innovate better product, better service, better value. It's good to know that there's one company with the ability to come up with better answers than your questions — regardless of your needs.

FLANGE DESIGNS



Custom Coil forms molded in Thermoplastic, Thermosets and Fluorocarbons.

Thermotech Coil Forms & Components

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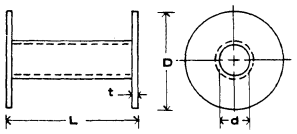
THERMOTECH® INC.

ROUND CORE STOCK BOBBINS



N NYLON
GN NYLON GLASS REINFORCED
D DELRIN
NL NYLATRON
P POLYCARBONATE (LEXAN)
PP POLYPROPYLENE
FL FLUOROCARBON

* When two dimensions are given the first is the core thickness and the second is the thickness of the flange.
† Tapered flanges.
‡ Allow 3 to 4 weeks delivery.

Part Number	Hole Diameter d	Flange Diameter D*	Length Overall L	Wall Thickness t*	Flange Design	Material
2-314	.030	.184	.180	.012	T-T	N
2-226‡	.050	.170	.200	.010	W-W	N/NG
2-135	.063	.180	.206	.012	W-W	N
2-367	.067	.132	.300	.020	W-W	N
2-421	.094	.330	.685	.015	W-W	N/GN
2-403	.098	.280	.330	.015	W-W	GN
2-290	.098	.280	.370	.015	W-W	GN
2-236‡	.099	.328	.581	.015	W-W	N
2-354	.104	.197	.650	.012	W-W	GN
2-289	.110	.230	.140	.012	HH-KKK	N
2-149‡	.110	.290	.360	.020	W-W	N
2-436	.110	.290	.800	.018	Y-Y	GN
2-399	.110	.312	.130	.015	W-W	LEXAN
2-125‡	.113/ 3 ribs	.280	.435	.014	W-W	N
2-125A	.113	.280	.435	.014	W-W	N
2-401	.114	.290	.390	.021	W-W	GN
2-297	.120	.345	.750	.015	W-W	N
2-402	.120	.396	.406	.025	W-W	N
2-402A	.120	.396	.406	.025	W-VVV	N
2-271‡	.125	.285	.300	.015/.020	W-W	N
2-272‡	.125	.342	.300	.015/.020	W-W	N
2-201	.125	.342	.540	.020/.015	W-W	N
2-156‡	.125	.430	.627	.020	W-W	N/GN
2-473	.125	.355	.490	.015	W-HHH	N
2-207‡	.128	.496	.352	.018	W-W	N
2-281	.130	.230	.770	.014	W-W	N/GN
2-282	.130	.300	.770	.014	W-W	N/GN
2-482	.130	.388	.390	.028	W-W	N
2-164	.135	.360	.255	.018	W-GGG	N
2-383	.136	.250	.126	.014	W-W	N
2-208	.138	.375	.875	.030	W-Y	N
2-208A	.138	.375	.875	.030	W-T	N
2-441	.140	.593	.820	.032	W-W	N
2-463	.147	.875	.430	.035	W-LLL	P.P/N
2-238‡	.150	.496	.386	.017	W-W	N
2-247	.152	.800/1.000	.950	.075	I-I	N
2-287‡	.155	.400	.280	.012	W-W	N
2-410	.157	.300	.168	.010	W-W	N
2-480	.166	.378	1.021	.033	GGG-W	GN
2-496	.167	.368	1.015 w/5/16 Ext.	.033	T-W	GN
2-427	.180	.530	1.350	.020/.045 to .065	†000-000	N
2-392	.188	.495	.280	.029	W-W	N
2-232	.190	.405	.620	.030	W-W	N
2-301	.190	.495	.453	.018	W-LLL	N
2-432	.190	.650	.333	.032	W-UUU	N/NG
2-418	.191	.750	.505	.030	W-W	N
2-420	.192	.500	.350	.030	W-W	N
2-475	.192	.500	.360	.018	W-CC	N
2-409	.193	.650	.345	.026	W-W	N
2-318	.194	.418	.125	.020	W-Y	N
2-140	.195	.500	.436	.015	W-W	N
2-458	.195	.420	.533	.011	W-Y	N
2-459	.195	.420	.399	.011	W-Y	N
2-313	.200	.538 x .538	.625	.025	I-E	N
2-245	.203	.830	.345	.025	W-W	N
2-425	.205	.375	.430	.020/.030	W-W	N
2-179	.218	.625	1.090	.020/.025 to .040†	000-000	NL
2-340	.218	.808	.503	.030/.020	000-000	N
2-151	.220	.625	.950	.020/.025 to .040†	000-000	N/GN

Part Number	Hole Diameter d	Flange Diameter D*	Length Overall L	Wall Thickness t*	Flange Design	Material
2-168‡	.221	.592	.935	.020	W-LL	NL
2-302	.250	.495	.621	.018	W-LLL	N
2-477	.250	.750	.830	.032	W-W	GN
2-131	.255	.618	.934	.026	W-W	N
2-131A	.255	.725	.934	.025	W-W	N
2-470	.255	.525	.750	.031	W-W	N
2-474	.255	.500	.820	.025	W-W	N
2-123‡	.285	1.000	.990	.024	W-CC	N
2-464	.288	.430	.812	.020	W-Y	N
2-105‡	.290	1.000	.980	.030	Z-W	N
2-105A‡	.290	1.000	.980	.030	Y-W	N
2-455	.293	.870	.685	.030	W-W	N
2-303	.305	.625	.692	.020	W-W	N
2-188‡	.310	.510	.375	.015	W-III	D/N
2-454	.312	.875	.562	.030	W-W	N
2-415	.315	.875	.575	.035/.035 to .070	W-W	N
2-180	.315	.875	.600	.035	W-MM	N/GN
2-435	.315	.875	.650	.032	W-MM	N/GN
2-181	.315	.875	.700	.035	W-MM	N/GN
2-411	.316	.750	1.187	.022	W-W	GN
2-144	.316	.875	.590	.035	W-W	N/GN
2-320	.316	.875	.595	.027	W-W	N
2-118	.316	.875	.690	.035	W-W	N/GN
2-187	.316	1.155	.500	.031	W-HHH	N
2-363	.320	.725	.850	.030	III-III	GN
2-235‡	.320	.750	.562	.022	W-W	N/FL
2-431	.320	.755	1.337	.050	W-TTT	N-GN
2-296	.320	.875	.590	.025	W-X	N
2-296A	.320	.875	.590	.025	X-T	N
2-248	.320	.935	.535	.027	W-W	N/GN
2-445	.320	.725	1.000	.062	W-IRR	N
2-444	.322	.535	.276	.015	W-III	NL
2-446	.322	.535	.428	.015	W-III	NL
2-273	.325	.456	1.163	.015	W-W	N/GN
2-273A	.325	.502	1.163	.015	W-W	N/GN
2-492	.325	.675 dia. .681 Sq.	.703	.027	W-I	N
2-193‡	.328	.812	1.250	.040/.047	W-W	N/GN
2-422	.330	.720 Sq.	1.030	.032	E-E	GN
2-165‡	.333	.859 x .859	1.176	.045/.057	I-I	N
2-130‡	.370	.872	.982	.025	W-W	N
2-178	.375	.635	.135	.010	W	N
2-426	.375	.718	.937	.025	W-CC	N
2-115‡	.376	.656	.968	.035	W-W	N/FL
2-120	.376	1.000	.968	.032	BB-W	N
2-486	.377	.997	1.000	.038	T-W	N
2-429	.660	1.362	.380	.060/.030	W-W	D
2-495	.380	.937	.975	.015	W-W	GN
2-360	.380	.962	1.100	.020/.030	W-Y	GN
2-126	.380	1.000	.620	.024	W-W	N
2-395	.380	1.125	.562	.030	W-W	N
2-167	.382	.677	.310	.025	W-W	N/GN
2-618	.385	.938	.710	.034	W-W	N
2-618A	.385/.152	.938	.710	.034	W-W	N
2-319	.385	.980	.605	.028	W-W	N
2-143	.385	1.125	.628	.031/.047	W-HH	N
2-199‡	.385	1.125	1.093	.035	HHH-HHH	N
2-127	.388	1.000	.995	.027	W-W	N
2-366	.390	.900	.812	.030	W-W	GN
2-353	.408	1.000	1.187	.036/.047	W-W	LUMARITH
2-380	.420	1.050	.255	.035/.025	W-W	D

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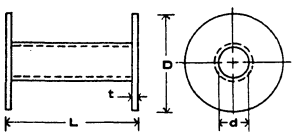
THERMOTECH® INC.

ROUND CORE STOCK BOBBINS



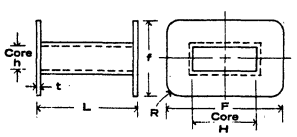
N NYLON
GN NYLON GLASS REINFORCED
D DELRIN
NL NYLATRON
P POLYCARBONATE (LEXAN)
PP POLYPROPYLENE
FL FLUOROCARBON

* When two dimensions are given the first is the core thickness and the second is the thickness of the flange.
† Tapered flanges.
‡ Allow 3 to 4 weeks delivery.

Part Number	Hole Diameter d	Flange Diameter D*	Length Overall L	Wall Thickness t*	Flange Design	Material
2-312	.420	1.210	.425	.030	000-000	N
2-488	.422	1.025	1.000 w/3⁄16 Ext.	.042	Y-W	N
2-430	.430	.755	.650	.015	W-W	N-GN-NL
2-244‡	.435	.725	.650	.020	W-III	N/GN
2-469	.463	.738	.650	.015	W-III	NL
2-222‡	.500	.935	.730	.030	W-III	N/GN
2-498	.507	.938	.942	.031	W-W	GN
2-456	.510	.964	.735	.020	W-III	NL
2-457	.510	.964	.520	.020	W-III	NL
2-237	.516	1.500	1.093	.040	W-W	N
2-330	.518	1.303	1.063	.042	W-W	GN

Part Number	Hole Diameter d	Flange Diameter D*	Length Overall L	Wall Thickness t*	Flange Design	Material
2-448	.560	1.400	.325	.030	W-W	N
2-176	.572	1.406	1.750	.060	W-W	N
2-195‡	.600	1.525	1.810	.065	W-FFF	N
2-451	.630	1.460	.440	.030	W-W	N
2-122	.637	1.375	.490	.032	W-W	N
2-357	.635	.990	.620	.032	Y-Y	N
2-376	.660	1.213	.910	.025/.030	W-CC	D
2-372	.765	1.750	1.562	.042	W-W	GN
2-228‡	.795	1.645	1.344	.020	W-MMM	NL
2-286‡	.967	1.985	2.040	.080	W-JJJ	N
2-262	1.614	2.375	.600	.050	W-W	N

RECTANGULAR STACKS - STOCK BOBBINS



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Part Number	Hole h	Hole H	Flange f	Flange F	Length Overall L	Wall Thickness t*	Flange Design	Matl.	Lamination Number Or Application
3-121	.015	.098	.500	Dia.	.227	.020	W-W	N	
3-368	.024	.073	.169	.218	.238	.012	I-O	GN	
3-304	.033	.066	.298	.240	.270	.012	CCC-CCC	N	Microsyl Core
3-254‡	.033	.066	.250	.280	.280	.012	I-I	N	Microsyl Core
3-292	.034	.068	.135	.185	.281	.012	F-F	GN	Microsyl Core
3-292A‡	.034	.068	.135	.185	.281	.015	F-F	GN	
3-205	.036	.070	.166	.200	.360	.014	I-I	N	
3-377	.055	.070	.185	.200	.100	.015	H-I	GN	
3-279	.056	.302	.203	.449	.301	.015	I-I	N	Microsyl Core
3-177‡	.063	.101	.355	.400	.500	.025	G-H	N	
3-378	.070	.105	.200	.235	.100	.015	H-H	GN	
3-412	.070	.465	.175	.615	.450	.020	I-I	N	
3-389	.070	.365	.185	.500	.450	.015	I-I	N	
3-382	.071	.168	.192	.306	.437	.016	I-I	N	
3-621	.071	.244	.147	.320	.093	.010	I-O	GN	
3-461	.075	.388	5⁄16	1¼	1½	.032	PPP-IRR	N	
3-212‡	.079	.154	.185	.260	.125	.012	I-I	N	
3-148	.096	.146	.270	.320	.151	.012	II-II	N	
3-433	.096	.400	.270	.580	.151	.012	I-I	N	
3-252‡	.097	.115	.239	.279	.125	.020/.012	I-I	N	
3-148A	.099	.146	.270	.320	.151	.012	F-F	N	
3-136	.100	.150	.275	.329	.273	.015	I-I	N	EE 30-31 9⁄64″ Stack
3-337	.100	.150	.275	.329	.275	.012	I-B	N	EE 30-31 9⁄64″ Stack
3-145	.100	.187	.277	.364	.270	.015	I-I	N/GN	EE 30-31 3⁄16″ Stack
3-145A	.100	.188	.278	.364	.270	.015	I-Q	N	EE 30-31 3⁄16″ Stack
3-145B	.100	.188	.278	.364	.270	.015	Q-Q	N	EE 30-31 3⁄16″ Stack

Part Number	Hole h	Hole H	Flange f	Flange F	Length Overall L	Wall Thickness t*	Flange Design	Matl.	Lamination Number Or Application
3-310	.100	.199	.300	.400	.110	.012	I-I	GN	Microsyl Core
3-299	.100	.200	.280	.390	.210	.012	H-H	N/GN	EI-187 3⁄32″ Stack
3-471	.100	.325	.195	.420	1.110	.020	I-I	N	
3-269‡	.102	.197	.285	.385	.209	.012	I	N/GN	Microsyl 3⁄16″ x .742 Stack
3-190‡	.103	.114	.270	.270	.148	.018	F-F	N	
3-288‡	.103	.266	.266	.430	.150	.015	I-I	N	EI-094 1⁄4″ Stack
3-211‡	.104	.140	.294	.330	.230	.012	I-I	N	
3-331	.106	.206	.240	.340	.604	.012	I-G	N	Microsyl Core
3-249	.106	.263	.266	.424	.406	.025	I-I	N	
3-424	.110	.396	.240	.550	1.120	.032	I-I	D	
3-424A	.110	.396	.230	.550	1.110	.030	I-I	GN	
3-398	.125	.250	.375	.502	.309	.020	I-I	N	
3-487	.128	.319	.364	.504	.305	.018	I-I	GN	
3-499	.129	.508	.458	.865	.650	.031	I-I	N	
3-493	.130	.320	.330	.500	.295	.013/.022	I-I	GN	
3-356	.130	.318	.368	.555	.305	.020	H-H	N	EE 28-29 5⁄16″ Stack
3-256‡	.130	.192	.360	.438	.300	.020	I-I	N	
3-497	.130	.850	1.093	.300	.565	.020/.030	I-F	N	
3-253‡	.131	.145	.375	.375	.474	.012	XX-XX	N	
3-153	.131	.255	.373	.498	.311	.020	I-JJ	N/GN	EE 28-29 1⁄4″ Stack
3-484	.135	.400	.347	.676	1.005	.037	I-O	Nylon	
3-449	.136	.260	.330	.450	.485	.021	I-I	N	
3-462	.132	.757	5⁄16	1¼	1½	.032	I-E	N	
3-240	.145	.625	.395	.875	.308	.018	H-H	N	
3-315	.156	.215	.406	.465	.150	.020	I-F	N	

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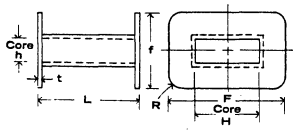
RECTANGULAR STACKS - STOCK BOBBINS



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FL FLUOROCARBON

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‡ Allow 3 to 4 weeks delivery.

Part Number	Hole h	Hole H	Flange f	Flange F	Length Overall L	Wall Thickness t*	Flange Design	Matl.	Lamination Number Or Application
3-321	.156	.312	.310	.450	.370	.015	I-I	N/GN	
3-291	.156	.312	.385	.540	.370	.014	I-RR	GN	
3-327	.165	.200	.500	.535	.425	.025	D-D	N	EI-187 5/32" Stack
3-450	.167	.385	.516	.734	.500	.025	I-A	N	
3-128‡	.168	.521	.627	.968	.839	.032/.025	DD-EE	N	
3-295‡	.176	.266	.290	.380	.170	.015	I-EEE	N	E 25 1/4" Short Stack
3-333	.180	1.690	.609	2.230	.855	.062	H-H	N	
3-465	.181	.353	.360	.574	.383	.020	H-KK	N	
3-241	.190	.440	.500	.750	.969	.020	H-H	N	
3-204‡	.192	.255	.436	.566	.455	.030	I-I	N	
3-332	.194	.256	.500	.570	.340	.015	I-I	GN	EI-187 1/4" Stack
3-246	.197	.225	.445	.480	.675	.020	I-I	N/GN	
3-258	.197	.275	.562	.625	.400	.020	I-WW	N	
3-307	.197	.571	.550	.925	.240	.020	I-I	N	EI 186 9/16" Stack
3-173	.198	.258	.332	.392	.656	.017/.021	I-I	N	
3-250	.200	.263	.360	.424	.406	.025	I-I	N	
3-134	.200	.263	.558	.597	.427	.023/.020	D-D	N	EI-187 1/4" Stack
3-134A	.200	.263	.558	.597	.427	.023/.020	D-I	N	EI-187 1/4" Stack
3-134B	.200	.263	.558	.597	.427	.023/.020	FF-FF	N	EI-187 1/4" Stack
3-191	.200	.296	.535	.670	.420	.028	I-L	N	
3-191A	.200	.296	.535	.670	.420	.025	D-D	N	
3-191C	.200	.296	.535	.670	.420	.025	I-I	N	
3-138	.200	.355	.535	.695	.425	.020	I-I	N	EI-187 11/32" Stack
3-338	.200	.355	.535	.695	.425	.022	L-DDD	N	EI-187 11/32" Stack
3-298‡	.200	.355	.437	.695	.656	.020	I-I	N	EI 188
3-306	.200	.385	.535	.885	.425	.025	NN-NN	GN	EI-187 3/8" Stack
3-283	.200	.385	.540	.720	.425	.030	I-I	FL/N/GN	EI-187 3/8" Stack
3-283A	.200	.385	.540	.720	.425	.025	D-D	N/GN	EI-187 3/8" Stack
3-283B	.200	.385	.540	.625	.425	.025	D-D	N/GN	EI-187 3/8" Stack
3-325	.200	.760	.450	1.000	1.120	.025	I-ZZ-ZZ	N	EI 75 3/16" Stack
3-619	.201	.385	.430	.615	.247	.010	I-I	N/D	
3-274‡	.207	.406	.437	.636	.610	.030	QQ-QQ	N	Arnold AM-6 "C" Core
3-358	.228	.256	.557	.557	.500	.020/.025	H-H	N/GN/PP	
3-284	.250	.390	.562	.718	1.085	.030	I-I	N	Arnold AH 246 "C" Core
3-391	.258	.383	.565	.690	1.120	.026	I-I	N	
3-322	.260	.450	.532	.722	.675	.025	I-SS	N	1314 W Lamination
3-322A	.260	.450	.532	.722	.675	.025	I-I	N	1314 W Lamination
3-224	.260	.385	.840	.967	.706	.032	Q-Q	N	
3-224A	.260	.385	.840	.967	.706	.032	M-M	N	
3-414	.260	.508	.500	.860	.500	.030	I-I	N	
3-166	.260	.510	.785	1.070	1.195	.020/.025 to .045†	NNN-NNN	NL	Arnold AH 40 "C" Core
3-221‡	.260	.513	.800	1.060	1.170	.028/.035 to .068†	NNN-NNN	N	Arnold AH 40 "C" Core
3-491	.265	.700	.680	1.120	1.100	.030	I-I	N	
3-379	.266	.515	.725	.970	.406	.020	I-I-I	N	
3-150‡	.266	.515	.720	.970	.490	.033	I-I	N	EE 24-25 1/2" Stack
3-150A‡	.266	.515	.720	.970	.490	.040	D-D	N	EE 24-25 1/2" Stack
3-362	.266	.515	.720	.970	.490	.040	I-S	N	
3-255	.266	.515	.720	.975	.490	.040	H-H	N	EE 24-25 1/2" Stack
3-227	.266	.391	.720	.875	.476	.030	I-I	N	EE 24-25 3/8" Stack
3-227A	.266	.391	.720	.875	.476	.030	Q-Q	N/GN	EE 24-25 3/8" Stack
3-116‡	.266	.630	.500	1.110	.469	.020	I-I	N	DU 124 5/8 Stack
3-485	.270	1.015	.635	1.500	.635	.033	I-KK	G	
3-175‡	.312	.385	.875	.865	.660	.030	OO-OO	N	E 38 5/16" Stack
3-142‡	.325	.465	.710	.850	.425	.035	I-I	N	Ferrox Cube 206 F440
3-142A‡	.325	.465	.710	.850	.425	.035	WW-WW	N	Ferrox Cube 206 F440
3-467	.327	.760	1.060	1.460	.650	.040	I-I	Noryl	
3-468	.327	.760	1.060	1.460	.422	.040	I-I	Noryl	
3-481	.332	.525	.575	.770	1.468	.030	I-I	N	
3-417	.335	.640	.700 .700	1.210 1.000	.297	.030	I-SSS	N/GN	
3-119	.348	.510	.813	.984	.719	.022	I-I	N	F 13 1/2" Stack
3-490	.382	.507	.968	1.125	.742	.030	I-B	N	
3-393	.385	.510	.986	1.100	.796	.028	I-I	N	
3-172‡	.390	.662	1.050	1.302	1.035	.028	I-I	N/GN	
3-341	.435	.844	1.807	1.900	.555	.035	I-I	GN	
3-616	.444	.507	1.240	1.300	1.303	.062	H-H	GN	
3-616A	.444	.507	1.240	1.102	1.303	.062	H-H	GN	
3-242‡	.448	.510	1.038	1.100	.796	.032	I-L	N	EI 21 7/16" Stack
3-192‡	.453	.468	.968	1.000	.968	.031	H-H	N	
3-231	.453	.531	.969	1.062	.969	.038	I-I	N	
3-428	.500	.758	1.120	1.312	.562	.032	I-I	N/GN	
3-355	.510	.635	1.100	1.225	.796	.030	NN-NN	N	
3-355A	.510	.635	1.100	1.225	.796	.032	I-M	N	
3-163	.510	1.020	1.170	1.800	.850	.055	KK-KK	N	
3-478	.512	.866	1.100	1.455	.807	.025	I-I	N	
3-413	.525	.595	1.300	1.500	1.350	.045	Special	N/GN	
3-442	.560	1.560	1.160	2.140	.500	.050	I-I	N	
3-329	.573	1.151	1.375	1.937	1.000	.040	I-AAA	N/GN	
3-370	.578	.640	1.109	1.171	.828	.025	I-I	N	
3-323	.633	.758	1.359	1.484	1.115	.031	I-I	N/GN	EI 75 5/8" Stack
3-225	.635	.755	1.205	1.343	.916	.030	I-I	N	EI 625 3/4" Stack
3-225A	.635	.755	1.205	1.343	.916	.030	I-L	N	EI 625 3/4" Stack
3-104‡	.635	1.015	1.370	1.750	1.370	.050	I-I	N	
3-400	.690	.846	1.296	1.445	.492	.030	I-TT	GN	
3-396	.953	1.515	2.077	2.640	1.188	.032	I-I	GN	
3-397	.953	1.515	2.077	2.640	1.312	.032	I-I	GN	

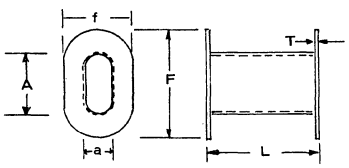
Send prints or samples for prompt, competitive price or quotation

Thermotech Coil Forms & Components

1202 SOUTH FIFTH STREET
HOPKINS, MINNESOTA 55343 — (612) 938-7671

THERMOTECH® INC.

REED SWITCHES- STOCK BOBBINS



N NYLON
GN NYLON GLASS REINFORCED
D DELRIN
NL NYLATRON
P POLYCARBONATE (LEXAN)
PP POLYPROPYLENE

* When two dimensions are given the first is the core thickness and the second is the thickness of the flange.

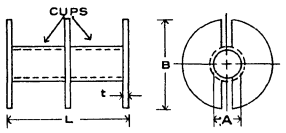
† Tapered flanges.

‡ Allow 3 to 4 weeks delivery.

Part Number	HOLE a	HOLE A	FLANGE f	FLANGE F	Length Overall L	Wall Thickness T	Flange Design	Material
8-251	.102	.506	.312	.719	.656	.017	PPP-PPP	N
8-437	.110	.240	.290	.420	.800	.018	QQQ-QQQ	GN
8-439	.110	.460	.290	.640	.800	.018	QQQ-QQQ	GN
8-438	.110	.350	.290	.530	.800	.018	QQQ-QQQ	GN
8-440	.110	.680	.290	.860	.800	.018	QQQ-QQQ	GN
8-489	.125	.390	.344	.687	.813	.020	PPP-PPP	Poly
8-352	.130	.505	.420	.800	.875	.030	PPP-QQQ	N
8-347	.130	.505	.500	.875	.687	.015/.030	PPP-PPP	N/GN
8-345	.130	.505	.500	.875	1.405	.015/.030	PPP-PPP	N/GN

Part Number	HOLE a	HOLE A	FLANGE f	FLANGE F	Length Overall L	Wall Thickness T	Flange Design	Material
8-350	.130	.505	.550	.927	.875	.030	PPP-PPP	N
8-349	.130	.505	.650	1.000	.875	.030	PPP-PPP	N
8-472	.130	.260	.230	.360	.770	.014	PPP-PPP	N
8-419	.194	.382	.475	.662	1.062	.025	PPP-PPP	N
8-348	.194	.382	.688	.875	1.062	.025/.030	PPP-PPP	N/GN
8-351	.220	.450	.590	.810	1.437	.025/.030	PPP-PPP	N
8-346	.255	.755	.875	1.375	.687	.025/.040	PPP-PPP	N/GN
8-466	.228	.708	.525	1.000	1.375	.025	QQQ-QQQ	N

POT CORE - STOCK BOBBINS



N NYLON
GN NYLON GLASS REINFORCED
D DELRIN
NL NYLATRON
P POLYCARBONATE (LEXAN)
PP POLYPROPYLENE

* When two dimensions are given the first is the core thickness and the second is the thickness of the flange.

† Tapered flanges.

‡ Allow 3 to 4 weeks delivery.

Part Number	Hole Dia. A	Flange Dia. B	Length Over-all - L	No. of Cups	Wall Thickness t	Matl.	For Use With
6-278	.160	.290	.137	1	.012	D	Fits pot cores manufactured by Ferroxcube, Siemans, Indiana General, Magnetics, Inc.
6-276	.194	.350	.168	1	.014	D	
6-277	.194	.350	.168	2	.014	D	
6-101‡	.205	.450	.280	1	.015/.020	N	
6-611	.242	.450	.214	3	.018	D/N	
6-600	.242	.450	.216	1	.019	D/N	
6-601	.243	.450	.213	2	.019	D/N	
6-603	.305	.578	.275	2	.018	D/N	
6-604	.305	.578	.278	3	.018	D/N	
6-602	.305	.579	.278	1	.019	D/N	
6-605	.374	.699	.358	1	.019	D/N	
6-606	.377	.697	.355	2	.018	D/N	
6-607	.378	.700	.355	3	.018	D/N	
6-160	.449	.705	.440	1	.027	D	

Part Number	Hole Dia. A	Flange Dia. B	Length Over-all - L	No. of Cups	Wall Thickness t	Matl.	For Use With
6-161	.449	.705	.440	2	.020	D	Fits pot cores manufactured by Ferroxcube, Siemans, Indiana General, Magnetics, Inc.
6-162	.449	.705	.440	3	.020	D	
6-609	.458	.824	.429	3	.024	D/N	
6-608	.460	.831	.425	1	.024	D/N	
6-157	.461	.831	.429	2	.025	D	
6-610	.539	.972	.506	1	.024	D/N	
6-158	.539	.980	.508	2	.035	D	
6-159	.649	1.142	.563	2	.035	D	
6-159A	.649	1.142	.563	1	.035	D	

SAMPLING IS SUGGESTED TO ASSURE PROPER SELECTION

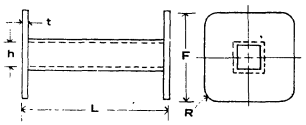
Custom Coil Forms Molded in Thermoplastic, Thermosets and Fluorocarbons

Thermotech Coil Forms & Components

1202 SOUTH FIFTH STREET
HOPKINS, MINNESOTA 55343 — (612) 938-7671

THERMOTECH® INC.

SQUARE STACK STOCK BOBBINS



N NYLON
GN NYLON GLASS REINFORCED
D DELRIN
NL NYLATRON
P POLYCARBONATE (LEXAN)
PP POLYPROPYLENE
FL FLUOROCARBON

When two dimensions are given the first is the core thickness and the second is the thickness of the flange.

† Tapered flanges.

‡ Allow 3 to 4 weeks delivery.

Part Number	Hole Square h	Flange Square F*	Length Overall L	Wall Thickness ††	Flange Design	Material	Lamination Number
4-452	.100	.178	.092	.010	I-I	D	
4-110	.104	.270 x .310	.271	.015/.012	A-I	N	EE 30-31
4-110A	.104	.270 x .310	.271	.015/.012	B-I	N	EE 30-31
4-110B	.104	.270 x .310	.271	.015/.012	D-I	N	EE 30-31
4-110C	.104	.270 x .310	.271	.015/.012	I-I	N	EI 094
4-223	.104	.270	.150	.012	KK-KK	N/GN	
4-615	.105	.375	1.044	.022	I-I	N	
4-112	.125	.376	.312	.020	I-I	N/FL	
4-112B	.130	.376	.312	.020	II-II	N	EE 28-29
4-112A	.125	.376	.312	.020	C-C	P/N/GN	
4-133	.128	.368	.307	.016	I-I	N/FL	EE 28-29
4-261	.131	.375	.220	.020	I-I	N	EE 28-29
4-114‡	.133	.273	.300	.018	I-I	N	EE 28-29
4-494	.133	.300	.447	.014	I-I	N	
4-183‡	.145	.428	.268	.025	NN-NN	N	
4-326	.162	.370 x .400	.310	.012	I-I	N	
4-423	.164	.365	.305	.012	I-I	N	35E
4-359	.164	.557	.520	.020/.025	H-H	PP/N/GN	
4-316	.168	.355	.165	.015	I-YY	N	
4-111	.194	.545	.245	.020	I-I	N/FL	
4-111A	.194	.545	.245	.020	D-D	N/FL	EI 186, F 14
4-102D	.200	.535	.425	.025	I-B	N	
4-108‡	.200	.535	.675	.020	I-I	N/FL	EE 186-187
4-209‡	.200	.575 x .535	.332	.026	NN-NN	N	
4-102	.200	.535	.426	.025	C-C	P/N/GN	E 1187
4-102A	.200	.535	.425	.025	I-I	N/GN	E 1187
4-102B	.200	.535	.425	.025	I-JJ	N	EI 187
4-102C	.200	.535	.425	.020	I-I	N	EI 187
4-233‡	.200	.535	.425	.035	I-I	N	
4-336	.200	.535	.425	.025	I-BBB	N	
4-620	.201	.430	.247	.010	I-I	N/D	
4-239‡	.220	.640	.340	.030	I-I	N	
4-385	.255	.495	1.220	.026	I-I	N	
4-106	.257	.750 x .656	.480	.020	I-F	N	EE 24-25
4-109‡	.257	.665 x 1.000	.492	.022	AA-AA	N	EE 24-25
6-132‡	.257	.740	.550	.028	G-H	N	
4-182‡	.257	.430	.406	.025	I-I	N	
4-373	.258	.543 x .625	1.120	.026	I-I	N	
4-384	.258	.617	1.486	.020/.028	I-I	N	
4-447	.263	.625	.720	.020	I-I	N	
4-113	.262	.740	.476	.026	H-H	N	EE 24-25
4-113B	.262	.720 x .750	.476	.026	H-H	N	EE 24-25
4-113C	.266	.720 x .750	.476	.035	I-I	N	EE 24-25
4-113D	.266	.720 x .750	.476	.033	J-I	N	EE 24-25
4-113E‡	.266	.720 x .750	.475	.035	I-M	N	EE 24-25
4-113F‡	.266	.720 x .750	.476	.035	M-M	N	EE 24-25
4-113G	.266	.720 x .750	.476	.026	C-C	N or GN	EE 24-25
4-113H	.266	.720 x .750	.476	.020	H-H	N or GN	EE 24-25
4-234	.266	.745 x .750	.496	.035	Q-Q	N	
4-229‡	.270	.750	.585	.025	H-G	N	
4-113A	.275	.720 x .750	.476	.050	N-O	N	EE 24-25
4-483	.281	.500	.745	.032	I-I	N	
4-293	.281	.625	1.020	.015	I-I	N	"C" Core
4-453	.330	.810	.940	.025/.035	H-H	GN	
4-137‡	.380	.860	.682	.030	I-I	N	EE 26-27
4-374	.383	.850	1.188	.030	I-I	N	
4-300‡	.385	.860	.682	.030	D-D	N/GN	EE 26-27
4-129	.390	.967	.706	.045	Q-Q	N/FL	EE 26-27
4-243	.390	.968	.755	.037	Q-Q	N	EI 375
4-103C	.390	.975	.735	.030	TT-I	N	EI 375
4-103	.395	.968	.735	.035	I-I	N	EI 375
4-103E	.395	.968	.735	.031	D-D	N	EI 375
4-103G	.395	.968	.735	.032	F-F	N	
4-103H	.395	.968	.735	.032	F-I-F	N	
4-103A	.395	.970	.730	.035	P-P	N/FL	EI 375
4-103B	.395	.970	.730	.030	I-M	N/FL	EI 375
4-103D	.395	.970	.730	.040	R-R	N	EI 375
4-103F	.395	.975	.730	.030	TT-I	N	EI 375
4-103J	.395	.970	.730	.040	I-I-I	N	
4-405	.505	.870	.985	.025	I-I	N	
4-328	.510	1.100	.796	.030/.036	L-L	PP	EI 21
4-107	.510	1.093	.796	.025	I-I	N	EI 21
4-107A	.510	1.100	.796	.040	P-P	N	EI 21
4-107B	.510	1.100	.796	.040	S-S	N	EI 21
4-107C	.510	1.100	.796	.040	GG-GG	N	EI 21
4-107D	.510	1.100	.796	.031	I-PP	N	EI 21
4-189‡	.510	1.250	.810	.050/.060	I-I	N	
4-152	.640	1.218	.918	.038	L-L	N/GN	EI 625
4-152A	.640	1.218	.918	.038	I-I	N/GN	EI 625
4-324	.697	1.344	1.000	.031	I-I	N/GN	EI 68
4-196	.758	1.480	1.115	.035	I-I	N	EI 75
4-617	.758	1.485	1.110	.040	H-L	N	
4-259	.880	1.740	1.270	.040	I-I	N	EI 11
4-259A	.895	1.730	1.263	.045	I-I	GN	
4-476	1.016	1.969	1.484	.042	I-I	GN	EI 100

TRANSFORMER STOCK BOBBINS WITH STAKED LUGS

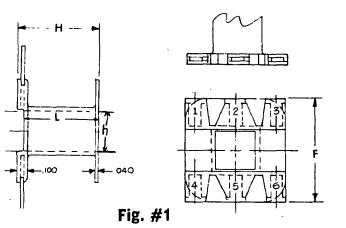


Fig. #1

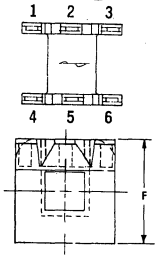
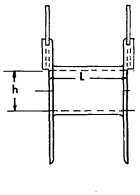


Fig. #2



WHEN ORDERING STATE
1 BOBBIN PART NUMBER
2 LUG PART NUMBER
3 NUMBER OF LUGS REQUIRED
4 POSITION OF LUGS BY STATION (SEE DRAWING OF BOBBIN)

Part Number	Hole Square	Flange	Length	Height	Matl.	Figure	Number
5-511	.266	.875	.476	.569	N	1	EI 24-25 ¼" Stack
5-512	.390	.768/1.032	.734	—	N	2	
5-502	.390	1.000/ .980	.734	.795	N	1	EI 375 ⅜" Stack
5-503	.510	1.100/1.125	.796	.860	N	1	EI 21 ½" Stack
5-508	.510/.635	1.100/1.125	.792	.858	N	1	EI 21 ⅝" Stack
5-509	.635	1.235/1.250	.921	.938	N	1	EI 625 ⅝" Stack
5-510	.635	1.235/1.250	.921	4 term. flange	N	2	
5-514	.635	1.235/1.250	.921	—	N	2	

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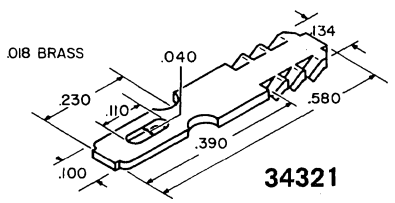
Thermotech Coil Forms & Components

1202 SOUTH FIFTH STREET
HOPKINS, MINNESOTA 55343 — (612) 938 7671

THERMOTECH® INC.

STOCK SOLDERING LUGS

1. Material brass pre-solder coat
2. Lugs will withstand 6 lb. pull test



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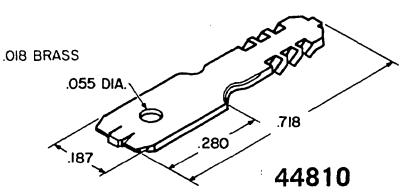

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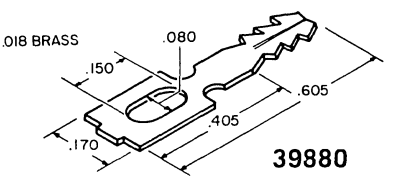

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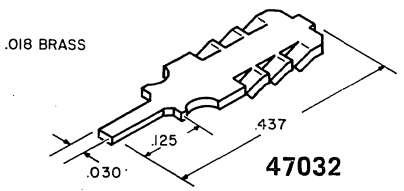

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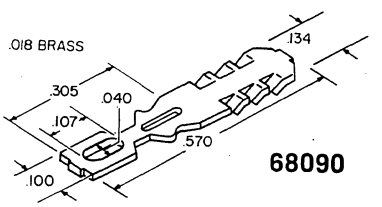

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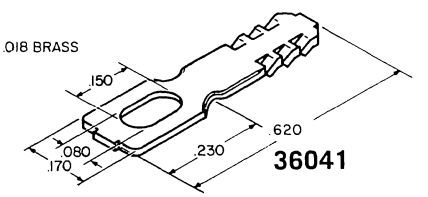

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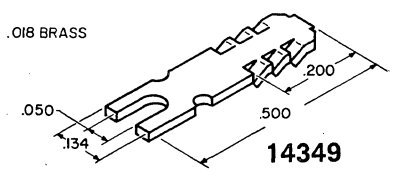

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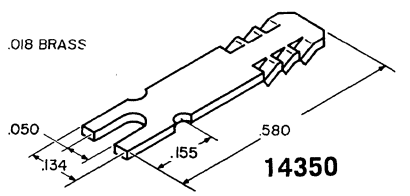

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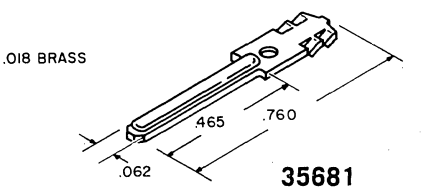

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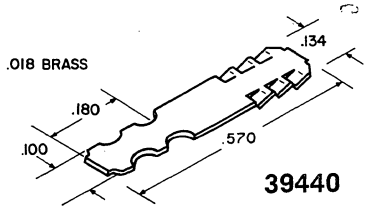

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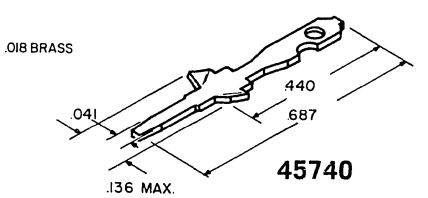

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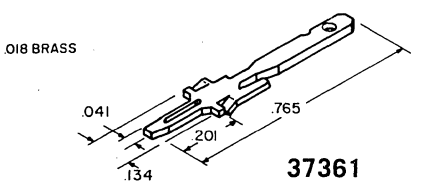

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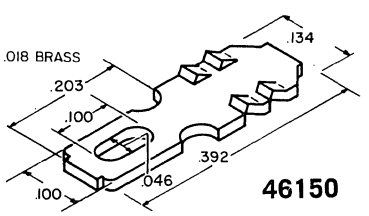

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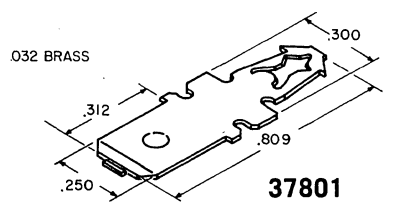

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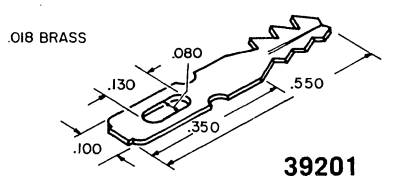
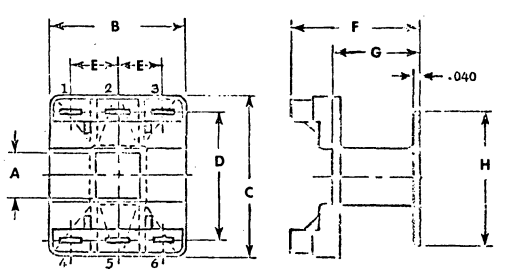


39201

TRANSFORMER BOBBIN FOR PRINTED CIRCUIT



* When two dimensions are given the first is the core thickness and the second is the thickness of the flange.

‡ Allow 3 to 4 weeks delivery.

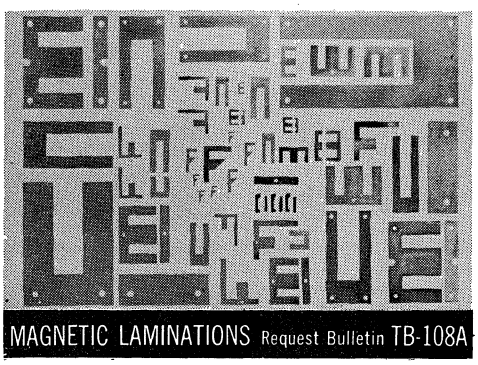
† Tapered flanges.

Part Number	A	B	C	D	E	F	G	H	Lamination Number	Available with lug
7-704	.200 Sq.	.592	.546	.421	.187	.600	.435	.535 Sq.	EI 187 3/16" Stack	4574
7-700	.260 Sq.	.725	.875	.720	.250	.691	.476	.725/.750	EE 2425 1/4" Stack	4574
7-701	.390 Sq.	.975	1.125	1.000	.312	.938	.735	.975 Sq.	EI 375 3/8" Stack	4574
7-705	Same as 7-700 with standoff bosses									
7-706	Same as 7-701 with standoff bosses									

Custom Coil Forms Molded in Thermoplastic, Thermosets and Fluorocarbons

SGL INDUSTRIES, INC.
G-L Electronics Division...

manufacturers of magnetic components



MAGNETIC LAMINATIONS Request Bulletin TB-108A

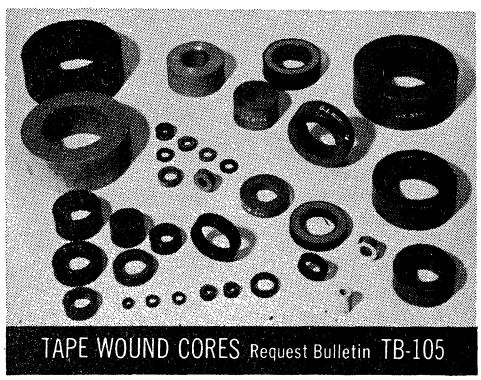
MAGNETIC LAMINATIONS
...nickel alloys and grain-oriented silicon steel

Available without tooling charge in a wide variety of standard EI, EE, F, DU, IU, L shapes, in 6 and 14 mil thicknesses, of non-oriented (round loop) and oriented (square loop) 50% nickel alloys, high permeability 80% nickel alloys, and grain-oriented silicon steel.

Exclusive G-L "Hy-Q" finish and use of highest quality carbide dies, provides high stacking factor, high interlaminar resistance, and high "Q" in transformers, filters, reactors, chokes, and inductors.

Maximum initial permeability is obtained from precisely controlled hydrogen anneals in closed furnaces. In the 80% nickel alloys, G-L "Mu-Max" laminations have raised the minimum initial permeability available to the designer by an average of 30%.

Special shapes are tooled in G-L's own Die Shop either with steel dies for economical short-runs or in carbide for maximum die life. Typical specialties are head laminations, spacers, and shields in thicknesses down to 1 mil, with thickness tolerances as close as 50 microinches.

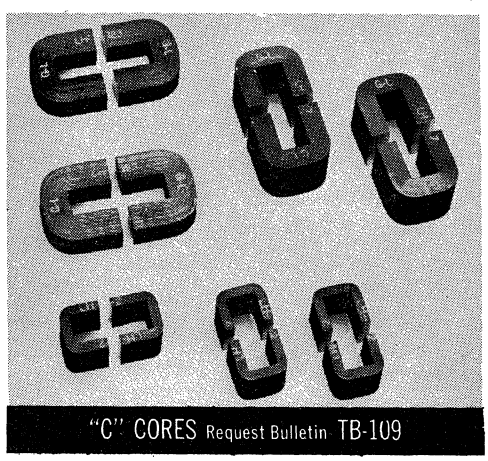


TAPE WOUND CORES Request Bulletin TB-105

TAPE WOUND CORES and BOBBIN CORES
Promptly produced in gapless toroidal form—in sizes from 1/16" OD and 1/32" tape width... to more than 10" OD and 2-3/4" tape width, weighing thousands of grams.

Wide selection of available alloys, as tabulated below, cover applications from tiny pulse transformers for transistorized ignition systems to massive cores for mag-amp controlled power supplies of missile launching submarines.

Cores are wound with 1/8 mil to 14 mil thick tape in various nickel alloys and silicon steel—uncased, or cased in a choice of aluminum, molded phenolic, or new glass filled nylon boxes... or on stainless or ceramic bobbins. Aluminum cased cores optionally available with G-L's "EE" coating, which not only eliminates taping before winding the core, but also provides a seal resistant to vacuum impregnation. The "EE" coating is neither tacky nor brittle, exhibits no cold flow, and does not soften at high temperatures. Aluminum cased cores, "EE" coated, have been used successfully in magnetic amplifiers at temperatures as high as 200°C., and have survived the shock of missile launching and in-flight centrifugal and centripetal forces, as high as 200 G.



"C" CORES Request Bulletin TB-109

"C" CORES
A wide range of 4 mil "C" cores from the smallest requirements up to approximately 4-1/2" in overall length are now available from stock. G-L "C" cores are produced by new manufacturing techniques with special emphasis on maintaining precise dimensional and electrical uniformity, to assure easy assembly and low power losses.

Because of new improved impregnation materials and techniques, "C" cores manufactured by G-L will operate continuously in temperature environments in excess of 200 degrees Centigrade without deterioration of the interlaminar bond.

AVAILABILITY:

LAMINATIONS—Stocks of all popular standard shapes, alloys, and thicknesses warehoused on both East and West Coasts for immediate shipment.

TAPE WOUND CORES—Stocks of IEEE, EIA standard sizes cased in plastic, aluminum, and EE coated, warehoused on both East and West Coasts for immediate shipment. Most other sizes available in quantity in less than two weeks.

"C" CORES—Prototype stock maintained on both East and West Coasts for immediate delivery.

BOBBIN CORES — Catalog bobbin sizes available in quantity in three weeks or less... bobbin cores are normally made to customer specifications.

SGL INDUSTRIES, INC.
G-L Electronics Division

Factory, Engineering Offices & East Coast Warehouse
300 Harvard Avenue
Westville, New Jersey 08093
609 GL 6-7300
TWX 609-456-6429

West Coast Warehouse
E. A. Cox & Associates
2037 Eugene Street
Anaheim, California 92804
(714) 530-1409

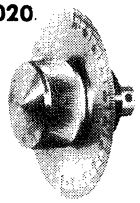
REPRESENTATIVES THROUGHOUT UNITED STATES AND CANADA

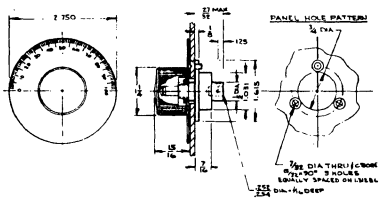
PLANETARY DRIVES

5:1 7:1 10:1 15:1 RATIO (OTHERS AVAILABLE)

VEMALINE

MODEL 4020





HOW TO ORDER

4020-☐-☐ SERIES 5:1 RATIO
4025-☐-☐ SERIES 15:1 RATIO
4035-☐-☐ SERIES 10:1 RATIO

EXAMPLE

4020-1-☐ With standard knob & dial.
4020-2- No knob or dial.
4020-3- With standard fast adjusting knob (5:1 only).
4020-4-☐ With dial, but not knob.

Note: For Fast Slewing Feature Prefix Part No. with "FS" or "FL"

DIALS

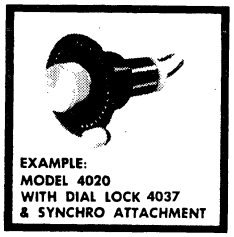
Add to above part numbers the suffix desired for scale. Dials available 1-1/4", 2-3/4" or 4" Dia.

A — Blank
B — Calibrated CCW 0—100, —180°
C — Calibrated CW 0—100, —180°
D — Calibrated CCW 0--360, —360°
E — Calibrated CW 0—360, —360°
F — Calibrated CCW 0 — 100, —360°
G — Calibrated CW 0 — 100, —360°

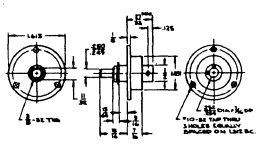
NOTE: CCW indicates counter clock wise reading on dial. Dial rotates same direction as knob.

EXAMPLE:
4020 - 1 - B - 1-3/4"
10:1 Std. Knob CCW 0-100 -180° Dial Size

MEETS ALL APPLICABLE MILITARY SPECIFICATIONS



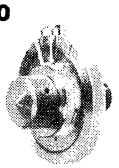
EXAMPLE:
MODEL 4020
WITH DIAL LOCK 4037
& SYNCHRO ATTACHMENT



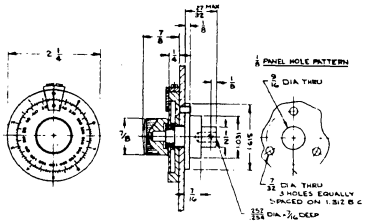
DIAL POINTERS AND DIAL LOCKS AVAILABLE

MODEL 5020

ULTRA SMOOTH PRECISION BALL DRIVEN PLANETARY DIAL



5020 WITH FAST SLEWING KNOB



5020-☐-☐ SERIES 5:1 RATIO
5025-☐-☐ SERIES 15:1 RATIO
5035-☐-☐ SERIES 10:1 RATIO
Comes only with knob & 1-3/4" Dia. Dial (A-G)
Note: Fast Approach feature in Knob Prefix Part No. F

FOR INDICATOR OR ROTARY COMPONENTS, TUNING COILS, POTENTIOMETERS, RESOLVERS, SYNCHROS, etc

- ZERO BACKLASH—(DIAL TO OUTPUT SHAFT.
- INITIAL OUTPUT TORQUE 15 IN. OZ. HIGHER TORQUES AVAILABLE.
- AVAILABLE FOR SYNCHRO, OR OTHER SERVO COMPONENTS.
- CAN BE CUSTOM MODIFIED.
- SMOOTH AND ACCURATE DRIVE ACTION.
- CORROSION RESISTANT.
- FOR MILITARY AND COMMERCIAL ELECTRONIC EQUIPMENT.
- HOUSING MADE OF ANODIZED ALUMINUM.
- STAINLESS STEEL SHAFT.
- VARIOUS STOCK DIALS AVAILABLE. AVAILABLE WITH STOPS & DIAL LOCKS.

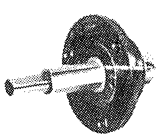
FAST APPROACH SLEWING DIAL AVAILABLE

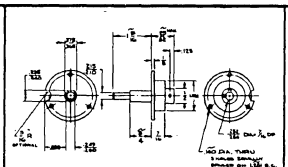
FL4020-☐

MANY OTHER PLANETARY DRIVES AVAILABLE. WRITE FOR CATALOG.

MANY OTHER STYLES AND RATIOS AVAILABLE WRITE FOR COMPLETE CATALOG

4042

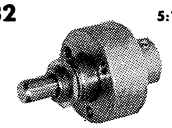


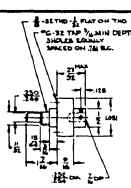


For closed circuit TV lens adjustment, Potentiometer & Coil fine tuning. Output torque from 15 IN. OZ. to 60 IN. OZ. Standard ratio 5:1 (available 10:1, 15:1 on request).

TAKES STANDARD KNOB SERIES 3027 and 1073.

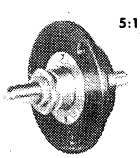
4032 5:1

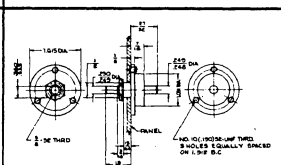




Only 1" Dia. Housing for use in confined areas. Standard ratio 5:1 (available 10:1, 15:1 on order.) Also available with 1/4" (Part #4033) male output shaft instead of standard female collar.

S4020 5:1

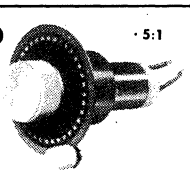


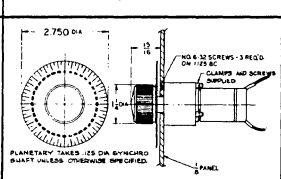


Similar to 4020 except with 1/4" male output shaft instead of standard female collar.

Standard ratio 5:1 (available 10:1, 15:1 on request).

4520 5:1





Similar to 4020 except for synchro mounting, comes complete with mounting clamps.

DIAL & KNOB ASSEMBLY ONLY AVAILABLE.

3027-☐-1 2-3/4" Dia. Dial
3027-☐-2 1-3/4" Dia. Dial
3027-☐-3 4" Dia. Dial

☐= USE DIAL A-G AS DESIRED

HOW TO ORDER

45☐☐-8-☐-☐-☐
45☐☐-10-☐-☐-☐
45☐☐-11-☐-☐-☐

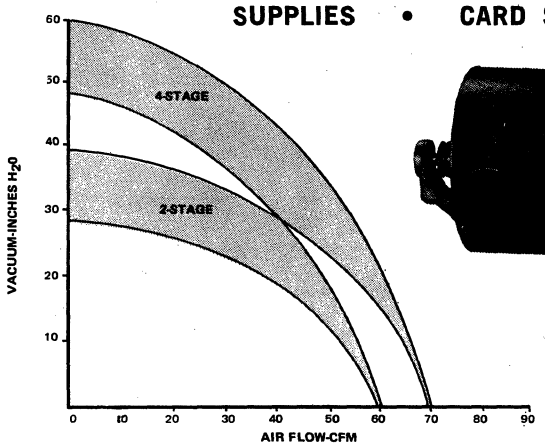
See ordering info. for 4020 for ratio desired. synchro avail Knob Dial Mark Dial Size

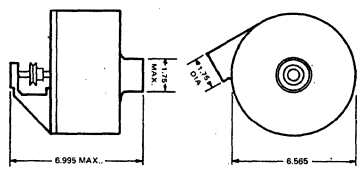
VEMALINE PRODUCTS COMPANY, INC.
WYCKOFF, NEW JERSEY / PHONE (201) 891-3200

AMETEK / Lamb Electric

Windjammer® BLOWERS FOR QUIET WORKING AIR

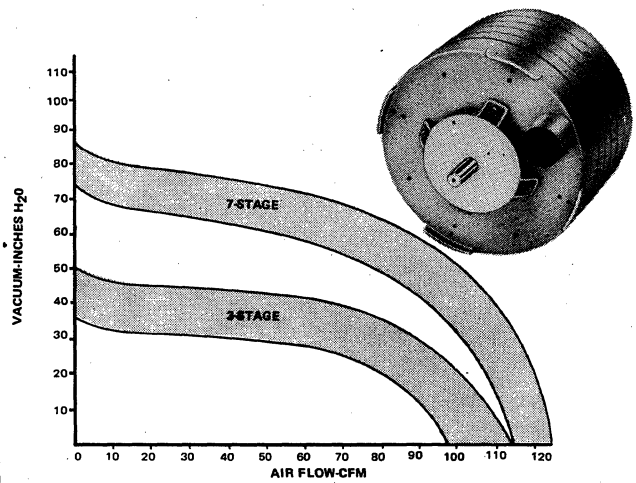
APPLICATIONS: POWER AIR COOLING • TAPE TRANSPORTS • VACUUM OR PRESSURE SUPPLIES • CARD SEPARATING • AIR SAMPLERS . . .

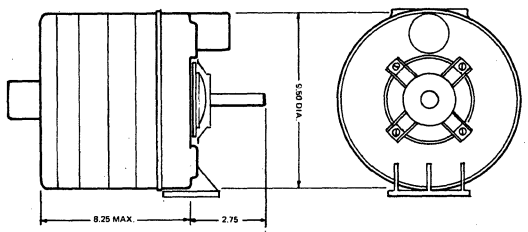




WINDJAMMER 5.7 Belt Driven Blower

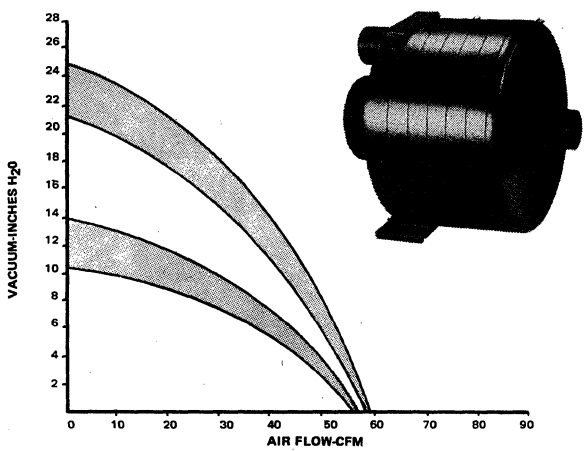
Quiet, efficient belt driven centrifugal fan system delivers vacuum, pressure or both. Available in one to four stage modular fan systems, the unit provides a wide range of operating characteristics. Available with shroud for extra noise reduction and ease of mounting. Prelubricated, shielded ball bearings and the elimination of rotating vanes assures long life and minimal maintenance.

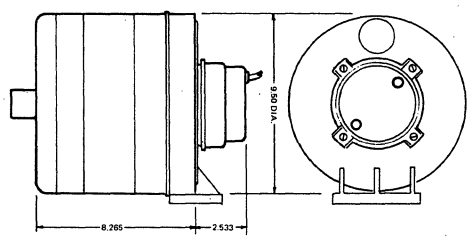




WINDJAMMER 9.5 Belt Driven Blower

Dependable, silent belt driven centrifugal fan system produces vacuum, pressure or both to a variety of applications. From one to seven modular fan stages adapt the unit to a wide range of operating conditions. Available with shroud for further noise abatement. Rotating fans, designed for maximum efficiency, and shielded, prelubricated ball bearings assure long, maintenance free life.

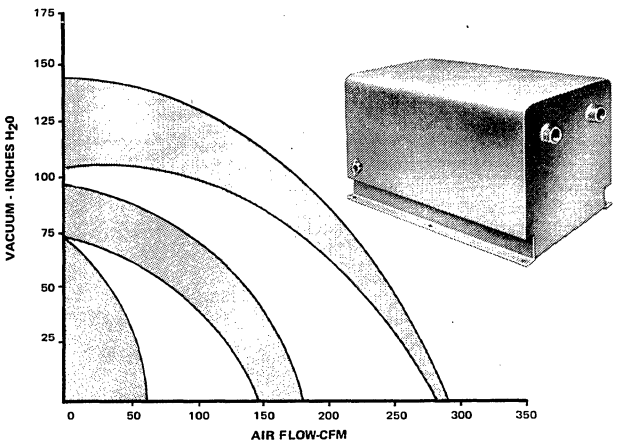




WINDJAMMER 9.5 Motor Driven Blower

Compact, self contained motor driven blower utilizing a standard 9.5 WINDJAMMER blower. Single or three phase induction motors with balanced components assure quiet, vibration free operation. Prelubricated ball bearings provide long life and the motor operates with fan systems sealed without degradation. Optional thermal protector available.

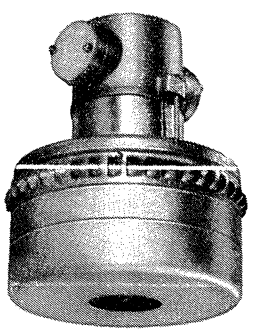
Windjammer® CUSTOM DESIGNED AIR SYSTEMS



WINDJAMMER SYSTEMS

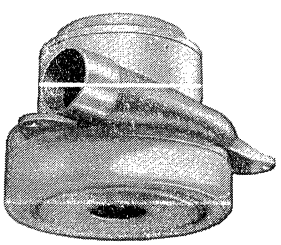
Single or multiple output packages which provide complete working air requirements for a variety of applications. Assembled from standard WINDJAMMER belt driven blowers and motors to customer specifications, the systems can be provided with stock base plates, covers, noise reduction materials, filters, elapsed time meters, remote control relays and other features. Designed for high performance, the system provides any combination of vacuum and/or pressure to the air system in any machine.

DEPENDABLE SERIES UNIVERSAL VACUUM MOTOR/BLOWERS



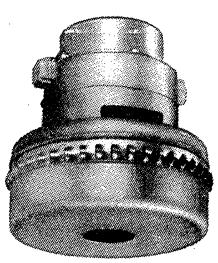
7.5″ Dia. Two & Three Stage Bypass Vacuum Motor/Blower

Rugged, single phase, two pole, AC or DC motor with centrifugal blower ideally suited to applications requiring long life and high performance.



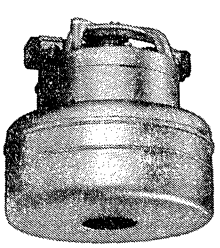
7.17″ Dia. Two Stage Bypass Vacuum Motor/Blower

Reliable, two pole, single phase, AC or DC motor and centrifugal bypass blower for high performance in light duty applications requiring wet or dry air flow.



5.7″ Dia. Two Stage Bypass Vacuum Motor/Blower

Efficient, single phase, two pole, AC or DC motor with centrifugal blower for wet or dry air flow and economic performance.



5.7″ Dia. Two Stage Thru-Flow Vacuum Motor/Blower

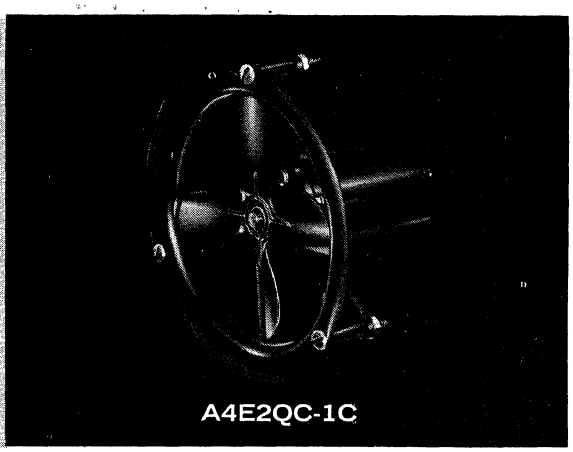
Lightweight, single phase, two pole, AC or DC motor with a centrifugal blower for dry air flow and economic performance.

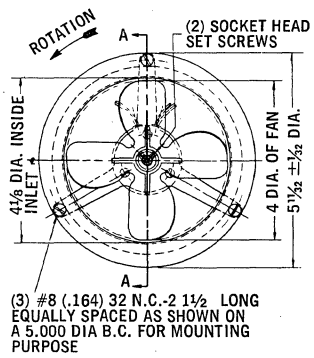
For information on Servo Motors and Gear Motors, see AMETEK/Lamb Electric catalog pages in Volume II, Section 3500 — Motors/Rotating Components & Accessories.

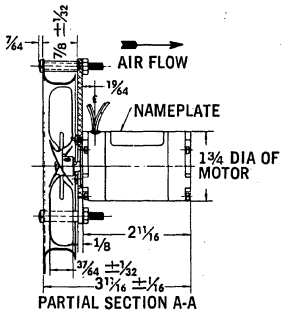
AMETEK / Lamb Electric
631 LAKE STREET • KENT, OHIO 44240
TEL: (216) 673-3451 • TELEX: 98-6497 • TWX: 801-437-2332

MINIATURE AXIAL FLOW FANS

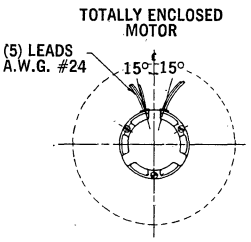
50, 60, 400, 320-1600 Hz, DUAL FREQUENCY
1 - 2 OR 3 PHASE
CUSTOM DESIGNED TO YOUR REQUIREMENT



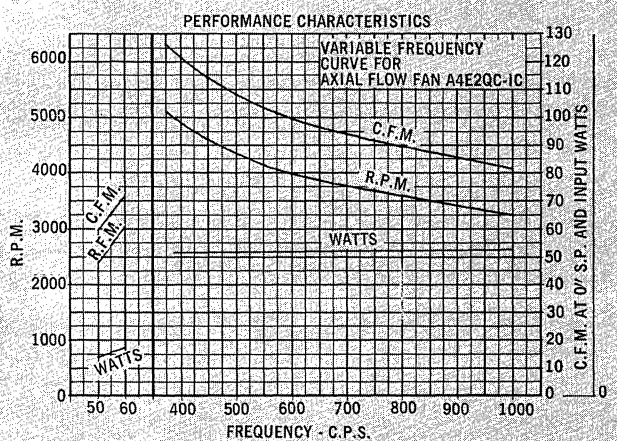




AXIAL FLOW FAN
MODEL NO. A4E2QC-1C



SPECIFICATIONS



Ashland miniature axial fans are small, light and versatile, they produce high air volumes with minimum space and weight. The latest in methods and materials combined with fine workmanship assure trouble free life under the most adverse ambients.

Special bell mouth mountings can be supplied or the fans can be incorporated in tube-axial enclosures. Modifications of mounting arrangements or special designs can also be supplied.

NOTE: For high altitude applications models are available wherein the loss of specific weight of air with altitude is compensated for by increased shaft speed of the motor. This condition approaches constant weight flow of air throughout the altitude range. Model A4K4-1CC is an example of such a unit. Operating from 115 volts, 400 Hz, 3 phase, the rated air delivery is 55 CFM st 0′ altitude and 368 CFM at 50,000′ altitude.

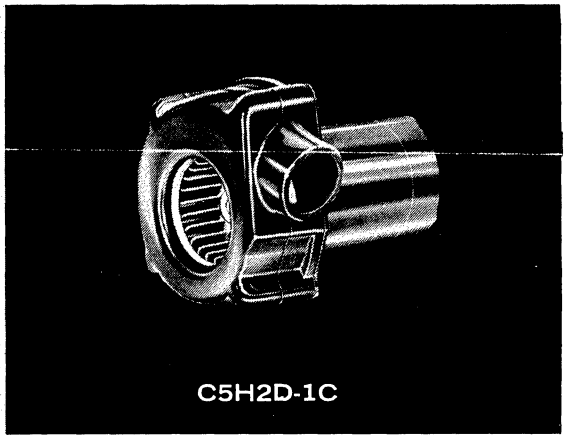
AEP MOTORS

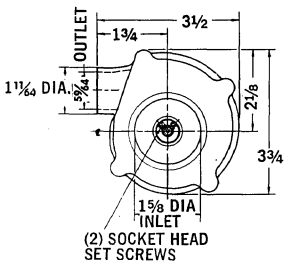
IN PHASE WITH INDUSTRY

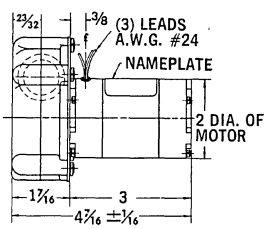
ASHLAND ELECTRIC PRODUCTS INC.
32-02 QUEENS BLVD., LONG ISLAND CITY, N. Y. 11101 • PHONE (212) 392-4010

MINIATURE CENTRIFUGAL BLOWERS

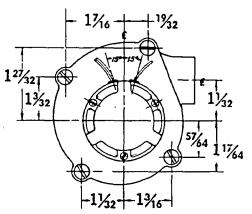
60 Hz - 400 Hz - VARIABLE FREQUENCY
1 - 2 OR 3 PHASE







CENTRIFUGAL BLOWER MODEL NO. C5H2D-IC



SPECIFICATIONS

Model Number	Nom. RPM	Volts	Freq.	Phase	CFM @ 0" S.P.	Length (In.)	Width (In.)	Height (In.)	Approx. Weight
C4B1P-1C	1700	115	60	1	2	2¾	2²⁷⁄₃₂	2¹⁵⁄₁₆	11 oz.
C4E2Q-1*	3200	115	60	2	20	5⁵⁄₁₆	3½	3¾	24 oz.
C4P2J-1C	6800	115	400	1	40	4⁵⁄₁₆	3⅞	4⅜	26 oz.
C5H2D-1C	7000	115	320/1000	1	20	4⁷⁄₁₆	3½	3¾	29 oz.
C5H4Q-1CC	3300	115	60	1	43	4¾	3¹³⁄₁₆	4³⁄₃₂	28 oz.
C5D2Q-9CC	3600	115	50/60	1	20	4⁵⁄₁₆	5	4⅛	24 oz.
C5N3J-1CC	4800	208	400	3	65	5⁵⁄₆₄	3¹³⁄₃₂	3¹³⁄₃₂	30 oz.
C5N41G-1CC	5400	208	400	3	50	4¹⁷⁄₃₂	4¹³⁄₃₂	4⅝	29 oz.

* Duplex Blower Model

OUR ENGINEERING DEPARTMENT WILL BE HAPPY TO REVIEW YOUR COOLING PROBLEMS AND MAKE RECOMMENDATIONS TO SOLVE THEM.

These Ashland blowers are designed to meet all existing military specifications and because of their small size and light weight are particularly adapted to military and airborne applications. They are compact, sturdy and efficient in operation. They can be supplied with either plastic or specially designed metal blower housings, and with mounting dimensions to meet your requirements.

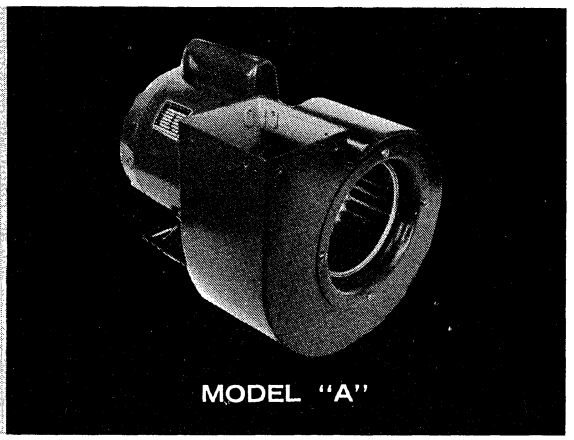
AEP MOTORS

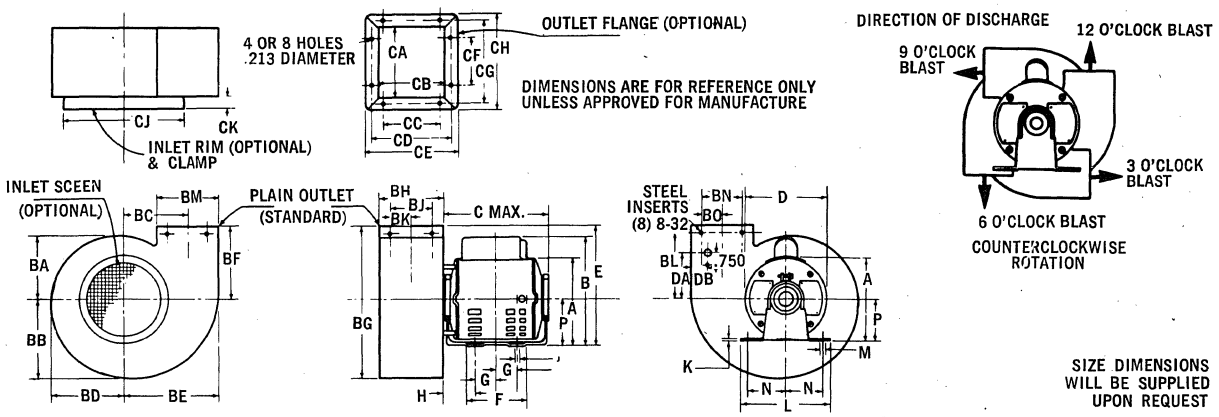
IN PHASE WITH INDUSTRY

ASHLAND ELECTRIC PRODUCTS INC.
32-02 QUEENS BLVD., LONG ISLAND CITY, N. Y. 11101 • PHONE (212) 392-4010

MODEL "A" CENTRIFUGAL BLOWERS

AVAILABLE IN — 115/208 - 230 VAC, OR 208 - 220/440 VAC, 60 Hz OR 50/60 Hz, SINGLE PHASE OR THREE PHASE, SLEEVE OR BALL BEARING, RESILIENT OR RIGID BASE MOTORS.





SPECIFICATIONS

VOLTS — 115/208-230 VAC, 60 Hz, 1 PHASE, CAPACITOR START

ADJUSTABLE DISCHARGE DIRECTION WITH CW OR CCW ROTATION

GENERAL ELECTRIC — RESILIENT MOUNTED SLEEVE BEARING MOTORS — DRIP PROOF

PRECISION MADE TO COMMERCIAL SPECIFICATIONS

FOR ELECTRONIC — INSTRUMENT AND INDUSTRIAL APPLICATIONS

USED BY THE INDUCTION HEATING, BROADCAST & TV INDUSTRIES

AIR DELIVERY — TO 1250 CFM AND 6.0" STATIC PRESSURE

COMPLETE UNIT — FINISHED WITH BLUE-GREY BAKED ENAMEL

All blowers are shipped with 12 O'clock blast which may be changed in the field to any of the 4 positions shown. Special positions can be supplied on order.

ROTATION — Model A blowers are available with either CW or CCW rotation. CCW rotation will always be shipped unless CW rotation is specified. The rotation cannot be changed in the field. Rotation is determined by viewing the blower wheel from the drive side of the housing.

MOTOR — NEMA frame designs manufactured by General Electric* are supplied with the Model A blowers. They are rated at 40°C, open — drip proof with integral resilient mounting.

THERMAL PROTECTION — can be provided upon request.

LUBRICATION — all angle, sleeve bearing, General Electric motors require a minimum of Service. Lubrication instructions are shown on the terminal box coverplate.

WARRANTY — Ashland's standard one year warranty applies to all materials and workmanship of the blower. The motors are warranteed by G.E. for 13 months from date of manufacture. They can be serviced at any local G.E. service station.

* Or equivalent

AEP MOTORS

IN PHASE WITH INDUSTRY

ASHLAND ELECTRIC PRODUCTS INC.

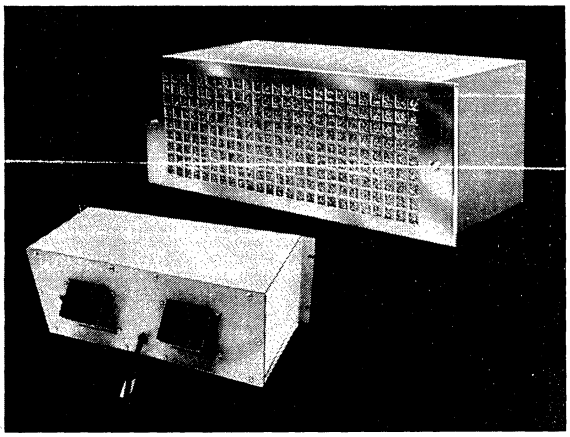
32-02 QUEENS BLVD., LONG ISLAND CITY, N. Y. 11101 • PHONE (212) 392-4010

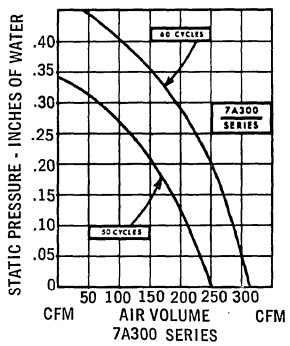
RACK MOUNTED BLOWERS

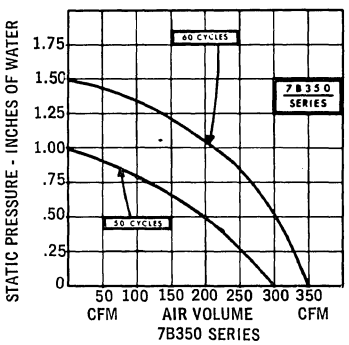
DESIGNED TO SURPASS WITH WIDE SAFETY MARGINS, THE MOST CRITICAL ENVIRONMENTAL CONDITIONS. THEY CAN WITHSTAND SHOCK, VIBRATION, MOISTURE AND OTHER SEVERE ENVIRONMENTAL CONDITIONS.

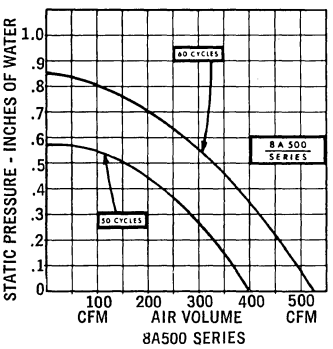
APPLICATIONS

Control systems • Accounting machines
Computers • Data processing systems









SPECIFICATIONS

7A300

Panel Size: Standard — 7″ high x 19″ wide; Recessed — 5¼″ high x 19″ wide
Motor: 110/120 VAC, 50/60 cycle, 1 phase heavy duty induction type with sleeve or ball bearings, 1600 RPM.
Air Delivery: 310 CFM @ 0″ Static Pressure, 48″ Shut Off.

7B350

Panel Size: Standard — 7″ high x 19″ wide; Recessed — 5¼″ high x 19″ wide
Motor: 110/120 VAC, 50/60 cycle, 1 phase, heavy duty, permanent split capacitor, ball bearing, 3350 PRM.
Air Delivery: 355 CFM @ 0″ Static Pressure, 1.3″ Shut Off.

8A500

Panel Size: Standard — 8¾″ high x 19″ wide; Recessed — 7″ high x 19″ wide
Motor: 110/120 VAC, 50/60 cycle, 1 phase, heavy duty, permanent split capacitor, ball bearing, 1700 RPM.
Air Delivery: 525 CFM @ 0″ Static Pressure, .83″ Shut Off.

These Blowers are specially designed for 19″ electronic racks. Their Slow Speed, Low Velocity Centrifugal Blowers quietly deliver cool filtered air... keeping the electronic rack pressurized and dust free.

Ashland's rack blowers distribute a maximum air volume at a minimum noise level.

Let Ashland design a rack blower unit for your particular cooling requirement.

AEP MOTORS

IN PHASE WITH INDUSTRY

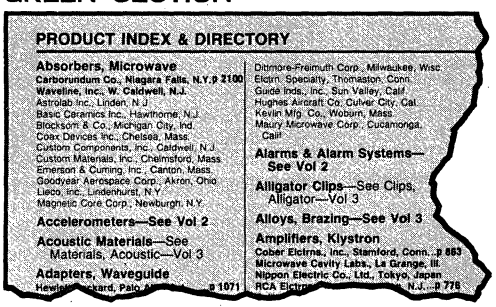
ASHLAND ELECTRIC PRODUCTS INC.

32-02 QUEENS BLVD., LONG ISLAND CITY, N. Y. 11101 • PHONE (212) 392-4010

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Wavetine, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

Adapters, Waveguide
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Ditmore-Freimuth Corp., Milwaukee, Wisc.
Elcon Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co., Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. ..p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J. ...p 778

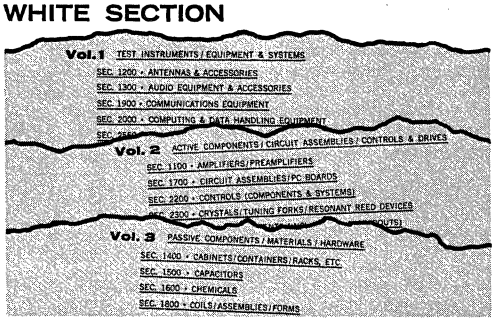
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol.1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2500 • ...
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
SEC. 2400 • ... (OUTS)
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

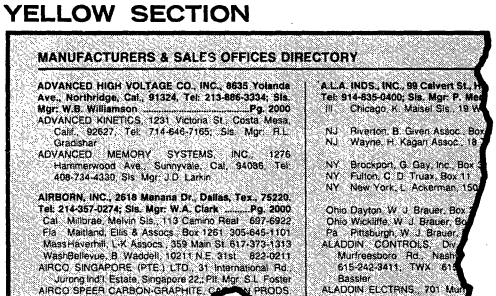
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION

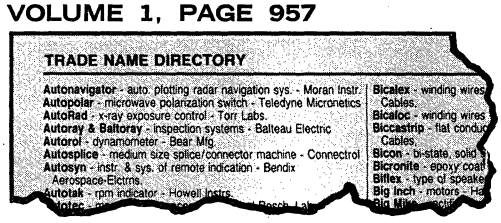

MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627. Tel: 714-646-7165; Sls. Mgr: R.L. Gradahar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086. Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Menana Dr., Dallas, Tex., 75220. Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal.: Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla.: Maitland, Ellis & Assocs., Box 1251, 305-645-1101
Mass.: Haverhill, L.Y. Assocs., 359 Main St. 617-373-1313
Wash.: Bellevue, B. Waddell, 10211 N.E. 31st. 822-0211
AIRCO, SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22, Plt. Mgr. S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, ... PRODS. DEPT., 900 Theresa ... Tel:
A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mea...
Ill.: Chicago, K. Maisel Sls., 19 W...
NJ.: Riverton, B. Gwen Assoc., Box...
NJ.: Wayne, H. Kagan Assoc., 19...
NY.: Brockport, G. Gay, Inc., Box...
NY.: Fulton, C.D. Truax, Box 11...
NY.: New York, L. Ackerman, 150...
Ohio: Dayton, W.J. Brauer, Box...
Ohio: Wickliffe, W.J. Brauer, Bo...
Pa.: Pittsburgh, W.J. Brauer,...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nashv... 615-242-3411; TWX 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210. Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotec - ... Bosch Labs
Bicalex - winding wires... Cables.
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid s...
Bicronite - epoxy coat...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike - ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

DACO Self-Reactivating Desiccators [Dehumidifiers] for head-up displays, navigational systems and other airborne optical equipment.

Provide clean, moisture-free air

Moisture condensing as a result of changes in temperature and air pressure during flight causes optical instruments to fog and electrical connections to short. DACO Desiccators trap moisture and thoroughly dry the air before it enters the instrument. A special drying cell reduces the moisture content of saturated air to such a small amount that the dew point falls as low as –70°F. Condensation within the instrument is prevented even under such extreme conditions as those in the Arctic regions or at 80,000 feet altitude. In addition, DACO Desiccators prevent dust from entering the system, blocking solid particles as small as 10 microns.

Automatic desiccant regeneration for long continuous service

DACO Desiccators continue to remove moisture from the air, without replacement of the desiccant, long after the desiccant in static desiccators would become saturated and have to be replaced. The exclusive DACO design automatically purges and regenerates the desiccant during flight, making it possible to use these desiccators for several years without servicing.

Reliable, verified performance

DACO Self-Reactivating Desiccators are among the most reliable components on an aircraft. An entirely new departure from previous types of desiccators, they have been designed specifically for use with airborne instrumentation, and are produced under careful control in facilities designed especially for this purpose. The performance of every DACO Desiccator under its specified application conditions is verified by testing before shipment.

Small Size

Designed to fit into tight locations, DACO Desiccators have a maximum diameter of 1.47 inches (exclusive of the mounting flange). Their length ranges from 4 to 7.63 inches, depending upon the air handling capacity.

Wide choice of models

Models are supplied to condition 0.05 to 1.5 cubic feet of air (net cavity volume). Each model is available as a 115-volt AC/DC or a 28-volt AC/DC unit. A variety of mounting flanges and a choice of standard port or port for use with air hose, are also provided.

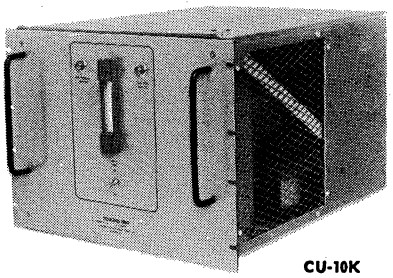
For additional details, model specifications, dimension drawings and ordering information, ask for DACO Bulletin 500.

DACO Instrument Company, Inc.
Merritt Boulevard, Trumbull, Connecticut 06611 (U.S.A.)
Telephone: (203) 375-5871 TWX: 710-453-1095 Cable: DACOINST TRUMBULL, CONN.

DACO™

COOLING UNITS
HEAT EXCHANGE - REFRIGERATING

Electro IMPULSE, INC.



CU-10K

CU SERIES

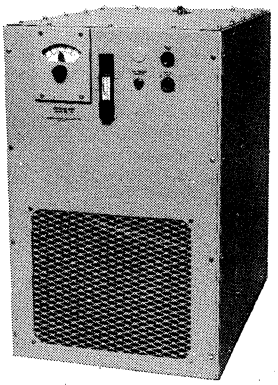
Heat exchange cooling units are useful whenever it is desirable to prevent runaway heat conditions. Heat is absorbed by a circulating coolant liquid, then exhausted into the ambient by forced air passing through a radiator.

Use this series when coolant temperatures can be allowed to rise above ambient.

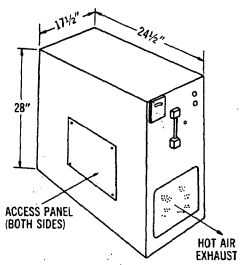
Model	Capacity Watts	Coolant Flow GPM (0-Back Pressure)	Input Power Frequency	Amps	Suitable Liquids*	Back Pressure P.S.I.
CU-500	500	.3	110v - 60 Hz 24v - DC	6	0	15
CU-1500	1500	.5	24v - DC		0	40
CU-2500	2500	1	110v - 60 Hz	6	ETH	50
CU-5000	5000	2	110v - 60 Hz	10	—	50
CU-5000S	5000	2	110v - 400 Hz		—	60
CU-10K	10000	2	110v - 60 Hz	11	W	50
CU-10K-S	10000	2	110v - 400 Hz		—	60
CU-20K	20000	4	110v - 60 Hz	12	—	60
CU-50K	50000	10	220v - 60 Hz	12	0	20
CU-100K	100000	20	220v - 60 Hz	15	—	20

*Suitable Liquids: Water — W. Oil — O. Ethylene Glycol with inhibitors — ETH.
Optional Equipment Available: Flow Switch, Thermometers, Thermostat, Flowmeter, Heater and Water De-ionizer.

RU SERIES



RU-75



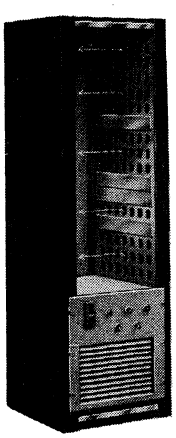
Models from this series are required when coolant temperatures must be below ambient. Using refrigeration, they can provide temperatures to 0 degrees C and below, while removing up to 6800 watts of heat.

These units are ideal for remote applications. Coolant temperatures are low, flow rate is steady, and the final heat sink can be in a location which will not cause overloading of air-conditioning equipment.

Special options can provide temperature control of ±1 degree C, while combinations of refrigeration and heating can hold temperatures at any point above ambient.

Model	Capacity Watts	Coolant Flow GPM (0-Back Pressure)	Max. Back Pressure P.S.I.	Operating Power 60 cps	HP
RU-12.5	212.5	1	60	115	.5
RU-25	425	1	60	115	.5
RU-50	850	1	60	115	.7
RU-75	1,275	1	60	115	1
RU-100	1,700	2	60	115	1
RU-200	3,400	2	60	220	1.3

Optional Equipment Available: Thermometer, Thermostat, Flow Meter, Heater.
In chart above, change model designation to RC for Rack Cooler specifications, and to RUH for Refrigeration-Heating Combination shown at left.

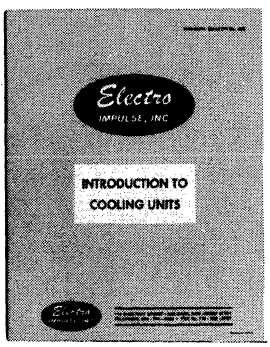


RACK COOLER

This series is designed for air, rather than liquid cooling. A sealed volume of air is cooled by a refrigeration system and continually re-circulated within the enclosure. Cool sensitive rack-mounted electronic equipment, or use duct work and manifolds for extensive cooling of radar or other electronic control consoles and cabinets.

For specifications, see chart above and merely substitute "RC" for "RU" in the Model column.

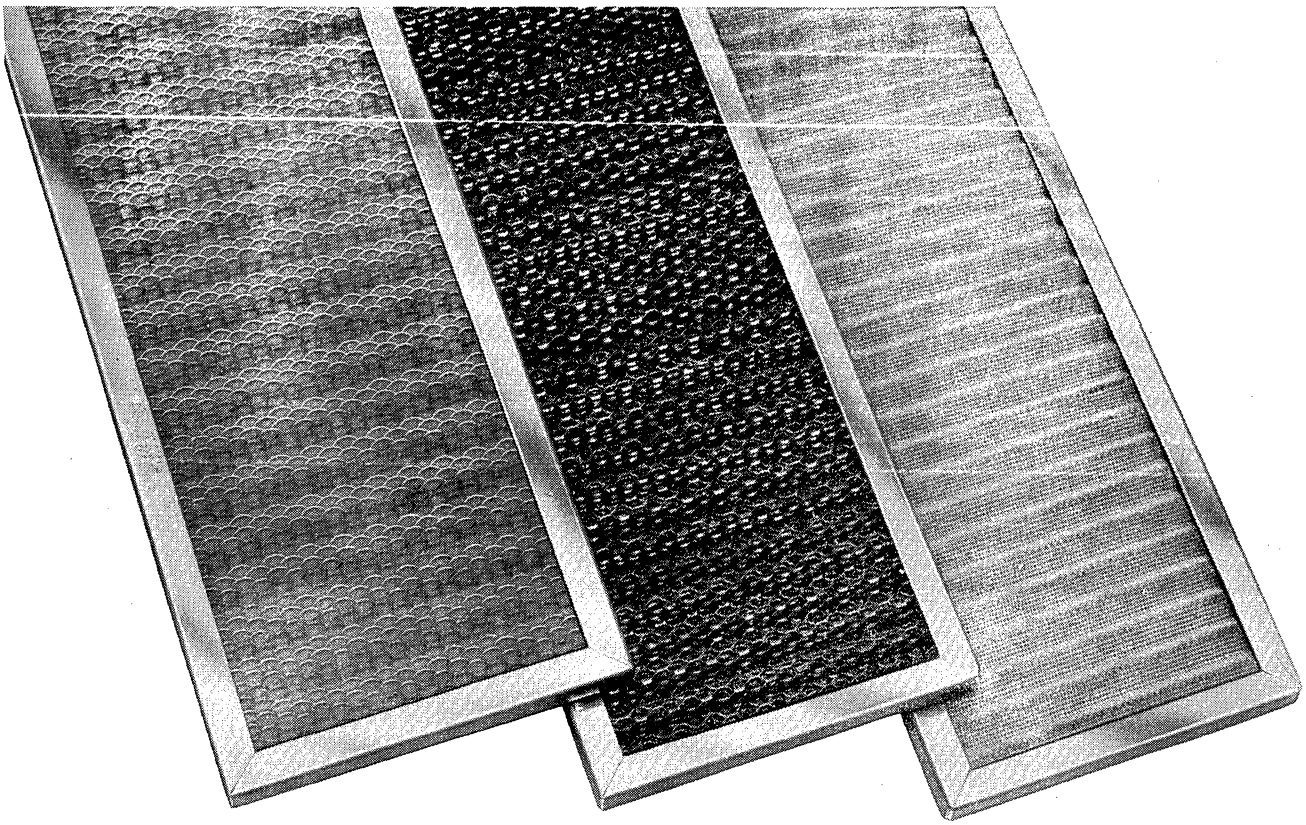
REQUEST FREE APPLICATION BULLETIN #696: "INTRODUCTION TO COOLING UNITS"



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Electro IMPULSE, INC.
116 CHESTNUT STREET • RED BANK, NEW JERSEY 07701
TELEPHONE: 201 - 741-0404 • TWX No. 710-722-5767

SEE OUR OTHER PRODUCTS ON PAGES 450, 603

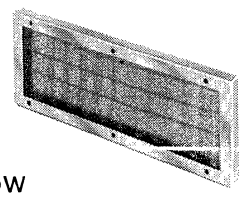


EVANS air filters

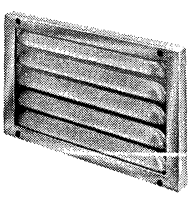
for Electronic Cabinet Application

. . . used on Computers . . . Card Readers . . . Tape Transports . . . Transceivers . . . Power Supply Units . . . both large and small cabinetry. Evans Air filters are permanent. Rigid. Aluminum. Made to withstand the brutal abuse of military field conditions. Frames have mitered corners for smooth, close tolerance fit. Die cut, expanded aluminum grids are criss crossed and precision fitted into each filter. Patented Brillo Lock design gives more air delivery with positive cleaning results.

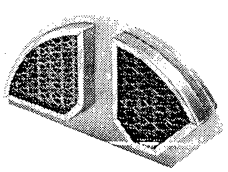
Tolerance:	± 1/32″
Velocity:	200 to 900 FPM
Efficiency:	75% AFI Test
Finishes:	Available in chemical film finish to meet requirements of MIL-C-5541 . . . MIL-F-14072 . . . MIL-A-8625
Sizes:	Filter of 1/2″ or 3/4″ dimension. Made to a maximum area 400 sq. inches . . . with maximum length 25″ on one side without special bracing. For complete information, write or call.



LOW RESISTANCE FILTER
Special serts permit fastening solidly to blower unit. Made for air drop equipment.



LOUVERED FILTERS
For outside application. Louvers protect filter media from water, ice, snow.



HEAVY DUTY UNIT
For rugged military use. Extra rigid frame made from .063 aluminum.

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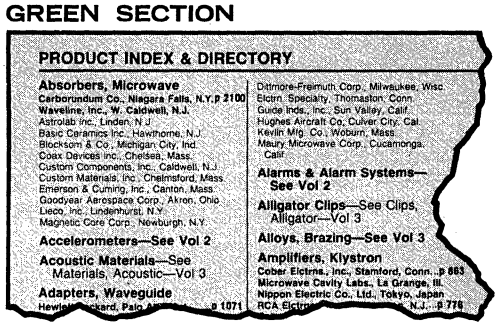
How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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Astrolab Inc., Linden, N.J.
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Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
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Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

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RCA Elctrn. ... N.J. ...p 776

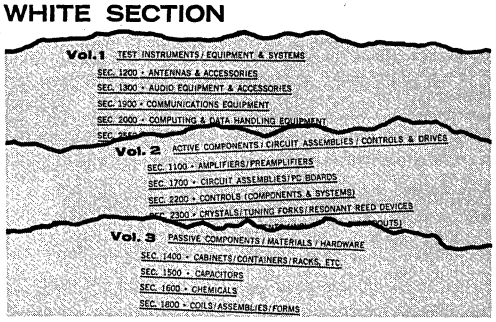
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
SEC. 2[illegible] ...CUITS)

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

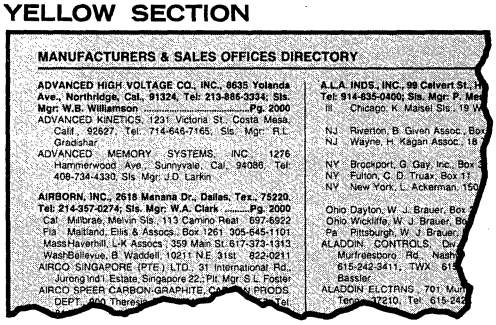
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
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Cal: Millbrae, Melvin Sls., 113 Camino Real, 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St., 617-373-1313
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Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer...
ALADDIN CONTROLS, Dav... Murfreesboro Rd., Nashv... 615-242-3411, TWX 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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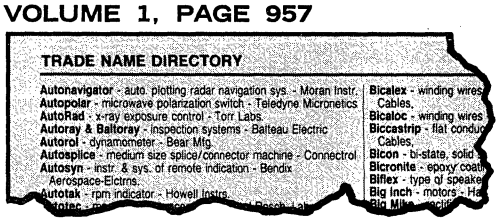
TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible]

Bicalex - winding wires, Cables,
Bicaloc - winding wires,
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid ...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

GLOBE TRW BLOWER & FAN SELECTOR

TRW/Globe offers a wide range of A.C. and D.C. fans and blowers for every cooling need. Many standard models are stocked for 48 hour delivery. And because TRW/Globe is the largest precision motor source, we can move fast to provide engineered specials in prototype or production quantities. Check your needs below. Hundreds of other units available.

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TELEX 288224 CABLE GLODAY

A.C. AND D.C. VANEAXIAL BLOWERS

Curve No.	Type	Dia.	Weight	Power Source	Part No.
1	VAX-1-DC	1⅛″	1.4 oz.	26 v.d.c.	19A1040
2	VAX-1-AC	1⅛″	1.5 oz.	26 v.a.c., 400 cps. 1-phase	19A1173
3	VAX-1.5 AC	1¾″	4.2 oz.	115 v.a.c., 400 cps	19A1233
4	VAX-2-MM	2″	5 oz.	26 v.d.c.	19A907
5	VAX-2-MC	2″	5 oz.	200 v.a.c., 400 cps 3-phase	19A774
6	STAX-3-FC	3″, 1 stage	48 oz.	200 v.a.c., 400 cps 3-phase	19A920
7	STAX-3-FC	3″, 2 stage	28.6 oz.	200 v.a.c., 400 cps 3-phase	19A921
8	STAX-3-FC	3″, 3 stage	29 oz.	200 v.a.c., 400 cps 3-phase	19A922
9	VAX-3-BD	3″	16 oz.	28 v.d.c.	19A827
	VAX-3-GN	3″	16 oz.	115 v.d.c., or 115 v.a.c., 60 cps. 1-phase	19A908
10	VAX-4-FC	4″	2 lbs.	200 v.a.c., 400 cps 3-phase	19A1348
11	VAX-4.5-LC	4 1/16″	5½ lbs.	200 v.a.c., 400 cps 3-phase	19A1350
12	VAX-3-FC	3″	14 oz.	115 v.a.c., 400 cps 3-phase	19A798
13	VAX-4.5-GR	4¾″	4½ lbs.	115 v.d.c., or 115 v.a.c., 60 cps 1-phase	19A832

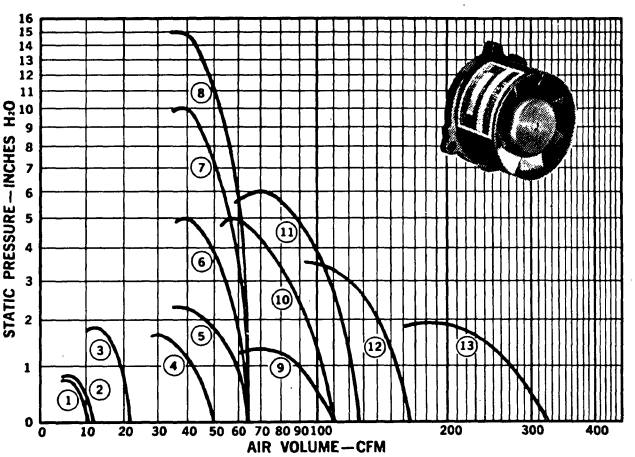
A.C. AND D.C. FANS

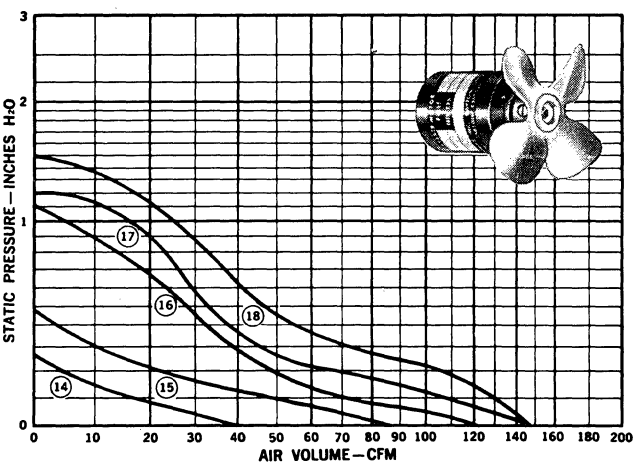
Air volume varies with direction of air flow and type of enclosure.

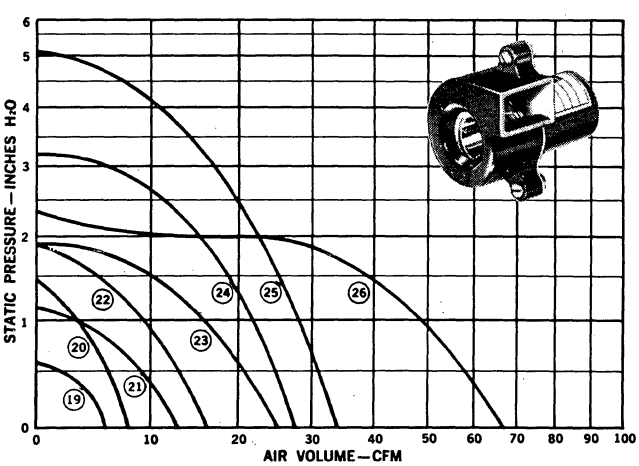
Curve No.	Type	Dia.	Power Source	Part No.
14	FC	3″ fan	115 v.a.c., 60 cps 1-phase	19A643
15	MC	4″ fan	115 v.a.c., 60 cps 1-phase	19A552
15	FC	4″ fan	115 v.a.c., 60 cps 1-phase	19A644
16	FC	4½″ fan	115 v.a.c., 60 cps 1-phase	19A645
17	FC	5½″ fan	115 v.a.c., 60 cps 1-phase	19A647
18	FC	5″ fan	115 v.a.c., 60 cps 1-phase	19A646

A.C. AND D.C. CENTRIFUGAL BLOWERS

Curve No.	Type	Dia.	Power Source	Part No.
19	SS	1″ blower	27 v.d.c.	19A566
20	SC	1″ blower	115 v.a.c., 400 cps 1-phase	19A565
21	MM	1½″ blower	27 v.d.c.	9A589
22	MC	2″ blower	115 v.a.c., 400 cps 1-phase	19A518
23	LL	2″ blower	27 v.d.c.	3A851
24	MC	2½″ blower	115 v.a.c., 400 cps 1-phase	19A532
25	FC	2″ blower	115 v.a.c., 400 cps 3-phase	19A725
26	YC	1½″ blower	115 v.a.c., 60 cps 1-phase	19A1185







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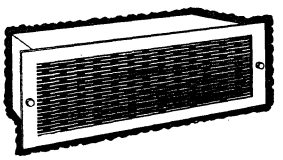
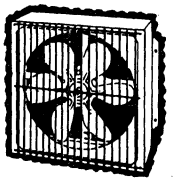


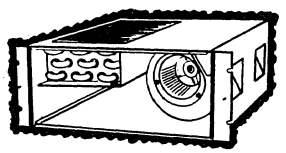
PACKAGED RACK BLOWER

Pressurizes and cools. Removes air pollution. Over 100 models, up to 1000 CFM. Commercial. Mil-Spec. EMI Shielded.



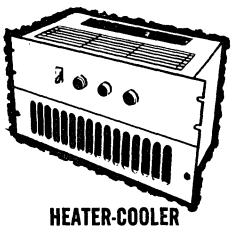
PACKAGED FAN (REVERSIBLE)

Low cost. Minimum space. Shallow depth. Pressurizes or exhausts. Four models, to 1200 CFM. Commercial. Mil-Spec. EMI Shielded.



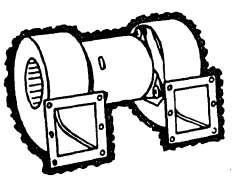
HEAT EXCHANGER

Maintains cabinet at 80°F max. with 1 KW heat dissipation. Air recirculates in rack and is cooled by exchanger in blower case.



HEATER-COOLER

For field installations, unheated military huts, unattended control stations. Maintains even 65°F with surrounding air as low as 10°F.

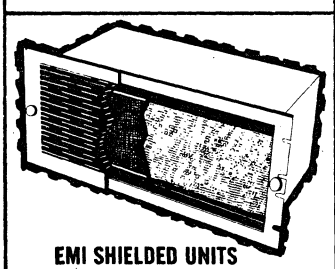


CENTRIFUGAL BLOWER

Single or dual. For spot cooling or pressurizing. 10 to 1000 CFM. Exhaust in any position. Commercial and Mil-Spec.

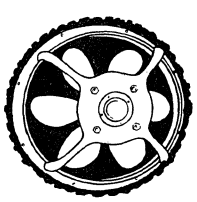
VENTURI-MOUNTED FAN

Rugged economy. 420 CFM, push or pull. Mounts top, bottom, or side. No vibration. Quiet. Commercial or Mil-Spec.



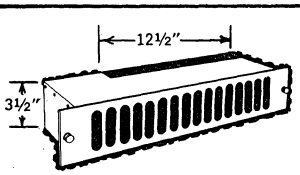
EMI SHIELDED UNITS

Cuts signal leakage either inward or outward.



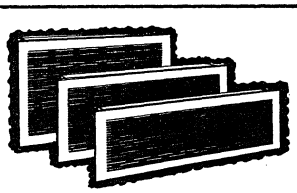
ORIFICE FAN — PANEL FAN

Extra-low-cost cooling. Up to 550 CFM. Strong, quiet, vibration-free. Easy to install. Life lubrication.



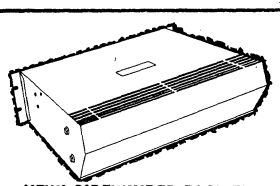
SLOT BLOWER

Ideal for densely packed circuitry. Fits 3½" panel slot. Forces narrow air slot (12½" wide) into cabinet. 150 CFM. Quiet.



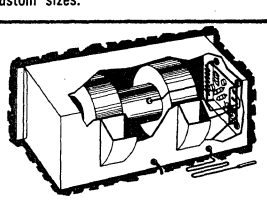
FILTER-GRILLE PANEL

Self-contained. Easy to install. Provide more exhaust louver area for improved air discharge. Washable filter. Standard or custom sizes.



NEW! SIDEWINDER BLOWER

More air! Higher pressure! Quieter! Uses less space! Provides 17-inch-wide airstream in a 19-inch rack! Three models — 3½", 5¼", 7" deliver 180, 350, 515 CFM.

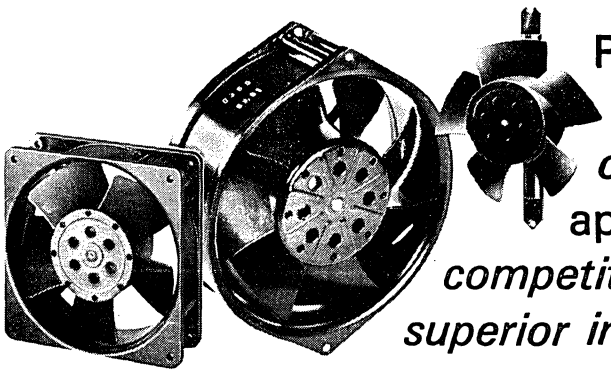


SOLID-STATE TEMPERATURE CONTROLLER

Cuts audible noise level. Modulates blower speed! Keeps equipment operating between 80-90°F. More reliable than air conditioning—but costs less.

PAMOTOR

FANS, BLOWERS, ACCESSORIES



Pamotor designs give every equipment designer and user the *optimum cooling* device for his application, at a *thoroughly competitive price*—and they are *distinctly superior in seven important ways . . .*

• ALL-METAL CONSTRUCTION • EASIER MOUNTING • LOWER NOISE • IMPROVED SHAPE FACTOR •
• REDUCED ELECTROMAGNETIC FIELD • LOWER OPERATING TEMPERATURE • LOWER COSTS •

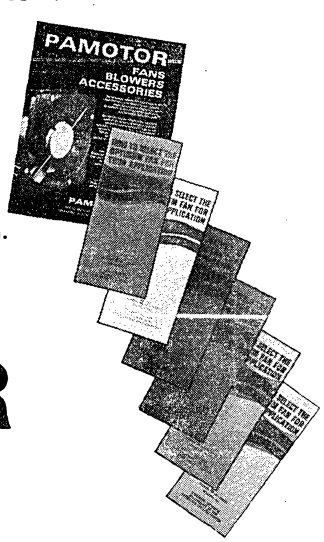
. . . that add up to FAR GREATER RELIABILITY.

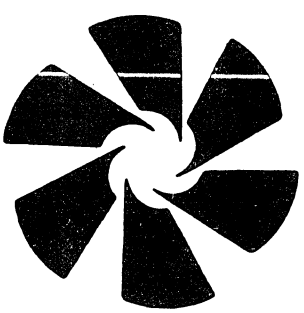
CFM*	SIL** (dB)	Dimensions (inches)	Series (S) or Model (M)	NOTES
General-Purpose Fans (24 models)†				
43	28.8	3-1/8 x 3-1/8 x 1-1/2	8500 (S)	Ultra-compact.
65	***	3-1/2 x 3-1/2 x 2	3000 (S)	Adjustable speed, high air flow.
70	18.0	4-1/2 x 4-1/2 x 1-1/2	4800 (M)	Low speed, virtually noiseless. Ideal for Hi/Fi, Stereo, TV, medical and office equipment.
105	39.6	4-1/2 x 4-1/2 x 2	1500 (S)	High performance, low noise, low cost.
115	37.5	4-1/2 x 4-1/2 x 1-1/2	4500 (S)	Low cost, low noise.
115	43.0	4-1/2 x 4-1/2 x 2	2500 (S)	Low cost, many uses.
125	43.0	4-1/2 x 4-1/2 x 2	1000 (S)	For lab and office equipment, communications, sound, industrial control systems.
130	39.8	4-1/2 x 4-1/2 x 1-1/2	4600 (M)	Handles 30% higher back pressure than conventional 4½" designs.
130	43.0	4-1/2 x 4-1/2 x 2	2000 (S)	Highest free air delivery in 4½" designs.
250	40.6	6 diameter x 2	7500 (S)	For large enclosures with high resistance to air flow. Replaces 2 smaller fans or one 7"–10" conventional design.††
High-Temperature Operation (7 ball-bearing models)†				
43	28.8	3-1/8 x 3-1/8 x 1-1/2	8506 (S)	20,000 hours @ 85°C.
115	37.5	4-1/2 x 4-1/2 x 1-1/2	4506 (S)	20,000 hours @ 85°C.
135	50.0	4-1/2 x 4-1/2 x 2	2110 (M)	400Hz high-temperature operation.
250	40.6	6 diameter x 2	7506 (S)	20,000 hours @ 85°C.
400Hz Operation (2 models)†				
110	50	4-1/2 x 4-1/2 x 2	1110 (M)	Axial design for airborne equipment.
135	50	4-1/2 x 4-1/2 x 2	2110 (M)	Ball-bearing design for high temperature.
No Venturi Housing (4 models)†				
35	22	3 diameter x 1-1/2	8700 (M)	Mounts on 4" bracket.
65	37	4-1/8 diameter x 1-1/2	4700 (S)	Saves space and weight.

*CFM — Cubic Feet per Minute **SIL — Speech Interference Level *** Low noise level of Series 3000 varies with fan speed selected.
†Ratings shown are at 115V, 60Hz unless specified otherwise. Most series include models for 220V and 50-60Hz.
††Series 7500 will deliver 200CFM at 0.2" water back-pressure.
Flanges available for replacing 7" and 10" conventional designs with these superior fans.

Premium Grade PENTAFLOW™ Series — 5-Year Warranty
Special models in Series 4500, 4600, and 8500 available at slightly higher prices than comparable standard models.

Send For Valuable Technical Literature — Free
12-page Short-Form Catalog contains performance data and mechanical specifications for the complete PAMOTOR line. Our six applications monographs, Nos. 7041–7046, on "How to Select the Optimum Fan for Your Application," contain comprehensive data on each of the six major factors involved in cooling system design and fan application.





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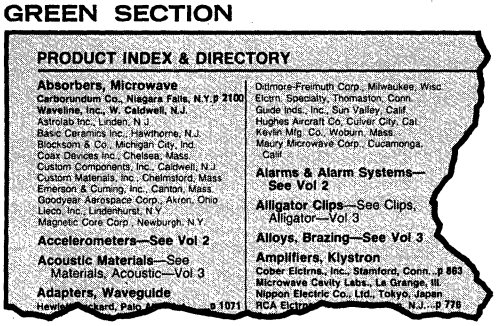
How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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Astrolab Inc., Linden, N.J.
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Blochsom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
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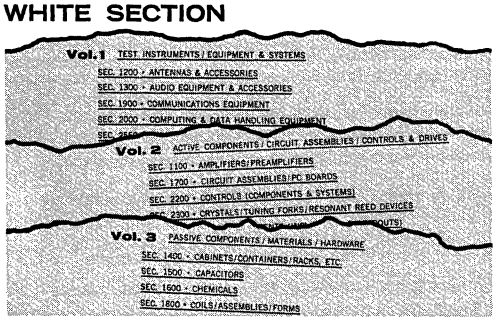
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
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SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

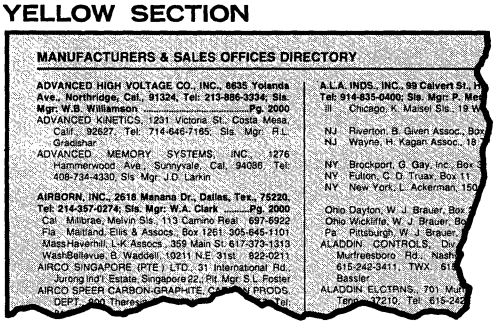
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324. Tel: 213-886-3304; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627. Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086. Tel: 408-734-4330; Sls Mgr: J.D. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220. Tel: 214-357-6274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal.: Millbrae, Melvin Sls., 113 Camino Real 697-6922
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NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C.D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W.J. Brauer, Box...
Ohio: Wickliffe, W.J. Brauer, Box...
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ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411, TWX 61... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210. Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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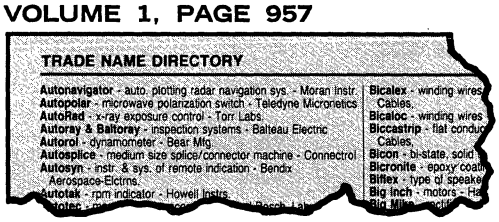
TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace Electrns.
Autotak - rpm indicator - Howell Instrs.
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat conduc Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big inch - motors - He

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

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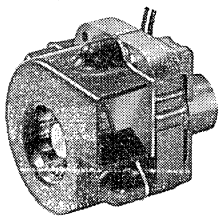
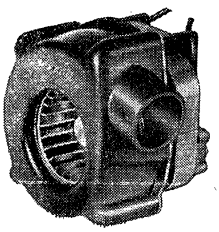
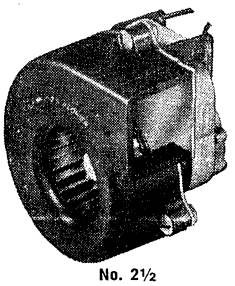
SPACE-SAVING *Precision Bearing* MOTOR-BLOWERS



No. 1½



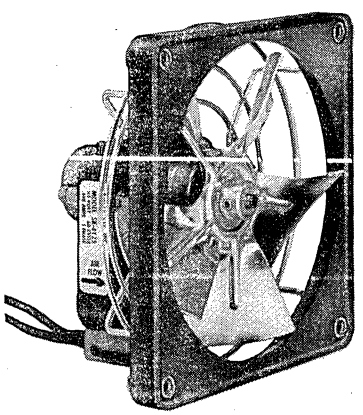
No. 2



No. 2½

A new line of compact Motor-Blowers are now available with air deliveries ranging from 5 to 19 cfm free air output. Designed to fill the requirements where space is a problem and a minimum of 5-year maintenance free performance is imperative. The precision bearing "power-pac" motor with permanent sealed-in lubrication requires no oiling and operates at an extremely low noise level. The unit can be mounted in any position. The low input wattage required is a cost saving factor of particular advantage ir multiple installations.

MODEL NUMBER	TYPE	INPUT VOLTAGE	WATTS	DUTY CYCLE	RPM	OUTPUT FREE AIR CFM	DIMENSIONS H x W x D	LIST PRICE
UK-1500	1½	115 V. AC-60 Cycle	7.5	Continuous	3400	5	2 15/16" x 3 5/8" x 3 1/16"	$10.17
UK-2000	2	115 V. AC-60 Cycle	7.5	Continuous	3300	10	3¾" x 3½" x 3¼"	$10.27
UK-2500	2½	115 V. AC-60 Cycle	8	Continuous	3250	19	4⅜" x 3⅞" x 3¼"	$10.40



GUARANTEED FOR FIVE YEARS

AXIAL FAN

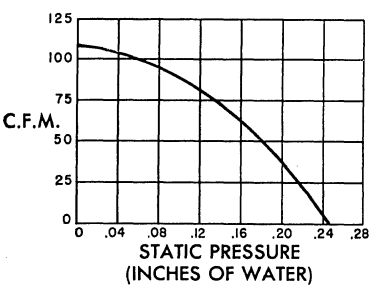
108 CFM CAPACITY

THE BIG VALUE IN RUGGEDNESS
COMPACTNESS & HIGH EFFICIENCY

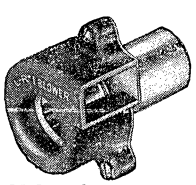
SPACE SAVING DESIGN

MODEL SK-4125

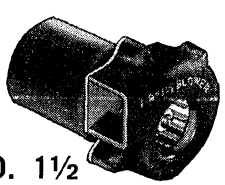
108 CFM Axial Fan designed for electronic and instrumentation cooling. Guaranteed for Five Years — (upon approval of application). Mounts on 4⅛" square — vertical or horizontal operating position. Permanently sealed-in lubrication — maintenance free. Overall mounting plate size is 4 1/16" square and depth is 3 1/16".



L-R MOTOR & BLOWER ASSEMBLIES



NO. 1



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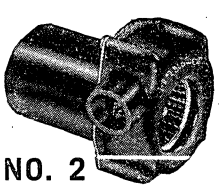

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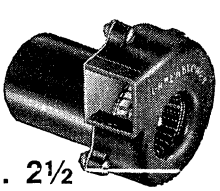

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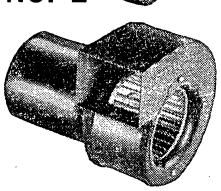

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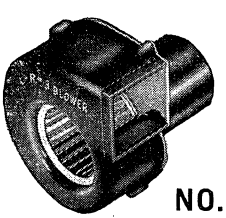

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CUSTOM ENGINEERED

to meet your exact application requirements

Laboratory facilities have been expanded to provide enginering service when it's the most valuable — in the initial stages of your new design application.

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for immediate delivery

Ripley offers a full line of air-moving units, axial fans, motor-blower assemblies, precision-bearing blowers. Write for price list and free catalog.

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Division of INSTRUMENT SYSTEMS CORPORATION
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BLOWERS

FEATURES: ● 50-60 or 400 Hz ● Variable or Dual frequency ● 1 or 3 phase ● BRUSHLESS DC ● up to 440 Volts AC ● Superior performance ● greater efficiency ● Rugged construction ● Permanently lubricated for long life ● Dynamically balanced ● Quality controlled per MIL-Q-9858 ● Meet or exceed MIL & UL specifications ● Ambient temperature range: -55 degrees C to +125 degrees C and up ● High Altitude ● Versatile mounting and adaptors ● Operate in any position ● Compact ●

TYPE F400

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B400-1	50/60	1	115	1.0	0.22	25	3200	49	4.53	6.45	6.04
B400-2	50/60	1	115	1.0	0.5	50	3150	88	6.40		
B400-3	50/60	3	200	--	0.2	64	3300	125	7.00		
B400-4	400	1	115	1.0	0.95	85	3600	100	6.28		
B400-5	400	3	208	--	0.8	110	5450	93	5.40		
B400-6	400	3	208	--	1.5	260	5650	265	7.59		
DOUBLE BLOWER											
B400-7	50/60	1	115	4.0	0.50	55	3400	115	8.00		
B400-8	50/60	3	208	--	0.45	120	3400	280	12.56		
INVERTED											
B400-9	50/60	1	115	1.0	0.38	40	3300	75	4.47		
B400-10	50/60	3	208	--	0.28	35	3300	75	4.47	6.45	6.04

INVERTED TYPE B600 (NOT SHOWN)

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B600-1	60	1	115	2.5	2.0	210	3000	200	6.31	9.70	8.66
B600-2	60	1	208	2.5	1.1	210	3000	200	6.31		
B600-3	60	3	208	--	0.9	300	3000	300	6.31		
B600-4	60	3	200	--	0.22	56	1600	175	4.75	9.70	8.66

TYPE B3500 (NOT SHOWN)

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B3500-1	50/60	1	115	1.0	0.45	50	3300	85	5.19	6.85	6.26
B3500-2	50/60	1	115	2.5	0.69	72	3300	248	7.91		
B3500-3	50/60	1	208	2.0	0.75	90	3200	175	6.13		
B3500-4	50/60	3	208	--	0.26	75	3300	180	6.13		
B3500-5	400	1	115	4.0	1.4	140	5300	140	5.57		
B3500-6	400	1	115	1.0	1.5	120	3500	185	6.63		
B3500-7	400	1	115	1.0	1.5	120	3500	240	7.91		
B3500-8	400	3	208	--	0.85	100	3750	100	5.06		
B3500-9	400	3	208	--	1.25	160	3750	255	7.91	6.85	6.26

TYPE B500 (NOT SHOWN)

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B500-1	50/50	1	115	4.0	1.0	120	3200	160	6.65	7.78	7.22
B500-2	50/60	1	115	2.5	2.0	220	3100	255	9.16		
B500-3	50/60	1	208	4.0	0.6	125	3200	160	6.65		
B500-4	50/60	1	208	2.5	1.2	220	3250	155	9.16		
B500-5	50/60	3	208	--	0.8	110	3250	160	6.65		
B500-6	50/60	3	208	--	1.2	190	3250	265	9.16		
B500-7	400	3	208	--	1.25	220	3600	180	6.65		
INVERTED											
B500-8	50/60	1	115/230	4.0	1.0	110	3200	155	5.17		
B500-9	50/60	1	115	2.0	0.30	30	1700	77	4.94		
B500-10	50/60	3	208	--	0.6	95	3300	152	5.17		
B500-11	400	3	208	--	2.4	190	3700	174	5.17	7.78	7.22

TYPE B2500

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B2500-1	50/60	1	115	1.0	0.11	10	3400	23	3.32	3.72	4.19
B2500-2	50/60	1	115	1.0	0.12	11	3300	23	4.08		
B2500-3	50/60	3	208	--	0.06	12	3400	21	3.44		
B2500-4	400	1	115	0.5	0.45	46	7500	50	3.94		
B2500-5	400	1	115	0.05	0.3	30	5000	33	4.08		
B2500-6	400	3	208	--	0.20	38	7500	50	3.94		
B2500-7	320 - 1000	1	115	1.25	0.8	80	7200	45 min.	4.29	3.72	4.19

TYPE B4500

ELECTRICAL								AIR	DIMENSIONS		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	W	H
B4500-1	50/60	1	115	2.5	1.8	200	3200	290	7.97	8.72	7.81
B4500-2	50/60	3	208	--	1.3	215	3200	340	8.53		
B4500-3	50/60	3	115	--	1.5	260	3100	390	9.03		
B4500-4	50/60	3	115	--	1.8	310	2950	455	9.72		
B4500-5	50/60	1	115	2.0	0.35	35	1650	150	6.41		
B4500-6	50/60	1	115	4.0	0.7	75	1700	240	7.97		
B4500-7	400	3	208	--	2.6	175	3700	170	5.81	8.72	7.81

ROTATION & BLAST CCW rotation - 12 o'clock is standard: CCW & CW rotation and any of eight blasts available. Specify desired rotation and blast required

OPTIONAL ACCESSORIES

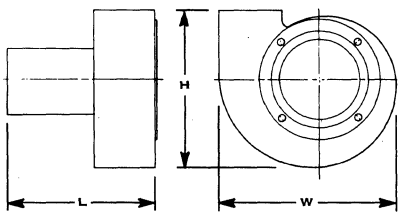
OUTLET { Flange, Ductclamp
INLET { Screen, Rim with Clamp, Cone

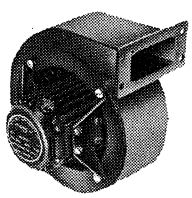
HOW TO ORDER OR INQUIRE

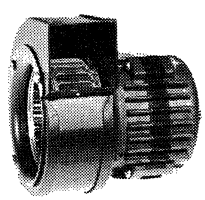
START with type design No. *(this is not a part No.)

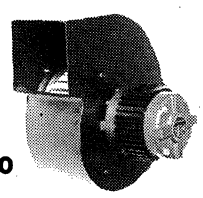
ADD Ambient temperature - Min. and Max. Optional accessories you require. Special environmental conditions. For modified or custom design, send your specs.

SEND to or call RC for quotation, drawing and part No.




F400


B2500


B4500

ROTATING COMPONENTS
Division of INSTRUMENT SYSTEMS CORPORATION
1560 FIFTH AVE., BAY SHORE, N.Y. 11706
(516)-666-8500 TWX-516-666-7047

FANS

FEATURES: • 50-60 or 400 Hz • Variable or Dual frequency • 1 or 3 phase • BRUSHLESS DC • up to 440 Volts AC • Superior performance • greater efficiency • Rugged construction • Permanently lubricated for long life • Dynamically balanced • Quality controlled per MIL-Q-9858 • Meet or exceed MIL & UL specifications • Ambient temperature range: -55 degrees C to +125 degrees C and up • High Altitude • Versatile mounting and adaptors • Operate in any position • Compact •

TYPE F300 (NOT SHOWN)

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F300-1	50/60	1	115	1	0.1	9	3300	40	3.00	4.25	3-.169
F300-2	50/60	3	208	--	0.06	10	3500	32	2.86	↓	Dia.
F300-3	60/400	1	115	1	.12/.35	12/25	3000	35	3.00	↓	holes
F300-4	400	1	115	1	0.15	25	11000	100	3.25	↓	equally
F300-5	400	3	200	--	0.15	23	11000	100	2.59	4.25	spaced

TYPE F700

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F700-1	50/60	1	115	4	0.5	58	3300	500	5.94	8.38	8-.156
F700-2	50/60	1	115	4	0.5	58	3300	500	5.94	↓	Dia.
F700-3	50/60	1	115	4	1.0	90	3300	600	5.94	↓	holes
F700-4	50/60	3	208	--	0.3	40	3300	500	5.00	↓	equally
F700-5	50/60	1	115	2	0.45	45	1700	250	5.00	↓	spaced
F700-6	400	1	115	1	1.25	95	3700	550	5.75	↓	↓
F700-7	400	3	208	--	1.00	106	3700	550	5.10	8.38	↓

TYPE F4500

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F4500-1	50/60	1	115	1	0.08	9	3300	110	2.94	6.00	3-.193
F4500-2	50/60	1	115	0.5	0.06	7	1700	58	2.94	↓	Dia.
F4500-3	50/60	1	230	1	0.05	10	3200	105	2.94	↓	holes
F4500-4	50/60	3	115	--	0.27	16	3500	120	3.44	↓	equally
F4500-5	50/60	3	208	--	0.06	13	3400	115	2.94	↓	spaced
F4500-6	50/60	3	208	--	0.07	11	1750	60	3.44	↓	↓
F4500-7	60/400	1	115	1	0.39	26	3350	115	4.44	↓	↓
					0.57	63	3500	120		↓	↓
F4500-8	400	1	115	1	0.5	60	7000	240	4.44	↓	↓
F4500-9	400	3	200	--	0.28	72	7100	250	3.44	↓	↓
F4500-10	400	3	200	--	0.27	50	6000	225	4.44	6.00	↓

TYPE F6500

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F6500-1	50/60	1	115	1	0.21	24	3300	300	3.88	8.50	6-.180
F6500-2	50/60	1	115	2	0.20	23	1700	160	3.88	↓	Dia.
F6500-3	50/60	3	208	--	0.20	23	3300	305	3.88	↓	holes
F6500-4	50/60	3	115	--	0.22	23	3300	305	3.88	↓	equally
F6500-5	400	1	115	1	0.77	66	3800	350	4.94	↓	spaced
F6500-6	400	3	208	--	0.83	75	3900	360	4.94	↓	↓
F6500-7	400	3	208	--	0.78	90	5600	500	4.94	8.50	↓

TYPE B400 (NOT SHOWN)

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F400-1	50/60	1	115	1	0.08	9	3450	85	2.91	5.50	3-.193
F400-2	50/60	3	208	--	0.06	12	3450	85	2.91	↓	Dia.
F400-3	60/400	1	115	0.5	0.24	21	3200	80	3.41	↓	holes
					0.20	36	3700	100		↓	equally
F400-4	400	1	115	0.5	0.50	46	7500	180	3.41	↓	spaced
F400-5	400	3	115	--	0.40	38	7500	180	3.41	↓	↓
F400-6	400	3	200	--	0.22	53	8500	210	3.41	5.50	↓

TYPE F800 (NOT SHOWN)

ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F800-1	50/60	1	115	2	1.6	60	3300	500	6.25	10.00	8-.180
F800-2	50/60	1	115	3	0.55	65	3300	630	6.25	↓	Dia.
F800-3	50/60	1	115	4	1.0	120	3300	810	6.75	↓	holes
F800-4	50/60	1	115	2.5	1.5	170	3300	1000	7.88	↓	equally
F800-5	50/60	1	115	2	0.3	25	1700	260	4.69	↓	spaced
F800-6	50/60	1	115	2	0.3	25	1700	330	4.69	↓	↓
F800-7	50/60	1	115	2	0.35	30	1700	400	4.69	↓	↓
F800-8	50/60	1	115	2	0.45	45	1700	500	4.69	↓	↓
F800-9	50/60	3	208	--	0.6	85	3300	800	6.75	↓	↓
F800-10	50/60	3	208	--	0.75	130	3300	950	6.75	↓	↓
F800-11	400	1	115	1	1.25	95	3800	540	6.25	↓	↓
F800-12	400	1	115	1	1.2	125	3800	740	6.75	↓	↓
F800-13	400	3	208	--	1.0	150	3800	780	6.75	↓	↓
F800-14	400	3	208	--	1.6	210	3800	900	7.88	↓	↓
F800-15	400	3	208	--	3.7	680	5600	1650	7.88	10.00	↓

TYPE F5500

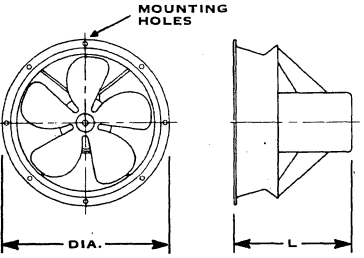
ELECTRICAL								AIR	MOUNTING		
Type Design No.	Freq. Hz	Ph.	Volts	Cap. Mfd.	Nom. Amps	Nom. Watts	Nom. RPM	CFM@ 0" SP	L	Dia.	Hdware
F5500-1	50/60	1	115	1	0.18	20	3450	180	3.63	7.50	6-.180
F5500-2	50/60	1	115	2	0.5	40	3350	315	4.63	↓	Dia.
F5500-3	50/60	1	115	1	0.20	23	1750	95	3.63	↓	holes
F5500-4	50/60	3	115	--	0.20	16	3450	180	3.63	↓	equally
F5500-5	50/60	3	208	--	0.20	16	3450	180	3.63	↓	spaced
F5500-6	50/60	3	208	--	0.06	11	1750	95	3.63	↓	↓
F5500-7	400	1	115	1	0.55	65	6400	315	4.88	↓	↓
F5500-8	400	3	200	--	0.29	56	5500	290	4.88	7.50	↓

HOW TO ORDER OR INQUIRE

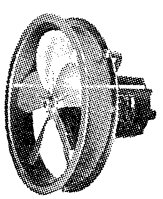
START with type design No. *(this is not a part No.)

ADD Air Flow direction A← or B→. Ambient temperatures - Min. and Max. Optional accessories you require. Special environmental conditions. For modified or custom design, send your specs.

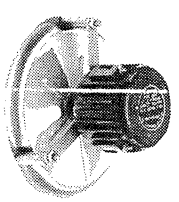
SEND to or call RC for quotation, drawing and part No.



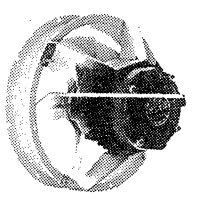
(AIR FLOW) A ⬅ ➡ B



F700



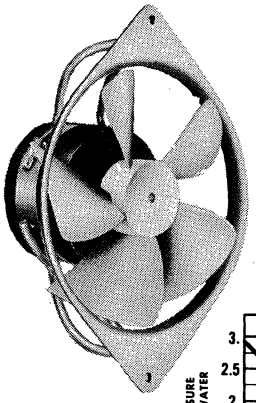
F4500

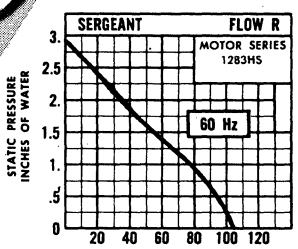


F5500
F6500

SYNCHRONOUS MOTORS • TACHOMETER GENERATORS • BLOWERS • BRUSHLESS DC BLOWERS • INDUCTION GENERATORS • P.M. GENERATORS
INDUCTION MOTORS • FANS • BRUSHLESS DC MOTORS • DRAG CUP MOTORS • PRECISION GEAR MOTORS • TORQUE MOTORS • SERVO MOTORS

sergeant T.M. FAN





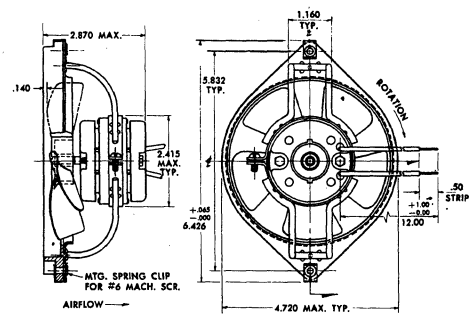
The Sergeant fan joins the famous Muffin and Skipper fans to form a family of three general purpose, commercial flushing fans in a choice of three price ranges. While the Sergeant fan is extremely low in price, it is reliable and ideally suited for cooling electronic equipment. The fan measures $4\frac{11}{16}$" by $2\frac{3}{4}$" in depth.

The Sergeant is available for either direction of airflow. It may be quickly mounted using two mounting holes which fit the industry's standard 4.125" square hole layout. Mounting in any attitude is permissible and there is a choice of mounting directly to the panel wall where the impeller may extend beyond the panel or flush mounting by including a venturi spacer.

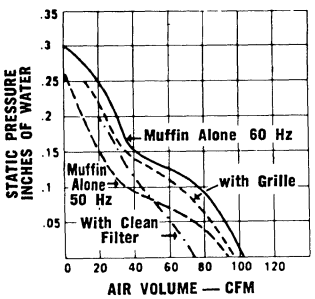
This fan is suitable for ambients up to 130°F (55°C) and has a design life of five years at 75°F (25°C) without maintenance. The fan is impedance protected and satisfies U.L. requirements. The sound interference level is a low 43 db at free delivery. The Sergeant draws watts. Electrical connection is made to 12" long 18 gauge leads.

The mounting spiders are formed steel wire, bright zinc plated. The venturi is cold rolled steel, bright zinc plated. The venturi spacer and the impeller are injection molded acetal resin thermoplastic.

For 115 vac, 50-60 Hz. Weight



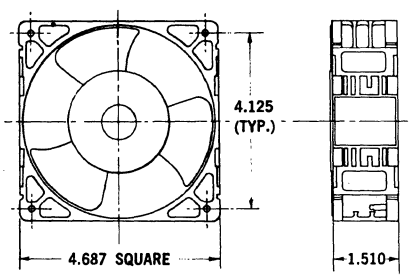
muffin® fan



The Muffin Fan is the most reliable commercial tubeaxial fan available. The Muffin Fan can be expected, with a 90% survival rate, to operate up to 10 years at room temperature. Installed in equipment, it minimizes component derating, increases the life expectancy of the equipment and assures top performance. Ultra-long-life bearings are precisely aligned for vibration-free operation. Encapsulated motor winding adds years to life of unit. Molded in bus-bar motor leads. Completely integrated design of motor, blades, optional venturi, grille and filter in a performance matched assembly. The Muffin Fan is designed for 115 VAC, 50-60 Hz, 1 Phase applications. Models for 230 VAC are also available. It has UL yellow card component recognition. File No. E-31293.

WEIGHT 1.0 POUND

MOUNTING HOLE DIMENSIONS 4.125"



For Further Information Request Catalog Sheet E-2820

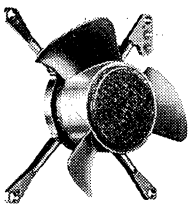
ROTRON® INCORPORATED

WOODSTOCK,
NEW YORK 12498
TEL: 914 679-2401

PACIFIC DIVISION 1912 WEST BURBANK BOULEVARD, BURBANK, CALIFORNIA 91506
TEL: 213 849-7871

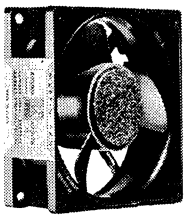
Sentinel, Muffin, Whisper, and Centaur Fans

AVAILABLE IN 4 VERSIONS



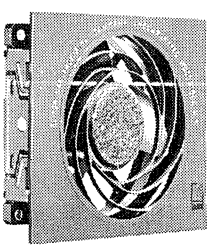
"SKELETON FAN"

Consists of a motor-driven propeller with 4 mounting arms containing molded-in leads. It can be mounted as an air-stirring device among hot components or can be mounted in a round, sharp-edged or bellmouth aperture in the equipment enclosure.



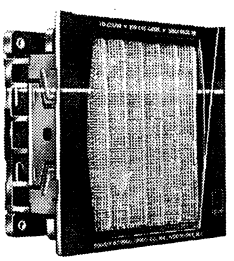
"VENTURI FAN"

An assembly of the "SKELETON FAN" mounted in a 4.68" square molded plastic VENTURI BLOCK only 1.50" thick. May be used in either a round or square opening in an equipment panel. Mounting holes are provided on both upstream and downstream sides to permit the fan to push or pull air. It may also be used with the MOUNTING CLIPS described in this folder.



"GRILLE FAN"

The "GRILLE FAN" results from the addition of the GRILLE and MOUNTING CLIPS to the "VENTURI FAN". The "VENTURI FAN" may be mounted against the inside surface of the equipment enclosure and the grille snapped into place from the outside. The grille is an advanced aerodynamic design which minimizes the accumulation of lint and dust, and keeps the acoustical noise level to the minimum while insuring maximum airflow.



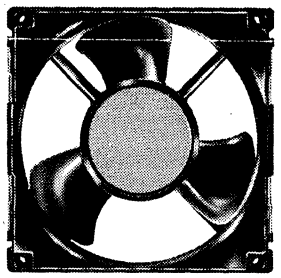
"FILTER FAN"

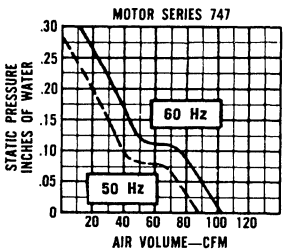
A complete cooling package consisting of matched fan and filter for maximum efficiency. The FILTER BOX locks in place between the GRILLE FRAME and the "VENTURI FAN" adding less than .75" to over-all depth. This unit completely eliminates guess work and risks involved in unmatched fan/filter assemblies. FILTER BOX, GRILLE and MOUNTING CLIPS are also available as separate accessories for existing "VENTURI FAN" installations.

Accessory Items For Sentinel, Muffin, Whisper and Centaur Fans.

Mounting Clips No. 13996 (Set)
Spiral Grille No. 16238
Filter Assembly No. 15449
Filtercoat No. 18440
Finger Guard No. 20132-2
Plug & Cord Assembly No. 16415

Sentinel® FAN

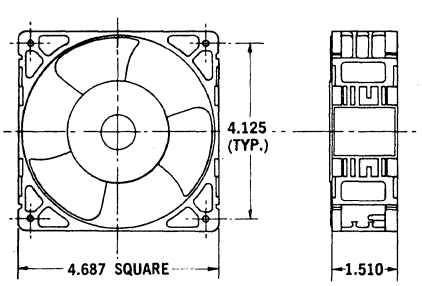




The Sentinel Fan has retained the high air performance, versatility, compact design and low noise level of the Muffin Fan but is designed for the more "rugged" application where the ambient temperature is higher. It is also for the customer that requires long, trouble free life without the requirement for maintenance. The Sentinel Fan may be used in a maximum ambient of 100°C and will withstand greater shock and vibration than the Muffin Fan was designed for. To achieve this design criterion the Sentinel Fan incorporates a glass-filled phenolic venturi block, an encapsulated stator, stainless steel ball bearings and an aluminum heat sink which draws heat from the windings to provide a cool running motor. The Sentinel Fan was designed to meet U.L. approval and has been satisfactorily qualified to MIL-E-4970A. The Sentinel Fan is designed for 115 VAC, 50-60 Hz, 1 Phase applications. Models for 230 VAC are also available.

WEIGHT 1.0 POUND

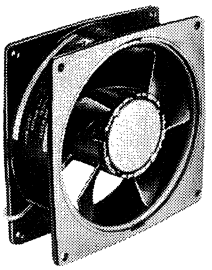
MOUNTING HOLE DIMENSIONS 4.125"

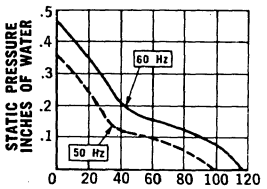


For Further Information Request Catalog Sheet E-2810.

ROTRON® INCORPORATED
WOODSTOCK,
NEW YORK 12498
TEL: 914 679-2401
PACIFIC DIVISION 1912 WEST BURBANK BOULEVARD, BURBANK, CALIFORNIA 91506
TEL: 213 849-7871

SPARTAN FAN



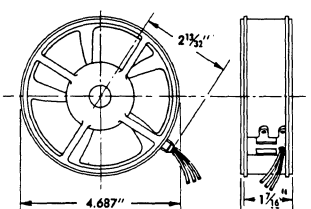


Delivers 115 CFM free delivery for military applications. Dimensions of $4\frac{11}{16}$" square by $1\frac{1}{2}$" in depth make this fan dimensionally interchangeable with the Muffin Fan. Powered by a multi-slot, double-shielded, ball bearing induction motor which is lubricated for life at a maximum ambient of 100°C. Electrical connection is made by means of 12" leads. The Spartan Fan is designed for 115 VAC, 50-60 Hz, 1 Phase and 400 Hz, 1 Phase and 400 Hz, 3 Phase. The Type "R" version contains round mounting rims for use with standard motor mounting clamps. The air-flow direction may be reversed by turning fan end-for-end. The Venturi Ring, spiders and hub are a single aluminum casting suitable for shock and vibration requirements. The Spartan Fan meets applicable military specifications for ground and shipboard use.

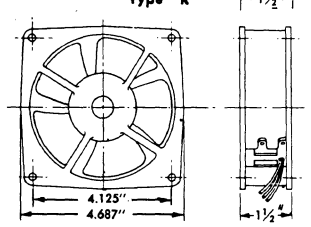
OPTIONAL ACCESSORIES: Terminal Block.
"Synclamps" for Clamping Rim Mtg. Part #24254. (3 Required Per Fan).
"Rever-Synclamps" for Clamping Rim Mtg. Part #14015.(3 Required Per Fan).

WEIGHT 1.0 POUND

MOUNTING HOLE DIMENSIONS 4.125"



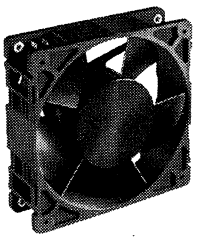
Type "R"



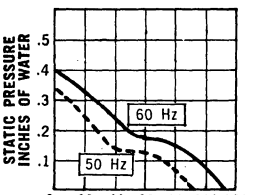
Type "S"

For Further Information Request Catalog Sheet E-2802.

CENTAUR® FAN



Available in 4 Versions



New aerodynamic principles by Rotron permit the new Centaur to achieve greater aerodynamic efficiencies than ever before from axial flow fans — and with low acoustical disturbance and compact size.

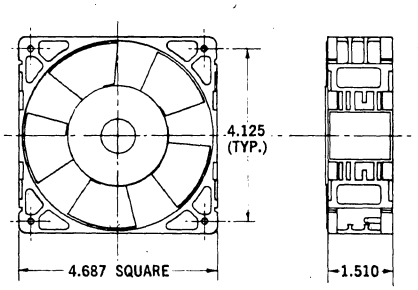
The Centaur with its computer designed five-bladed impeller molded of high impact polycarbonate is precisely matched to a powerful shaded pole motor — available with either oil-impregnated sleeve bearings or precision ball bearings lubricated for life. The recommended operating ambient temperature is −40°C to +55°C with sleeve bearings, and −40°C to +72°C with ball bearings. The motor is mounted to a spider of die cast aluminum which is in turn assembled to a venturi of high temperature resistant black phenolic.

The Centaur will deliver 115 cfm of air, free delivery operating at 115 volts, 60 Hz, or 100 cfm free delivery at 230 volts, 50 Hz making it possible for the design engineer to select a fan to deliver the same cfm on European power sources as Muffin fans or Sentinel fans at 60 Hz power used in the U.S.A.

The Centaur is designed to be physically interchangeable with the Muffin fan or the Sentinel fan.

WEIGHT 1.2 POUNDS

MOUNTING HOLE DIMENSIONS 4.125"



For Further Information Request Catalog Sheet E 2850.

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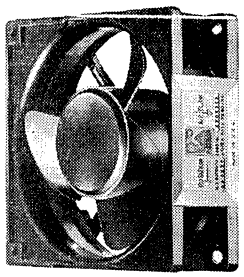
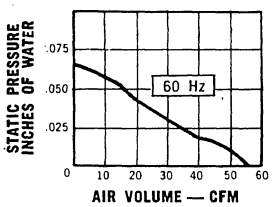
TEL: 213 849-7871

Whisper® Fan



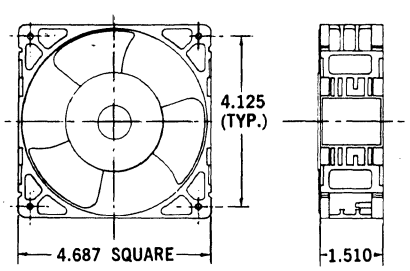
MARK I
Available in 4
Versions



Breathing 55 cubic feet of cool air over, under and around every heat-generating component, the Whisper Fan improves performance of hi-fi equipment, radio-TV receivers and O.E.M. equipments by minimizing drift due to temperature change within the enclosure. So quiet you have to feel the breeze to know it's going. Only 18 db SIL. Also supplied as Whisper Fan Kit complete with special mounting, hardware, plug and cord for electrical connections and detailed instructions. Whisper Fan is designed for 115 VAC only, 50-60 Hz, 1 Phase.

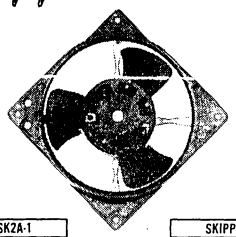
WEIGHT 1.0 POUND

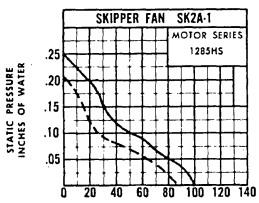
Mounting hole dimensions 4.125"

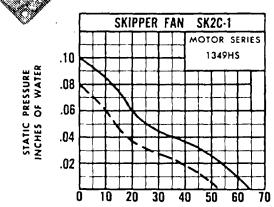


For Further Information Request Catalog Sheet E-2801

Skipper® FAN



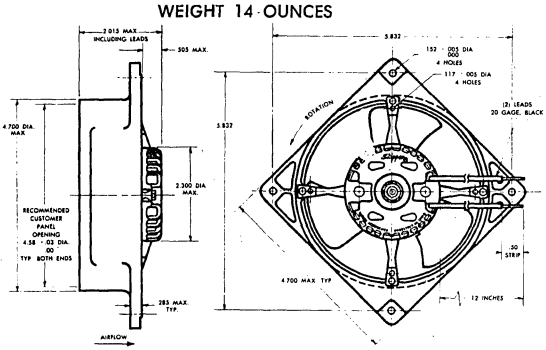




FEATURES

- **Saves installation time**—venturi model needs only two mounting screws
- **Easily reversible air flow**—designed for mounting from either side
- **Mounts easily**—on any panel thickness
- **Powerful**—moves 100 cfm
- **Extra quiet**—35.8 db (SIL); ultra quiet low speed model yields only 25.2 db SIL
- **Thin profile**—2-inch axial depth
- **Compact**—installs in an area less than 4¾-inch square
- **Lightweight**—weighs less than 1 lb.
- **Never needs lubrication** — prelubricated bronze sleeve bearings for 5-year maintenance-free life
- **Cool running** — die-cast zinc motor housing for better heat dissipation
- **Designed for high temperature operation**—provides continuous cooling at temperatures up to 50°C (122°F)
- **Needs no plug or cord**—furnished with 12-inch leads
- **Meets UL Class "A" Insulation Specs.**
- **Impedance protected**
- **Immediate delivery**—both venturi and skeleton models in stock for fast delivery

WEIGHT 14 OUNCES



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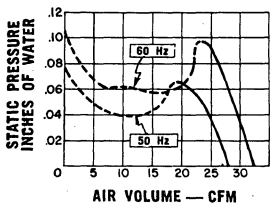
TEL: 213 849-7871

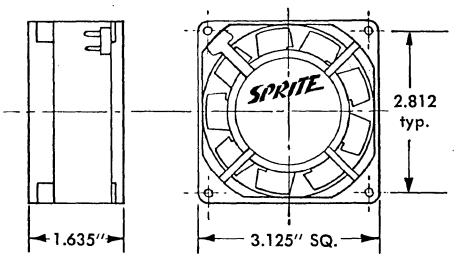
SPRITE® FAN



The Sprite fan has been designed especially for commercial cooling applications in low-profile electronic equipment, where size and reliable LOW COST performance are the important requirements.

It is only 3⅛" square, still, this rugged little fan with its nine-bladed propeller delivers 33 cfm — tailored to produce high pressure at the ranges approaching free delivery. (See Curve)

WEIGHT 14 OUNCES

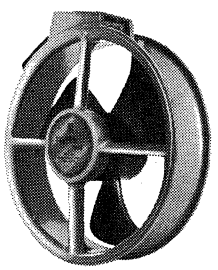


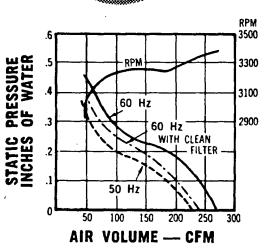
Review these important features:

- Small—only 3⅛" square.
- Peppy—delivers 33 cfm.
- Reversible air flow—Simply turn fan end-for-end.
- Impedance protected.
- Designed to meet UL requirements.
- Designed to operate in temperature up to 140°F (60°C).
- Quiet—only 35 db SIL.
- Long life—up to five years.

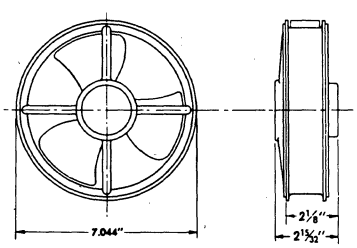
FEATHER® FAN

For Further Information Request Catalog Sheet E-3001





The Feather Fan delivers 270 CFM for flushing computer consoles, power supplies, heat exchangers and electronic control equipment that can spare little room for a cooling device. The fan's depth dimension of only 2 15/32" x 7" diameter imposes little space displacement on the system to be cooled. The Feather Fan is constructed of high-impact polycarbonate plastic which is resistant to extreme temperatures and boasts outstanding dimensional stability. The fan is powered by multi-slot induction motor that incorporates prelubricated stainless steel ball bearings for an ambient temperature range of −55°C to +65°C. 115 VAC, 50-60 Hz, 1 phase. A capacitor is provided which is mounted on the fan venturi. The electrical connection is made to tinned brass terminals and a mating plug and cord is available. The fan is provided with clamping rims for easy mounting and the airflow is reversible by turning the fan end-for-end. A matched filter box #17785 which is permanent, nonloading and washable is optional as are fan guards.



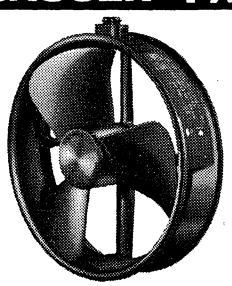
WEIGHT 1.5 POUNDS

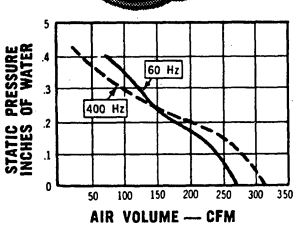
OPTIONAL ACCESSORIES:
Rim Guard #14559.
Panel Guard #14651.
Plug & Cord #16398.
Filter Box #17785
Mounting Clamp #16410 (3 required per fan).
Panel Mount Guard Clip #14611 (3 required per guard).
Rotron Filtercoat #18440.

Also available to meet MIL-B-23071/1/. Please Inquire.

SAUCER® FAN

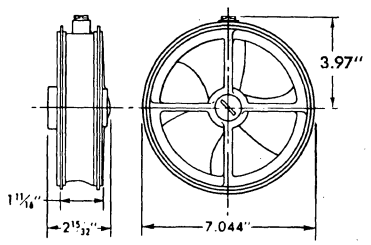
For Further Information Request Catalog Sheet E-3000





The Saucer Fan is ideally suitable for integration into modern electronic packages requiring 270 CFM of cooling air. Its axial length or thickness is strictly limited to the minimum measurement required by a highly efficient propeller, with no further space sacrificed for the driving motor. In other words, **"It is all fan"**. Airflow is reversible by turning the fan end-for-end. Clamping rims at each end of venturi provide easy mounting. Electrical connections are made to a compact terminal block. The Saucer Fan meets applicable military specifications for ground equipment.

A 400 Hz version is also available.



WEIGHT 1.6 POUNDS

MOTOR	ELECTRICAL							AIR
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Watts at Free Delivery	Line Amps.	CFM
654DS	115	1	400	—	3750	30.5	0.25	310
650JS	200	3	400	—	3800	25	0.13	310
340ZS	115	1	50-60	2.0	3300	24	0.23	270
544JS	200	3	50-60	—	3300	20	0.10	270
559DS	115	1	50-60	2.0	1680	10.5	0.10	140

OPTIONAL ACCESSORIES:
Flush Mount Guard #14651, Rim Mount Guard #14559, Clip #14611. (For mounting flush mount guard)
"Synclamps" for clamping rim mounting part #24254 (3 required per fan)
"Rever-Synclamps" for clamping rim mounting part #14015 (3 required per fan)
Filter Box #19869.

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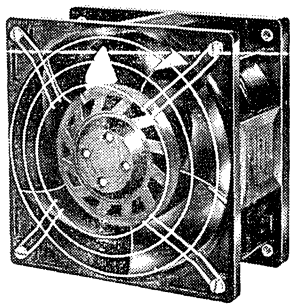
TARZAN® FAN

For Further Information Request Catalog Sheet M-8000.

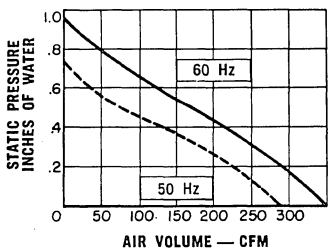


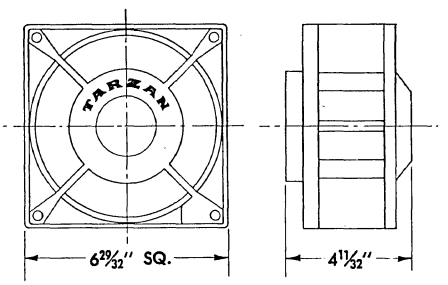
WEIGHT 5 POUNDS

The Tarzan fan brings an entirely new concept of air moving device versatility to the science of electronic cooling — CENTRIFUGAL BLOWER PERFORMANCE IN A COMPACT AXIAL FLOW FAN. This unique Rotron aerodynamic design (patent applied for) develops much greater pressure than comparably sized axial flow fans.

Its straight line performance curve permits the packaging engineer to realize full potential from the Tarzan at any point along the curve with no instability normally found in a curve of an axial flow fan.

When considering a squirrel cage centrifugal blower to deliver 175 cfm at 1/2" water static pressure — CONSIDER A TARZAN FIRST — SAVE SPACE — eliminate discharge diffusers.





More features:

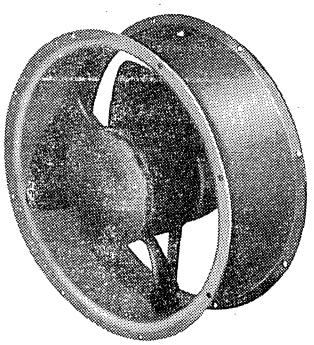
- Long maintenance free life.
- Economically priced.
- Reversible air flow — Simply turn fan end-for-end.
- Ball bearings — lubricated for life.
- 115 VAC, 50/60 Hz.
- 230 VAC, 50/60 Hz.

Optional accessories:

- Plug and Cord #17555.
- Filter Box #20990.
- Finger Guard #21196-2.

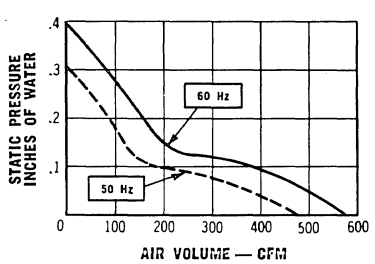
Caravel® FAN

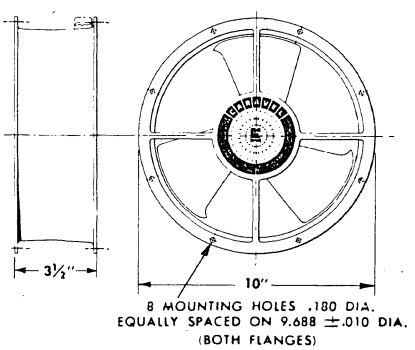
For Further Information Request Catalog Sheet E-3050



WEIGHT 5 POUNDS

The Caravel Fan delivers an air volume of 575 CFM while holding a narrow depth dimension of only 3½" x 10" diameter. This high performance and compact design makes it ideal for flushing large racks and cabinets. The fan may be mounted directly to a panel or cabinet wall using the holes located around the circumference of the venturi. Airflow may be reversed by turning the fan end-for-end. The motor is provided with ball bearings for long, quiet life. No maintenance is required. The electrical connection is made to a terminal block and a mating plug and cord is optional. The Caravel is suitable for the most rugged commercial applications where the cabinet temperature does not exceed 140°F. Thermal protection for the motor, designed to meet UL approval, is available on special order.





CARAVEL TYPE CHART

TYPE	VAC	PHASE	Hz	CFM
CL2T	115	1	50/60	575
CL3T	230	1	50/60	575

OPTIONAL ACCESSORIES: Screen Guard #19694-2
Plug & Cord #17555

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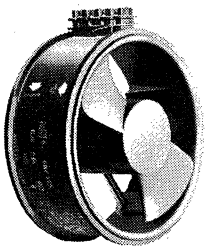
TEL: 213 849-7871

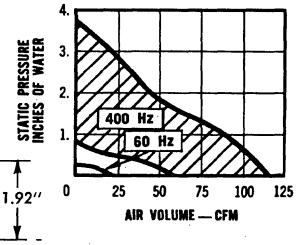
PROPIMAX® 2

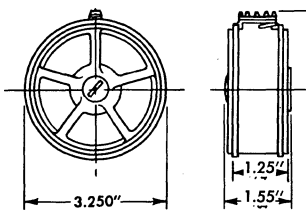
For Further Information Request Catalog Sheet E-2900



WEIGHT 6.5 OUNCES

The PROPIMAX-2 is ideal for 400 Hz airborne and missile applications where high shaft speeds are mandatory to obtain maximum air performance in a minimum of space. Selection from constant speed or high altitude varying speed "Altivar"® motors, which change shaft speed directly with altitude. A 50-60 Hz design is also available. The units are lubricated for a maximum ambient temperature of 125°C and will have a life expectancy of 2000 hours of continuous duty in an ambient atmosphere of 14.7 psia and 72°C. For fan life specifications for motor series 366ZS contact factory. The airflow is reversible by turning venturi ring end-for-end. There are clamping rims at each end of venturi for quick mounting. A single terminal block for all electrical connections. Meets applicable military specifications.





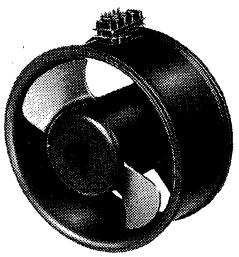
MOTOR	ELECTRICAL							AIR
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM
606NS	115	1	50-60	1.0	3100	7.0	0.06	17
366ZS	115	1	400	0.75	21000	41.0	0.37	122
464ZS	115	1	400	0.15	11000	10	0.10	62
367JS	200	3	400	—	20500	34	0.13	118
415ZS*	115	1	400	0.15	12300	18	0.18	67
395JS*	200	3	400	—	12500	18	0.10	68
704WS	200	3	400	—	11500	17	0.12	65

*Altivar

OPTIONAL ACCESSORIES: "Synclamps" for Clamping Rim Mtg. Part #24254. (3 Required Per Fan).
"Rever-Synclamps" for Clamping Rim Mtg. Part #14015. (3 Required Per Fan).

PROPIMAX-3 & 3B

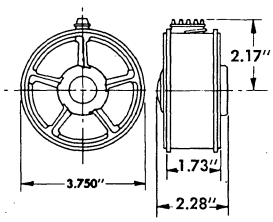
For Further Information Request Catalog Sheet E-2901.

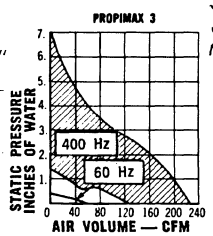


WEIGHT 15.2 OUNCES

The PROPIMAX 3 and 3B will deliver up to 220 CFM free delivery and will work against high air impedance. It is ideal for cooling small airborne systems which must place maximum emphasis on size and weight. This means heavy component density with large heat loads and high air impedance in relation to the envelope dimensions of the system. The PROPIMAX 3 has a two bladed propeller and is powered by a constant speed 400 Hz motor operating at 22,000 RPM. The PROPIMAX 3 will deliver large volumes of air against relatively high static pressures. The PROPIMAX 3B is provided with a four bladed propeller for operation at speeds of 12,000 RPM or less on 400 Hz. The PROPIMAX 3B will deliver large volumes of air against lower static pressure levels. The PROPIMAX 3B offers a choice of a constant speed 11,000 RPM design and high altitude, variable speed "ALTIVAR"® motors which change speed directly with altitude. There is also a 50-60 Hz design available.

The units are lubricated for a maximum ambient temperature of 125°C and will have a life expectancy of 2,000 hours of continuous duty in an ambient atmosphere of 14.7 psia and 72°C. For more stringent duty conditions fan life specifications must be individually defined. Airflow is reversible by turning fan end-for-end. There are clamping rims at each end of the venturi for quick mounting. A single terminal block for all electrical connections. Meets applicable military specifications.





OPTIONAL ACCESSORIES:
"Synclamps" for Clamping Rim Mtg. Part #14015. (3 Required Per Fan).
"Rever-Synclamps" for Clamping Rim Mtg. Part #24254. (3 Required Per Fan).

PROPIMAX 3

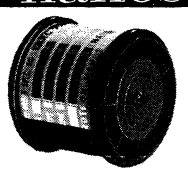
MOTOR	ELECTRICAL							AIR
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM
409ZS	115	1	400	2.5	22,500	100	1.0	220
341JS	200	3	400	—	22,500	80	0.3	220

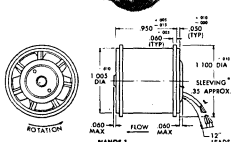
PROPIMAX 3B

MOTOR	ELECTRICAL							AIR
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM
763ZS	115	1	60	0.5	3,450	10.5	0.12	58
754DS	115	1	400	2.0	11,100	60	0.6	190
718ZS	115	1	400	0.25	7,400	25.5	0.3	125
400ZS*	115	1	400	0.5	6,250	35	0.3	110
473JS	200	3	400	—	11,000	54	0.26	190
387JS*	200	3	400	—	8,300	67	0.3	190
805ZS	115	1	50 60 400	0.25	2,400 3,100 3,300	25 24 25	0.26 0.24 0.23	40 52 57

*Altivar

nanos FAN

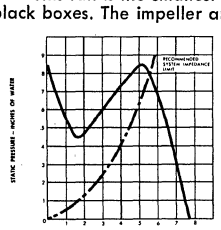




ACCESSORY
Synclamp Rotron PN #24688
(3) required per fan

The Nanos fills the requirement for an extremely small air moving device. It is only 1" in diameter by 1" long or it may be provided in a 1" cube and delivers up to 7.5 cfm free delivery.

This fan is the smallest and lightest of a family of miniature high frequency fans for tightly packed electronic black boxes. The impeller and correctional vanes are of airfoil construction for maximum aerodynamic efficiency and minimal acoustical noise. Power is provided by an inverted construction, hysteresis motor, utilizing an air lubricated hydrodynamic journal bearing.



The Nanos is designed to withstand 100G shock in any direction. The temperature range is −55°C to +100°C. Under normal continuous running conditions, life expectancy would be in excess of 20,000 hours or more than 500,00 start-stop cycles. The fan may be mounted in any attitude. The airflow is reversible by turning the fan end-for-end.

Electrical connection is made to (3) leads 12" long. Choice may be made between a round configuration with clamping rims of a 1" cube which will mount flush at either end or on the side. For the servo configuration specify Nanos-1 or for the cube unit Nanos-1B or 1-C depending on desired airflow direction. Power requirement is 26 vac, 400 Hz 1ϕ.

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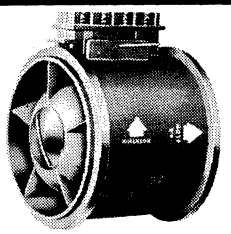
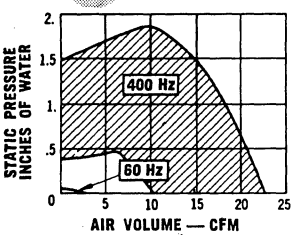
VANEAXIAL FANS

Vaneaxial fans are usually employed in high component density assemblies which require high performance under relatively high air impedance and at the same time offer minimum space for the cooling device. Vaneaxial fans in this group offer exceptional reliability under extreme operating conditions. These fans are generally of high frequency (400 Hz) power designs with resulting extremely high motor rpm. This speed provides the excellent pressure building abilities within their small physical size. They can also be supplied with 50-60 Hz motors. Models with Altivar motors are available for high altitude use in aircraft and unmanned high atmosphere vehicles.

AXIMAX ® 1

For Further Information Request Catalog Sheet F-3100.



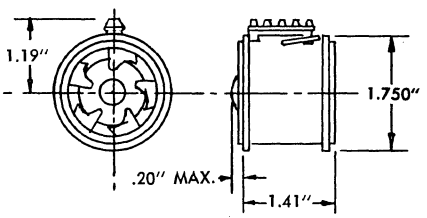


The smallest and lightest of a family of miniature, high frequency fans for use in tightly packaged airborne "black boxes" where size and weight must be held to an absolute minimum, where reliability is critical and where high heat loads must be dissipated with cooling air. The Aximax 1 will answer all of these requirements while overcoming considerable air resistance. It will deliver 17 CFM at 1" w.g. Mounting is by Clamping rims.

The Aximax 1 is available for both pressurized and non-pressurized applications and is built for single-phase or three-phase operations, and meets applicable military specifications.

A 50-60 Hz motor is available.

Weight 4 ounces.

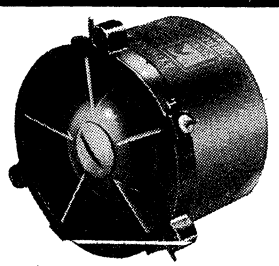


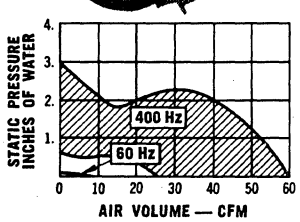
MOTOR	ELECTRICAL							AIR	
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM	Max. S.P. at 0 Del.
606NS	115	1	50-60	1.0	3200	7	0.06	2.6	0.03
623YS	115	1	400	0.25	22750	0.16	0.15	22	1.5
367JS	200	3	400	—	22500	0.10	0.1	22	1.5
464YS	115	1	400	0.15	11400	8.5	0.09	11	0.4

OPTIONAL ACCESSORIES: Altivar Motor.
"Synclamps" for Clamping Rim Mtg. Part #24254. (3 Required Per Fan).
"Rever-Synclamps" for Clamping Rim Mtg. Part #14015. (3 Required Per Fan).

AXIMAX 2

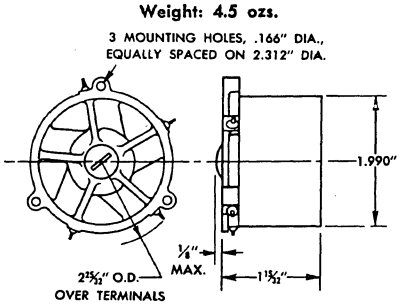
For Further Information Request Catalog Sheet F-3200.





Air delivery of 60 CFM, free delivery, is provided from a fan 2" in diameter by 1.5" axial length. The Aximax 2 is designed for maximum cooling against high static pressures with a minimum space and weight loss. It is available from a choice of constant speed or variable speed motor designs for low or high ambient densities. The Aximax 2 can be supplied with clamping rim mounting and electrical connection to a compact terminal block or as shown in the sketch. It meets applicable military specifications. A 50-60 Hz motor is also available.

Weight: 4.5 ozs.



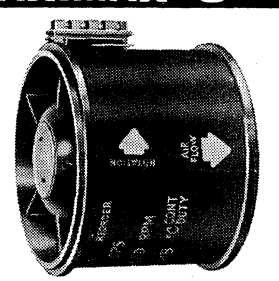
MOTOR	ELECTRICAL							AIR	
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM	Max. S.P. at 0 Del.
606NS	115	1	50-60	1.0	3150	7.0	0.06	8	0.08
368YS	115	1	400	0.5	20000	38	0.33	58	2.8
367JS	200	3	400	—	20500	34	0.13	60	3.0
464YS	115	1	400	0.15	11000	10	0.10	30	0.9
415YS*	115	1	400	0.15	11000	18	0.2	32	1.0
395JS*	200	3	400	—	11000	18	0.1	32	1.0
414YS**	115	1	400	0.25	19500	14	0.14	30	2.5
398JS**	200	3	400	—	20500	12	0.06	32	2.8

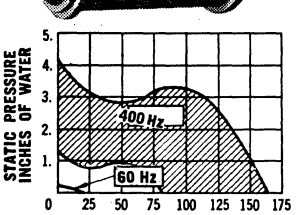
*Varying Low Density
**Varying High Density

OPTIONAL ACCESSORIES:
Altivar Motor, Clamping Rim Mounting.

AXIMAX 3

For Further Information Request Catalog Sheet F-3300.

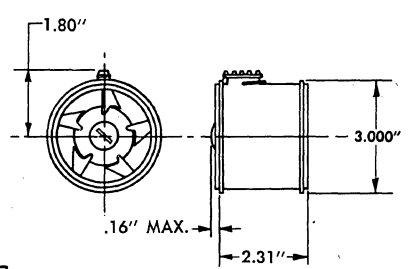




The Rotron Aximax 3 vaneaxial fan is specifically designed for high frequency cooling applications where high air deliveries against high static pressures are to be obtained in a minimum of space, therefore requiring high shaft speed. For airborne equipment, including missiles, the features of the fan will be found particularly attractive. Selection can be made from constant speed motors or varying speed motors for low ambient densities. Airflow is reversible by turning fan end for end. The Aximax 3 is mounted by clamping rims. It meets most applicable military specifications.

A 50-60 Hz motor is also available.

Weight: 14 ozs.



MOTOR	ELECTRICAL							AIR	
Series	Volts	Phase	Hz	Cap. Mfd.	RPM	Full Watt Load	Line Amps.	Max. CFM	Max. S.P. at 0 Del.
599NS	115	1	50-60	0.5	3500	3.0	0.03	23	0.13
341JS	200	3	400	—	22000	126	0.41	157	4.5
422DS	115	1	400	1.0	11300	23	0.28	78	1.2
528YS	115	1	400	2.0	22500	130	1.3	157	4.5
473JS	200	3	400	—	11800	25	0.22	82	1.25
387JS*	200	3	400	—	13900	56	0.25	98	1.7
400YS*	115	1	400	0.5	11000	35	0.30	76	1.1
558YS	115	1	50 60 400	0.25	3200 4500	14 17	0.15 0.16	21 31	0.1 0.2

*Altivar

OPTIONAL ACCESSORIES: Altivar Motor.
"Synclamps" for Clamping Rim Mtg. Part #24254. (3 Required Per Fan).
"Rever-Synclamps" for Clamping Rim Mtg. Part #14015 (3 Required Per Fan).

® ROTRON INCORPORATED
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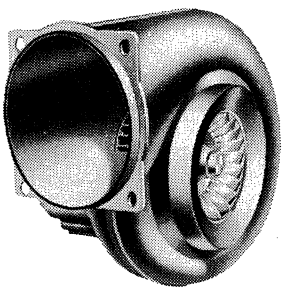
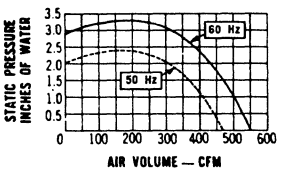
Model CXH33A

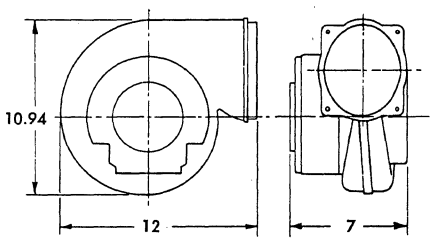
Model CXH29A

CENTRIMAX®

- Delivers more air with more efficiency than conventional squirrel cage blower.
- Package size substantially smaller than assembled squirrel cage blower.
- Motor completely integrated with impeller design.
- No maintenance — oversize, double shielded, precision ball bearings — lubricated for life.
- Ultimate in reliability — no centrifugal starting switches or relays which are the cause of most single phase motor failures.
- Every unit comes equipped with adjustable blast direction — impeller housing can be rotated 360°.

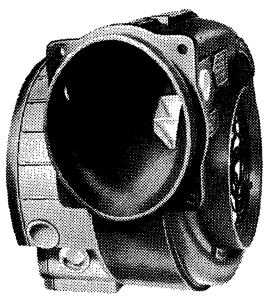


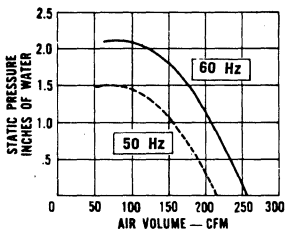


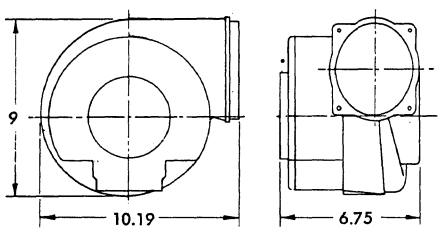


Model	Volts	Hz	Phase	Watts	Amps.	Cap. Mfd.	CFM
CXH33A2	115	50-60	1	420	3.7	12.0	540
CXH33A3	230	50-60	1	380	1.7	6.0	545
CXH33A33	220	50-60	3	410	1.3	—	530

- Can be installed in any attitude and mounted from any one of three mounting surfaces.
- Designed to accept standard, readily available round ducting.
- Blower housing fabricated from flame retardant polyester resin.
- Never rust, never bend.
- Thermal safety cut out feature available as optional.
- Operating temperature from −20°C to 85°C.
- Available in 115 VAC, 60 Hz, single phase; 230 VAC, 50 Hz, single phase; 208-230 VAC, 50-60 Hz, three phase.







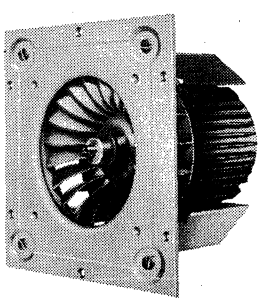
Model	Volts	Hz	Phase	Watts	Amps.	Cap. Mfd.	CFM
CXH29A2	115	50-60	1	145	1.4	6.0	250
CXH29A3	230	50-60	1	135	0.65	6.0	250
CXH29A33	220	50-60	3	130	0.45	—	245

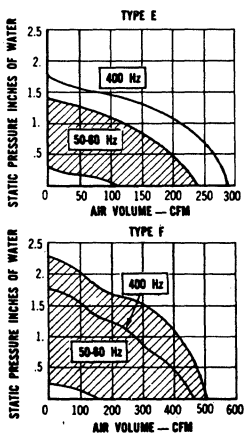
For Further Information Request Catalog Sheet G-3350.

Model G

For complete details request Rotron catalog sheet G-3340.

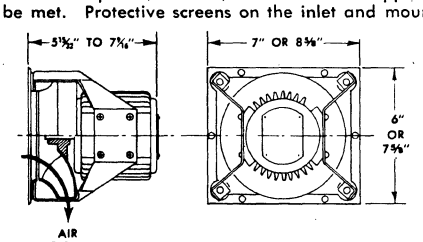
TYPES E & F





The Model G blowers are another type of blower incorporating the centraxial impeller. This blower uses the impeller without a scroll type housing. It consists of a mounting inlet plate holding the motor and the centraxial impeller. It has the unique feature of drawing the air in axially and discharging it uniformly radially 360° around the impeller. The Model G blower incorporates great flexibility in installing the blower in tight spaces.

Two basic sizes of the Model G blower are available. The Type E with airflows up to 285 cfm and maximum static pressures at no delivery up to 1¾" and the Type F with airflows up to 500 cfm and maximum static pressure at no delivery up to 2¼". Motors are available for either 115 or 230 volts, single or three phase, and 50/60 or 400 Hz. Applicable military specifications can be met. Protective screens on the inlet and mounting for the Rotron Model 2A Airflow Switch are available as accessories.



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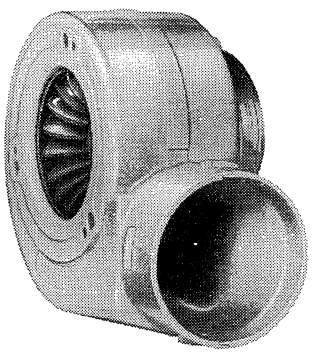
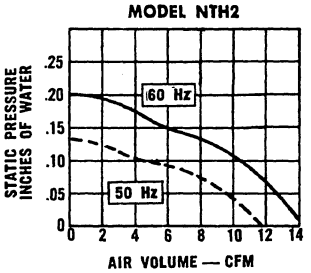
CENTRAXIAL BLOWERS

Centraxial blowers, so named for their unique impellers, are far more efficient than squirrel cage blowers of similar capacity or size. The centraxial impeller functions similarly to a turbine impeller. Therefore, you might compare efficiency by comparing a water turbine to an old fashioned water wheel. Centraxial blowers cost less to buy, cost less to install because of their built-in versatility and cost less to operate since they require less power to get performance.

They operate in the specific speed range of 9,000 to 80,000.

NUGGET® BLOWER





The Nugget (Model NTH2) is a new, compact, low cost blower ideally suitable for spot cooling applications in test instruments, transmitters, TV cameras, office machinery, and tape recorders. Its centraxial wheel, a new design concept by Rotron affords greater efficiency than standard squirrel cage wheels — greater volume to pressure characteristics. It is only $3\frac{19}{32}$" x $4\frac{1}{32}$" x $2\frac{3}{32}$". The Nugget delivers 14 CFM. The Nugget incorporates a specially designed miniature subfractional horsepower induction motor that draws only 7 watts. 115 VAC, 50-60 Hz, 1 Phase, 3200 RPM. The rugged blower housing is injection molded from polycarbonate plastic to form a combination of features which will prove helpful and convenient to any packaging engineer. The Nugget is also available without housing to be used as an air stirring device (Model NTP2). This model requires a space of only $2\frac{1}{2}$" x 2".

OPTIONAL ACCESSORIES:

Plug & Cord Assembly, Part No. 17555 (For both models)

Rim (inlet), Part No. 17469 (For Model NTH2 only)

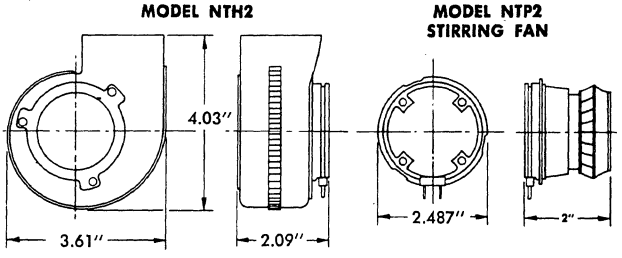
Inlet Clamp Part No. 17597-1 (For Model NTH2 only) (Use with Rim #17469)

Outlet Clamp, Part No. 17597-1 (For Model NTH2 only)

Flange (Outlet) Part No. 17471 (For Model NTH2 only)

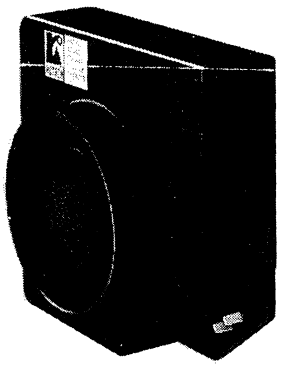
3 Brass Inserts, Part No. 19803 to be used on Blower Inlet, Model NTH2

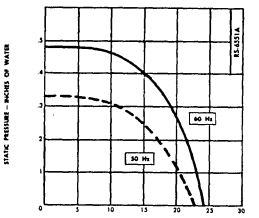
WEIGHT 0.6 POUNDS



For Further Information Request Catalog Sheet G-3310.

biscuit BLOWER





The Biscuit blower is designed for packaging within the confines of equipment having a vertical profile of no more than $1\frac{3}{4}$". This new blower provides high pressure centrifugal blower performance in a space never before possible. It has a depth dimension of only $1\frac{5}{16}$".

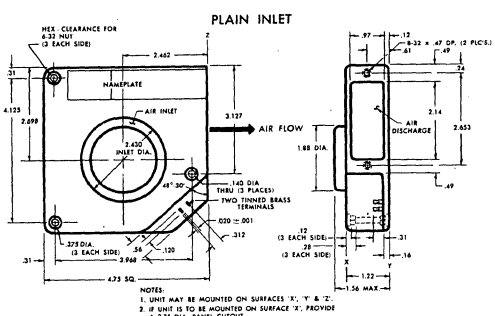
Delivering up to 25 cfm free delivery and with a high static pressure capability, it permits a significant increase in the packaging density of instruments using the latest integrated circuit technology.

The Biscuit blower features the same inverted motor construction and resiliently mounted permanently lubricated sleeve bearing system as Rotron's famous Muffin® fan and, therefore, provides a design life in excess of 10 years at room ambient without maintenance.

Among the commercial applications for which it is designed are computer terminals, core memories, heat exchangers and sinks, power supplies, projector lamps and rack mounted instruments. In the office equipment field, the Biscuit is ideal for the cooling of copying machines, optical character readers and X-Y plotters and recorders.

Encapsulated stator construction integrates the electrical portion of the shaded pole motor into the blower housing to provide a monolithic structure totally impervious to moisture. The Biscuit may be mounted from the back, the inlet or the discharge. Electrical connection is made to a choice of tinned solder terminals or plug and cord #17555 may be specified. Other options include an inlet ring, hose clamp or outlet guard.

The Biscuit is designed for U.L. component recognition and has a low speech interference level of 44 db. It operates on a power source of 115 vac, 50-60 Hz. Also available for 230 vac. Power draw is 16 watts. Specify BT2A-1 for a plain inlet or BT2A-2 for a rim inlet.



ACCESSORIES
Outlet Guard #24540
Hose Clamp #001-048
Plug and Cord #17555

For Further Information Request Catalog Sheet H-3306.

ROTRON® INCORPORATED
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PACIFIC DIVISION 1912 WEST BURBANK BOULEVARD, BURBANK, CALIFORNIA 91506

Spiral® BLOWERS

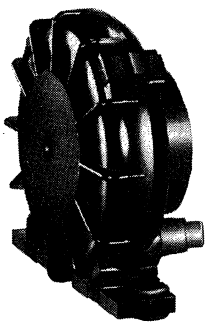
Spiral blowers are revolutionary new motor-blower packages designed to develop unusually high positive or negative air pressure at low to moderate volume of air. Thus, performance achieved without the use of sliding seals or vanes. Contacting surfaces are confined to the precision extra wide ball bearings, lubricated for extremely long life — no maintenance is required.

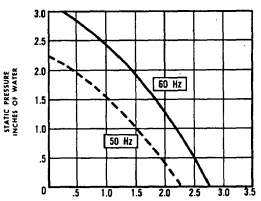
Life expectancy is enhanced by their low speed motors as well as by the absence of brushes or commutators. The RF noise, characteristic of the universal motors generally used in vacuum cleaner type blowers, is eliminated.

Optional accessories include adjustable trimmer valve, differential pressure gauges for instantaneous trimming to system requirements and a thermal protector.

MINI-SPIRAL

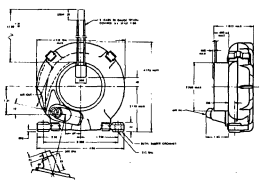
For Further Information Request Catalog Sheet J-6550.





The Mini-Spiral is a high pressure, low flow air moving device specifically designed for gas sampling applications. The unique regenerative energy conversion characteristic of the Spiral® blower has been combined with the highly reliable ball bearing system of the famous Sentinel® fan, offering proven long life and reliability in a compact package. This tiny blower which measures 4⅝" in diameter by 1 3/16" in depth will create a suction of 3" wg, which could normally be achieved with a centrifugal blower many times its size and power consumption.

The Mini-Spiral may be used in commercial equipment to draw up to 2½ cfm through long lengths of tubing, resistance filter or chemical beds. It may be operated continuously at shut-off (no airflow) when it would provide maximum suction of 3" wg for gas sampling, fume removal, document hold down, tape hold down or the removal of chad.

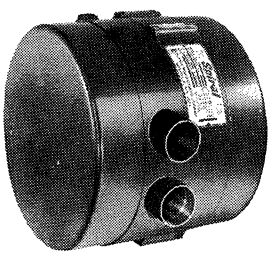


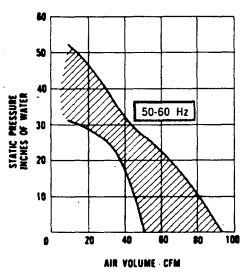
The blower housing and impeller are a high strength, glass filled, flame retardant phenolic. Bearings are double shielded, single row, radial ball, stainless steel which are lubricated for life. Magnet wire is Nema Class F. Termination consists of two U.L. style 1180 Teflon® leads, 20 AWG, 12" long.

The Mini-Spiral satisfies U.L. requirements and may be operated continuously in an ambient up to 72°C. It has a life expectancy of 50,000 hours at 40°C. A low speech interference level of 45 db renders the Mini-Spiral suitable for application in office equipment. Mounting is easily provided for running screws through two butyl rubber grommets. The weight is only 1.1 lbs.

DUPLEX SPIRAL

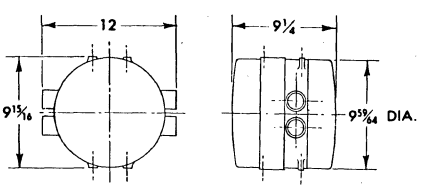
For Further Information Request Catalog Sheet J-6610.





The Duplex Spiral offers greater performance characteristics than the Spiral Model SL2 above. By internal ducting of the airflow from two impellers, higher pressures are achieved with Model SL4; Model SL5 extends the airflow range, and Model SL6 provide an economical source of **two** independent high pressure air streams, which can be utilized at different pressure levels. While the dimensions of all these models are the same, the functions cannot be changed in the field. The Duplex Spiral is designed for use in ambient temperatures up to 55°C, in typical applications as:

- Magnetic tape slack control and capstan motor cooling in one package (Model SL6).
- Document and card handling equipment.
- Paper tape and card reading equipment.
- Power supply for fluid amplifiers.
- Laser head cooling.
- Printed circuit motor cooling.
- Materials handling.
- Waveguide pressurization, or cooling.
- Actuation of machine elements.
- Gas sampling and purification.
- Air bearings for tape and film.
- Microwave cavity cooling.
- For holding photographic film or paper on rollers OR frames.



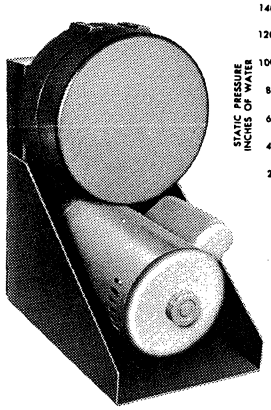
Remember these features:

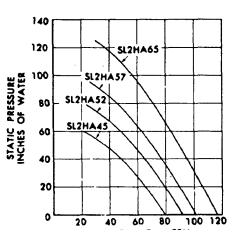
- Two independent air sources from one package.
- Two jobs for the price of one.
  OR
- Extended performance — pressures — vacuums to 2 PSIG.
  OR
- Extended performance — airflow delivery up to 94 CFM.
- Oil free air flow — no possible contamination.
- Quiet.
- Low Speed — 3300 RPM.
- Economically priced.
- Continuous duty.
- Available for single or three phase, 50-60 Hz power, 115 or 208/230 VAC.
- Optional accessory — Dust filter.

BELT DRIVEN SPIRAL BLOWER

For complete details, request Rotron catalog sheet J-6620.

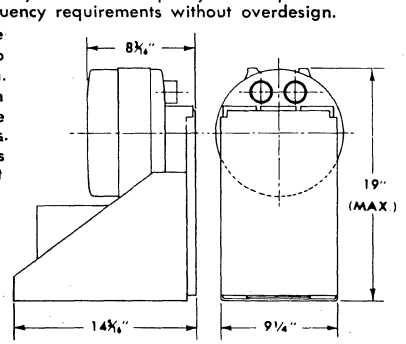
MODEL SL2HA





To obtain even higher pressures and airflows than can be obtained with a Model SL2 or Duplex Spiral shown above, Rotron has adopted the Model SL2 to be belt driven from an external motor. This permits the blower speed of the Model SL2 Spiral to be increased for higher air performance. Pressures or vacuums up to 4½ psig can be obtained. Flows at free delivery of 115 cfm can be obtained. The flexibility of different pulley ratios permits the designer to meet altitude and frequency requirements without overdesign.

Motors used with this blower are induction motors with no brushes to wear and operate at 3450 rpm. They are available in all common voltages and frequencies and have permanently lubricated ball bearings. Belts are designed for 10,000 hours life with no maintenance or adjustments.



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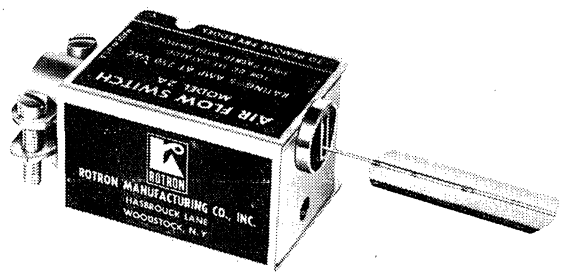
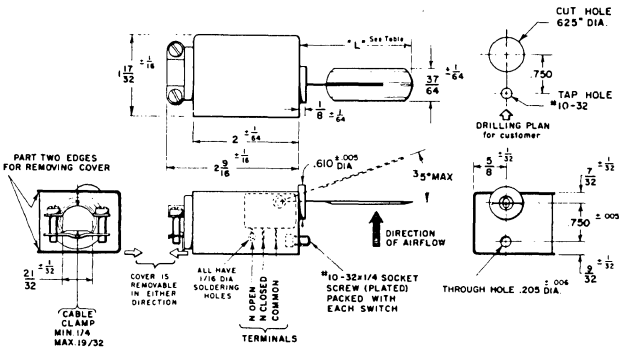
AIRFLOW INTERLOCK SWITCH

For Further Information Request Catalog Sheet K-6800.

The Rotron Model 2A Airflow Interlock Switch provides insurance against equipment damage due to a loss of the cooling airflow regardless of the reason for the malfunction. The Model 2A Airflow Switch is a velocity actuated switch, not pressure actuated, and senses the loss of airflow because of an obstruction, or air leak up-stream from its location, or due to the failure of the cooling fan. The switch is a single pole double throw type and normally open and normally closed contacts are available which may be used to turn off the power to the endangered equipment or actuate alarm systems. Eight different vane sizes are available to size the switch for various air velocities. A convenient determinator kit permits quick selection of the proper air vane for a particular application.





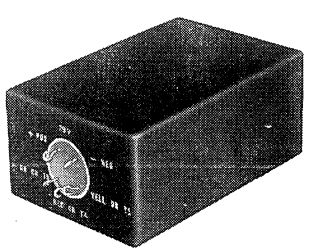
Rotron Model 2A Airflow Switches Will Actuate and De-Actuate in an Airstream of the Following Velocity in Ft./Min. For "Standard" Air (29.9 Inch HG, 70°F).

		HORIZONTAL AIRSTREAM							
		VERTICAL-UP AIRSTREAM		ARM HORIZONTAL		ARM VERTICAL VANE DOWN		VERTICAL-DOWN AIRSTREAM	
Type No.	Dim. "L" Max.	Increasing Air Ft./Min.	Decreasing Air Ft./Min.	Increasing Air Ft./Min.	Decreasing Air Ft./Min.	Increasing Air Ft./Min.	Decreasing Air Ft./Min.	Increasing Air Ft./Min.	Decreasing Air Ft./Min.
		Actuate	Deactuate	Actuate	Deactuate	Actuate	Deactuate	Actuate	Deactuate
1000	2 27/32	785	700	735	630	750	615*	NOT USABLE	NOT USABLE
1350	2 7/32	1125	1030	1025	970	1000	890	720**	685**
1600	1 15/16	1340	1212	1215	1095	1225	1130	1040*	865**
1800	1 27/32	1550	1450	1460	1335	1500	1375	1280	1115*
2000	1 7/8	1800	1675	1790	1580	1760	1580	1595*	1425*
2450	1 1/8	2340	2120	2120	1867	2270	2035	2125	1950
3000	13/16	2925	2700	2690	2420	2880	2570	2780	2395
4000	3/4	4000	3680	3720	3485	3870	3520	3760	3565

NOTE: All figures shown above are ±10% except: *Denotes ±15% **Denotes±20%

POWER CONVERSION MODULES

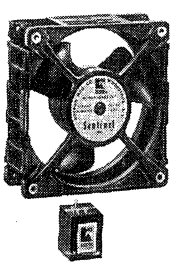
SYSTEM POWER SUPPLY PROBLEMS FOR DTL, TTL, MOS AND OTHER LOGIC DRIVES?
SYSTEM POWER SUPPLY PROBLEMS FOR COOLING DEVICES?



Rotron can solve these independently or combine both requirements in a common supply. Power DC to AC inverters, AC to AC converters, and DC supplies can be designed to meet your specifications. Rotron's approach of combining these requirements results in increased efficiencies, weight and size reduction of the often neglected power supply. Your Packaging Engineer will be grateful for the additional volume allotted to today's dense packages.

Please call upon us to consult in the solution of your power supply problems. As a bonus, free consultation is offered on your cooling applications.

Wide assortment of BATAC and DELTAC (frequency converter) designs available. For further information, contact Rotron Applications Engineering Dept. Woodstock, N.Y. Return to Section #4000 for other BATAC and DELTAC Applications.



ROTRON DC FANS BRUSHLESS DC WITH ROTRON BATAC®

The Batac solid-state DC to AD single-phase inverter gives long, maintenance-free life to air-moving devices that operate on DC power. Single-phase fans mate with the low-voltage square-wave output of the Batac, eliminating the need for a transformer. The Batac/Fan combination offers all the advantages of AC operation—no brush dust or brush changes, arc-free operation, and no commutator to create RFI.

FEATURES

- Rotron reliability and performance from a DC power source
- Efficient—Every design tailored to a specific load
- Compact—Batac sizes range from 1⅜" x 1⅛" x 1" to 2½" x 3½" x 4⅛"
- Available with protection against accidental reversal of input voltage
- Offered with integral RFI suppression network
- For use in ambients between −40°C and +71°C
- Offered with voltage surge protection
- Reasonably priced

Also available for use with the aforementioned fans is a variety of solid state Deltac converters capable of increasing or decreasing output frequency with respect to input, on 115 VAC, single phase supplies.

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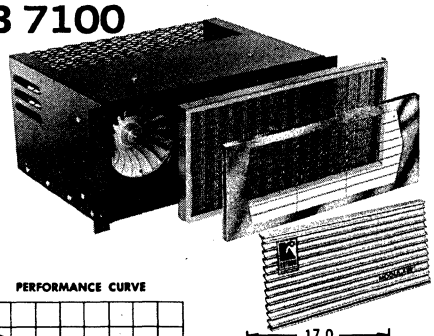
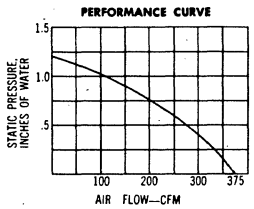
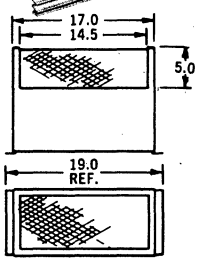
TEL: 213 849-7871

MB 7100







DESCRIPTION — The Modulair MB 7100 is a most efficient cabinet panel blower incorporating two (2) famous Rotron Centraxial wheels noted for their high pressure building characteristics and driven by two matched ball bearing motors, pre-lubricated for years of maintenance-free life.

The standard MB 7100 normally occupies a panel opening of 7", however, recessed models, Type 175 and Type 275, require only 5¼" panel space and utilize the cabinet space between the bottom cabinet frame and the base of the cabinet, with no loss in airflow.

The air is discharged evenly across the entire width of the Modulair in a turbulent pattern. The noise level is only 65 db (SIL).

WHERE TO USE — In EIA standard rack cabinets where component density is great and there is much resistance to airflow — where pressure building capabilities of the MB 7100 are necessary.

MOTORS

- Two (2) motors are used in MB 7100
- Ball Bearings
- Pre-lubricated
- Life — 5 years
- Thermal Protection standard

ACCESSORIES

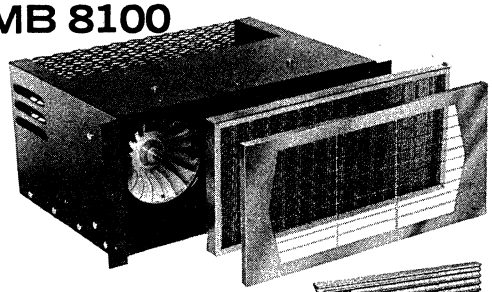
Deluxe Grille	24360-2
Deluxe Grille for Recessed Types 175 & 275	24360-1
Dust Filter	24361-2
Dust Filter for Recessed Types 175 & 275	24361-1
RFI/EMI Filter	24362-2
RFI/EMI Filter for Recessed Types 175 & 275	24362-1

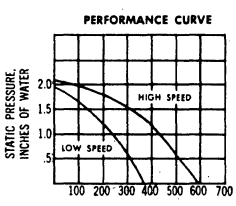
TYPE CHART

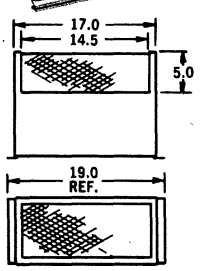
MODULAIR		ELECTRICAL							Air	Panel Height Inches	Dust Filter Washable	RFI/EMI Filter	Recessed Model
Series	Type	Volts	Phase	Hz	*Capacitor	RPM	Watts	Line Amps	CFM				
MB7100	100	115	1	50/60	5.0 μf	3200	205	1.8	375	7.0	Yes	No	No
MB7100	175	115	1	50/60	5.0 μf	3200	205	1.8	375	5.25	Yes	No	Yes
MB7100	200	115	1	50/60	5.0 μf	3200	205	1.8	375	7.0	Yes	Yes	No
MB7100	275	115	1	50/60	5.0 μf	3200	205	1.8	375	5.25	Yes	Yes	Yes

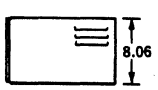
*Supplied with Modulair, integrally mounted.

MB 8100









DESCRIPTION — Modulair Model MB 8100 normally occupies a panel space of 8¾" and delivers 600 cfm from two Rotron designed Centraxial wheels noted for their high pressure building characteristics and driven by two (2) matched ball bearing motors, pre-lubricated for years of maintenance free operation.

Modulair Model MB 8100, Types 175 and 275 are recessed models requiring only 7" panel space and utilize the space available between the bottom cabinet frame and the base of the cabinet, with no loss in airflow.

The air is discharged evenly across the entire width of the Modulair in a turbulent pattern to affect every area of the cabinet and eliminate hot spots. The noise level is only 75 db (SIL) at high speed and 70 db (SIL) at low speed.

WHERE TO USE — In EIA standard rack cabinets where component density is great and there is much resistance to airflow — where pressure building capabilities of MB 8100 are necessary.

MOTORS

- Two (2) motors are used in MB 8100
- Ball Bearings
- Pre-lubricated
- Life — 5 years
- Thermal Protection standard

ACCESSORIES

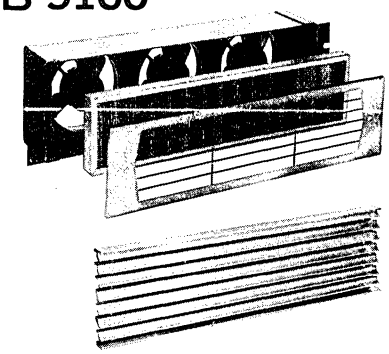
Deluxe Grille	24360-3
Deluxe Grille for Recessed Types 175 & 275	24360-2
Dust Filter	24361-3
Dust Filter for Recessed Types 175 & 275	24361-2
RFI/EMI Filter	24362-3
RFI/EMI Filter for Recessed Types 175 & 275	24362-2

TYPE CHART

MODULAIR		ELECTRICAL							Air	Panel Height Inches	Dust Filter Washable	RFI/EMI Filter	Recessed Model
Series	Type	Volts	Phase	Hz	*Capacitor	RPM	Watts	Line Amps	CFM				
MB8100	100	115	1	50/60	5.0 μf	3400	800	7.5	600	8.75	Yes	No	No
MB8100	175	115	1	50/60	5.0 μf	3400	800	7.5	600	7.00	Yes	No	Yes
MB8100	200	115	1	50/60	5.0 μf	3400	800	7.5	600	8.75	Yes	Yes	No
MB8100	275	115	1	50/60	5.0 μf	3400	800	7.5	600	7.00	Yes	Yes	Yes
MB8150	100	115	1	60	5.0 μf	3400/2200	800/450	7.5/4.2	600/380	8.75	Yes	No	No
MB8150	175	115	1	60	5.0 μf	3400/2200	800/450	7.5/4.2	600/380	7.00	Yes	No	Yes
MB8150	200	115	1	60	5.0 μf	3400/2200	800/450	7.5/4.2	600/380	8.75	Yes	Yes	No
MB8150	275	115	1	60	5.0 μf	3400/2200	800/450	7.5/4.2	600/380	7.00	Yes	Yes	Yes

NOTE: Model MB8150 available with thermostatic controls.
*Supplied with Modulair, integrally mounted.

MB 9100

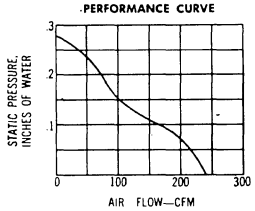


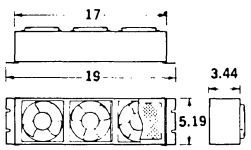
DESCRIPTION — Modulair MB 9100 series incorporates the performance capabilities of three (3) famous MUFFIN fans and delivers 240 cfm of clean, filtered air from a package only 5¼" high and 3½" deep. Life expectancy of the MUFFIN fan is 10 years.
The Modulair MB 9100 series can also be supplied with Rotron's ball bearing Sentinel and Spartan fans to meet military specifications or with Rotron's new Centaur for a 20% increase in air delivery. Model 9100 is impedance protected. The noise level is only 52 db (SIL).
WHERE TO USE — Modulair MB 9100 should be used in EIA rack cabinets where the component density and resistance to airflow is minimal and where there is relatively free passages for the flow of air.
DUST FILTERS — Modulair model MB 9100 comes equipped with low impedance, washable, 3 ply corrugated screen viscous impingement filter.

ACCESSORIES

Deluxe Grille	24360-1
Dust Filter	24361-1
Finger Guards	20132-2
Filter Coat	18440

PERFORMANCE CURVE

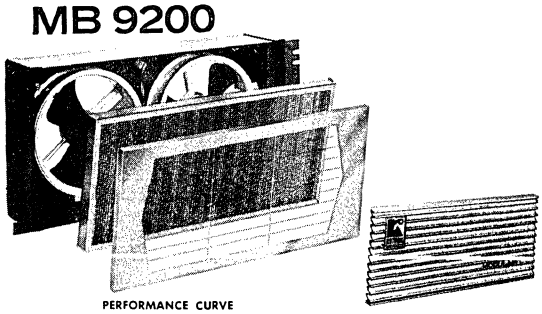




TYPE CHART

	MODULAIR						ELECTRICAL							Air	
	Series	Type	Fan	Comm	Mil	Bearings	Volts	Phase	* Cap.	Hz	RPM	Watts	Line Amps	CFM	Dust Filter
Ⓓ	MB9100	100	Muffin	x		Sleeve	115	1		50/60	3200	42.0	0.48	240	Yes
	MB9100	125	Muffin	x		Sleeve	230	1		50/60	3250	42.0	0.24	240	Yes
	MB9100	150	Muffin	x		Sleeve	230	1		50	2700	30.0	0.18	202	Yes
	MB9100	200	Sentinel		x	B.B.	115	1		50/60	3250	42.0	0.45	240	Yes
	MB9100	225	Sentinel		x	B.B.	230	1		50/60	3250	42.0	0.24	240	Yes
	MB9100	250	Sentinel		x	B.B.	230	1		50	2750	30.0	0.20	202	Yes
	MB9100	300	Spartan		x	B.B.	115	1	1.0	50/60	3300	37.5	0.33	280	Yes
	MB9100	325	Spartan		x	B.B.	230	1	1.0	50/60	3250	33.0	0.15	278	Yes
	MB9100	350	Spartan		x	B.B.	115	1	0.39	400	3700	39.0	0.39	324	Yes
	MB9100	400	Centaur	x		Sleeve	115	1		60	3100	45.0	0.66	276	Yes
	MB9100	425	Centaur	x		Sleeve	115	1		50	2650	60.0	0.93	230	Yes
	MB9100	450	Centaur	x		Sleeve	208 230	1		60	3100	48.0	0.36	276	Yes
	MB9100	475	Centaur	x		Sleeve	208 230	1		50	2650	69.0	0.48	230	Yes

MB 9200

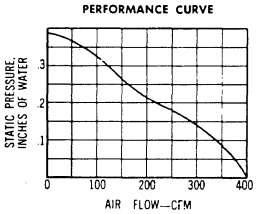


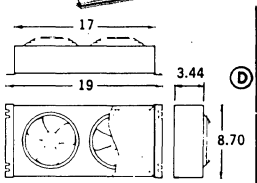
DESCRIPTION — Two (2) powerful ball bearing Rotron Feather Fans delivering 400 cfm from a package 8¾" high and only 3½" deep make up the Modulair MB 9200 series.
The Modulair MB 9200 can also be supplied with Rotron's Saucer fan to meet military specifications. Modulair MB 9200 can be supplied with thermal protection. The noise level is only 56 db (SIL).
WHERE TO USE — Modulair MB 9200 should be used in EIA rack cabinets where component density and resistance to airflow is minimal and where there are relatively free passages for the flow of air.
DUST FILTERS — All Modulairs come equipped with low impedance, washable, porous, Scott Foam filters enclosed in a rigid aluminum frame.

ACCESSORIES

Deluxe Grille	24360-3
Dust Filter	24361-3
Finger Guards	14651

PERFORMANCE CURVE

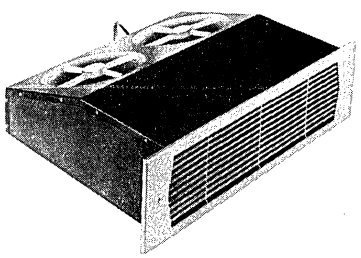




TYPE CHART

	MODULAIR					ELECTRICAL							Air	
	Series	Type	Fan	Comm	Mil	Volts	Phase	* Capacitor	Hz	RPM	Watts	Line Amps	CFM	Dust Filter
Ⓓ	MB9200	100	Feather	x		115	1	2.0	50/60	3380	40	0.36	400	Yes
	MB9200	125	Feather	x		230	1	0.5	50/60	3350	40	0.18	400	Yes
	MB9200	300	Saucer		x	115	1	2.0	50/60	3300	48	0.46	400	Yes
	MB9200	325	Saucer		x	230	1	0.5	50/60	3300	48	0.46	400	Yes
	MB9200	350	Saucer		x	115	1	1.0	400	3750	61	0.60	470	Yes

MB 5100 TWINPAX

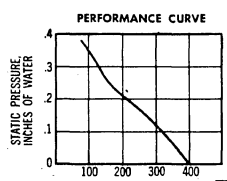


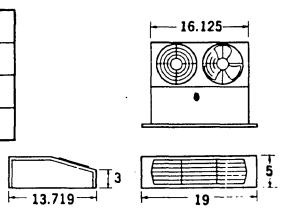
DESCRIPTION — The Modulair MB 5100 Twinpax utilizes the performance capabilities of two (2) Rotron Feather Fans or two (2) Rotron Saucer Fans, as in Modulair MB 9200, to discharge 400 cfm of clean, cool, filtered air.
MB 5100 Twinpax requires only 5¼" panel space, an unusually low profile for a unit with so much performance.
Modulair MB 5100 Twinpax can be supplied with thermal protection. The noise level is only 55 db (SIL).
WHERE TO USE — Modulair MB 5100 Twinpax should be used in EIA rack cabinets where component density and resistance to airflow is minimal and where there are relatively free passages for the flow of air.
DUST FILTERS — Modulair MB 5100 Twinpax is supplied with a large permanent aluminum washable filter.

ACCESSORIES

Deluxe Grille	24360-1
Filtercoat	18440
Finger Guards	19699

PERFORMANCE CURVE





TYPE CHART

	MODULAIR					ELECTRICAL							Air	
	Series	Type	Fan	Comm	Mil	Volts	Phase	* Capacitor	Hz	RPM	Watts	Line Amps	CFM	Dust Filter
Ⓓ	MB5100	100	Feather	x		115	1	2.0	50/60	3380	40	0.36	400	Yes
	MB5100	125	Feather	x		230	1	0.5	50/60	3350	40	0.18	400	Yes
	MB5100	300	Saucer		x	115	1	2.0	50/60	3300	48	0.46	400	Yes
	MB5100	325	Saucer		x	230	1	0.5	50/60	3300	48	0.46	400	Yes
	MB5100	350	Saucer		x	115	1	1.0	400	3750	61	0.60	470	Yes

*Supplied with Modulair, integrally mounted.
Ⓓ AVAILABLE FROM ROTRON DISTRIBUTORS.

ROTRON® INCORPORATED
WOODSTOCK, NEW YORK 12498

How to use eem

to find manufacturers of a specific product

GREEN SECTION

PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See
Materials, Acoustic—Vol 3

Adapters, Waveguide
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Elctrn. Specialty, Thomaston, Conn.
Guide Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. p 883
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J....p 778

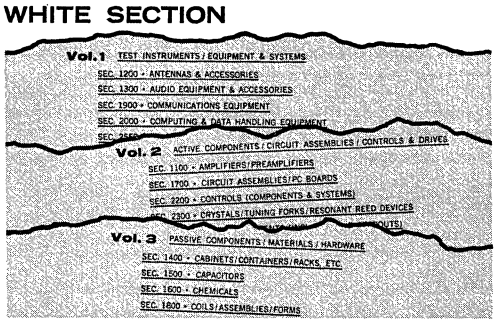
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem,** the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

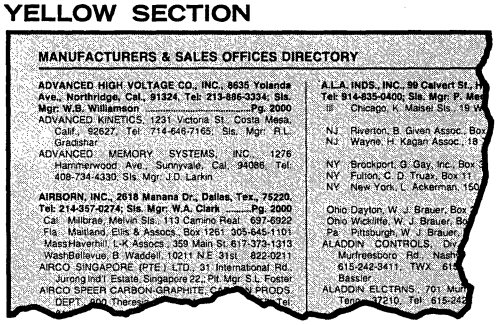
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradshar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2616 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real, 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St, 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st., 822-0211
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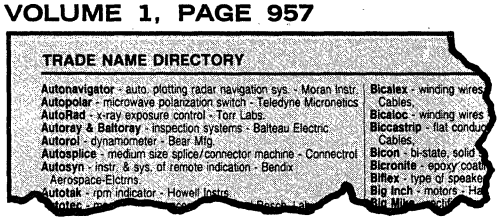
Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio: Dayton, W. J. Brauer, Box...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer,...
ALADDIN CONTROLS, Div... Murfreesboro, Tenn., Nashv... 615-242-3411, TWX: 615... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn. 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Bicalex - winding wires... Cables.
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

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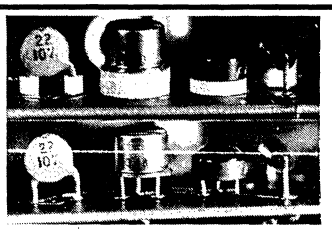
BEFORE

AFTER



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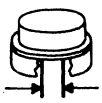
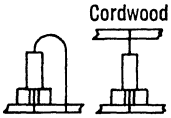
Stock Items	Part No.	I.D.	O.D.	Thickness	Slot Depth	Fig.	Usage
TO-5  .200 Typ. Lead Space	TO-5	.225	.375	03, 04, 05, 06, 07, 09, 10, 12, 13		A	TO-5 spacer
	TO-6	.250	.375	03, 05, 06, 07, 09, 10, 12, 13		A	TO-5 (I.C.) spacer
	TO-9	.300	.437	05, 07, 10, 13		A	TO-5 to .300 L.S.
	TO-13	.225	.310	03, 05, 07, 09, 10, 12, 13		A	TO-5 (epoxy case)
TO-18 .100 Typ. Lead Space	TO-12	.125	.310	08, 10, 12		B	TO-18 to .250 L.S.
	TO-16	.125	.205	03, 05, 07, 10, 13		A	TO-18 (epoxy case)
	TO-17	.170	.250	03, 04, 05, 06, 07, 10, 12, 13		A	TO-18 (thin walls)
	TO-18	.125	.250	03, 04, 05, 06, 07, 09, 10, 12, 13		A	TO-18 (standard)
	TO-20	.125	.290	09, 10, 12, 13		B	TO-18 to .200 L.S.
	TO-27	.125	.290	03, 05, 07, 10, 13		A	TO-18 (heavy walls)
Cordwood  or On-End	TO-7	.075	.175	03, 05, 07, 10		A	Cordwood spacer
	TO-8	.062	.156	03, 05, 06, 07, 09, 10, 12		A	Cordwood spacer
	TO-10	.040	.085	03, 04, 05, 06, 07		A	Cordwood spacer
	TO-11	.045	.100	03, 04, 05, 06, 07		A	Cordwood spacer
	TO-26	.070	.187	02, 03, 04, 05, 06, 07		A	Cordwood spacer
	TO-65	.075	.140	03, 05, 06, 07, 09, 10, 12		A	Cordwood spacer
					Slot Depth		
Axial Spacer or Capacitor Spacer	TO-21	.125	.250	09, 10, 12, 13	.045	C	Axial lead spacer (slot)
	TO-35		.400	12, 15	.065	C	Axial lead spacer (slot)
	TO-36		.187	06, 07, 08, 09, 10, 13	.040	C	Min. axial L.S. (slot)
	TO-37		.156	05, 07, 09	.025	C	Min. axial L.S. (slot)

Part No.	I.D.	O.D.	Thickness	Fig.
TO-19	.250	.480	05, 07, 10	A
TO-22	.225	.437	07, 09, 12	A
TO-23	.090	.310	04, 07, 10	A
TO-24	.090	.340	04, 07, 10	A
TO-25	.180	.480	04, 07, 10	A
TO-29		.156	05, 07, 10	D
TO-30		.060	05, 07, 10	D
TO-31		.125	05, 07, 10	D
TO-32		.187	05, 07, 10	D
TO-33		.250	05, 07, 10	D
TO-34		.375	05, 07, 10	D

General Purpose

Solid Spacer

Fig.	A	B	C	D

PRICES Per Thousand/Per Item:

1-5	$15.00	50-100	$8.50
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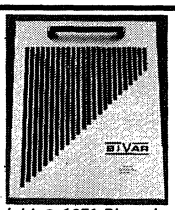
TO ORDER: Simply specify part number, TO-5, followed by thickness as noted in thickness column (-07 indicates .070 thick, etc.)



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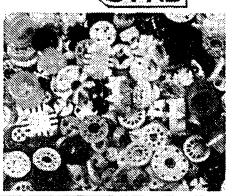

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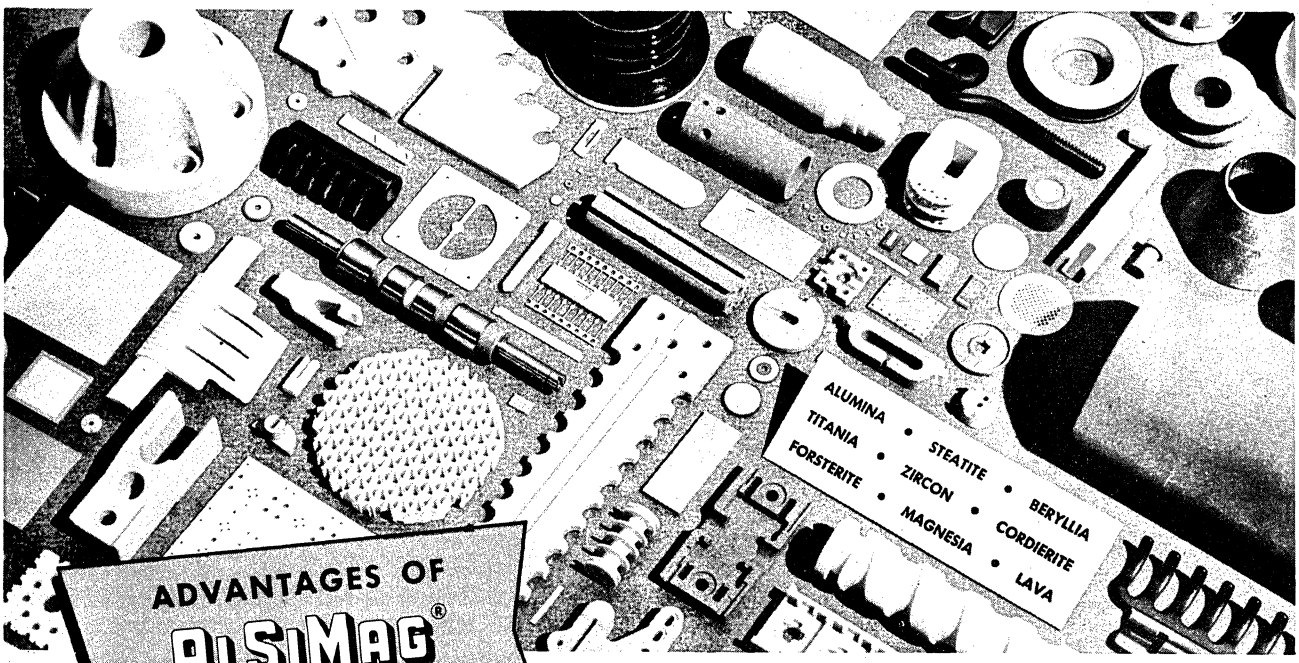

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For many decades American Lava has worked with leading firms to develop special ceramics for their advanced designs. The result is the greatest number of special ceramic compositions available from any source. This wealth of ceramic materials can help in two ways. First, it may give you the exact performance you require. Second, it enables you to select the most economical material that meets your design requirements.

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American Lava Corporation A SUBSIDIARY OF 3M COMPANY

PHONE 615/265-3411 • CHATTANOOGA, TENNESSEE 37405, U.S.A.

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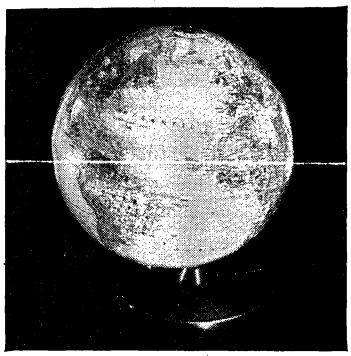
70th YEAR OF CERAMIC LEADERSHIP

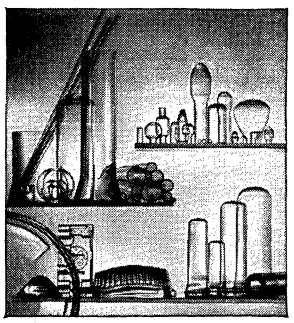


Worldwide Service and Prompt Delivery for Quartz, Lucalox® and Electronic Glass Products

G

GLASS

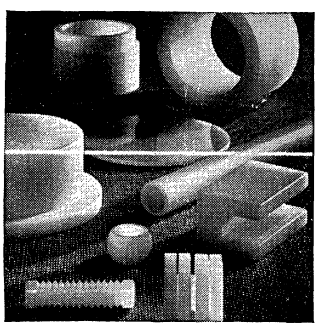
Machine-pressed shapes, formed to specification without additional grinding and polishing, can be furnished in a wide variety of glass compositions. At far right, is an example of an as pressed lens system for an audio visual entertainment unit for children. A highly experienced staff is available for customized orders in glass tubing, special glass formulations (beads) and other glass components.



L

LUCALOX®

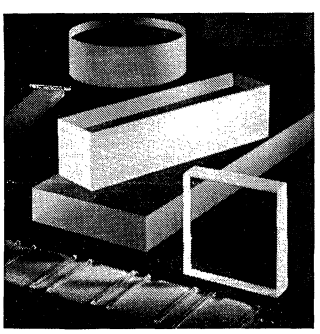
Lucalox®, a polycrystalline alumina, is available in standard tubing, rod, plates, discs and custom parts. This versatile ceramic is ideal for such critical applications as electrical insulators in corrosive environments, where wear surfaces require dimensional stability and for windows when low loss factor is important. Lucalox can transmit up to 90% of total light in the visible spectrum. Outstanding characteristics include: chemically inert to cesium, fluorine, sodium, potassium; transmits radiation in both visible and infrared wave lengths; surface may be polished to less than one micro-inch; high dielectric strength. Lucalox can be fabricated to complex specifications. Standard shapes in stock.



Q

QUARTZ

General Electric high purity fused quartz is available in clear and translucent tubing and rod, solid shapes, standard fabrication, and to custom specifications. New Type 125 fused quartz, a high-quality, economical material which features the absence of large bubbles, is suitable for commercial grade optical and mirror applications. It has low stress birefringence and high transmission in both UV and IR wavelengths.



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MARKEL
SINCE 1922

Insulating Tubings and Sleevings- High Temperature Wire and Cable

HYGRADE®

HYGRADE Fabric-Base Insulating Sleevings, the oldest and best known in the industry, are constructed of carefully braided fiberglass yarn, impregnated and coated with varnishes, vinyls, resins, or silicone rubber compounds.

HYGRADE SR-398 Silicone Rubber Coated Fiberglass Sleeving is a Class H material of closely woven glass braid coated with highly abrasion-resistant silicone rubber.

HYGRADE SV-862 Silicone Varnish Impregnated Fiberglass Sleeving is a flexible Class H insulation with unusual resistance to temperature extremes and weathering.

HYGRADE VF Flexible Fiberglass Sleeving is a tough, Class B insulation of plastic-covered fiberglass combining excellent electricals, flexibility, heat stability.

HYGRADE Polytube 463 Class F Flexible Fiberglass Sleeving is an acrylic-coated material compatible with the wire enamels used in motors and transformers.

HYGRADE Polytube 962 Class F Flexible Fiberglass Sleeving is a polyurethane-coated insulation compatible with the wire enamels in motors and transformers.

HYGRADE Thermoflex 1200 Class C Flexible Fiberglass Sleeving is made of 100% tightly braided fiberglass. For use at continuous temperatures as high as 1200°C.

HYGRADE Thermoflex 500 Class C Flexible Fiberglass Sleeving is made of tightly braided and pigmented fiberglass. For continuous operating temperatures to 500°C.

Ask for data sheets on these HYGRADE and FLEXITE products

FLEXITE®

Included in the FLEXITE line are extruded plastic tubings of Teflon, Silicone Rubber, Vinyls, Polyethylene, Nylon, and other plastics; Shrinkdown Heat Shrinkable extruded Tubings; and TGL Triangular Guide Line Wrapping Tape.

FLEXITE TFE Extruded Tubing of DuPont Teflon is a flexible material for continuous use at 250°C, with outstanding electricals, heat stability, chemical resistance.

FLEXITE AR-400 Modified Teflon Tubing is a flexible material with exceptional abrasion and cut-through resistance at temperatures from −70°C to 250°C.

FLEXITE SR-200 Silicone Rubber Extruded Tubing is made of an extremely elastic compound, and is excellent for high voltage applications at Class H temperatures.

FLEXITE Teflon FEP Extruded Tubing is a fluorocarbon tubing suitable for continuous use at 200°C. It possesses outstanding electricals and chemical resistance.

FLEXITE HT-105C Extruded Vinyl Tubing is U/L recognized for continuous use at 105°C. It is a strong, very flexible tubing suited for many general applications.

FLEXITE E Extruded Vinyl Tubing is an extremely flexible tubing designed primarily for low temperature applications (to −68°C), as in aeronautical instrumentation.

FLEXITE Polyethylene is a flexible Class A tubing offering excellent electricals, compatibility and abrasion resistance over a wide (−70°C to 80°C) temperature range.

FLEXITE Shrinkdown HT-105 Heat Shrinkable Tubing is a flexible material supplied in expanded sizes to cover shapes; it shrinks 50% on application of heat (190°F).

FLEXITE Shrinkdown PO-135 is a Class B flexible tubing which shrinks at 235°F. It is widely used to jacket cables, insulate terminals, and as a printed marker.

FLEXITE Shrinkdown TE-250 is a Heat Shrinkable Teflon Tubing for use at Class H temperatures. It shrinks at 621°F to make a form-fitting Teflon cover over shapes.

1 SOURCE *for* EXCELLENCE *in Insulating Tubings and Sleevings • High Temperature Wire and Cable*

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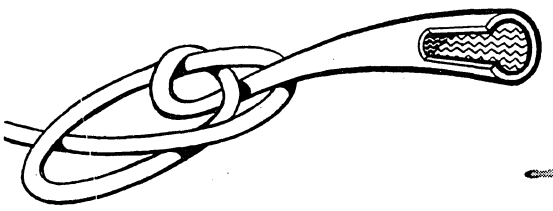
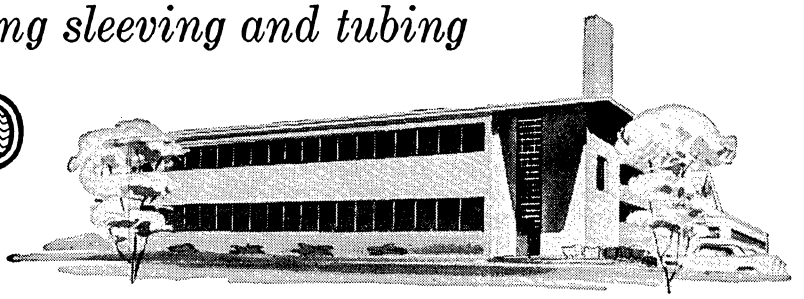
RELIABLE PRODUCTS DELIVERED ON TIME

VARFLEX *the complete line*

of electrical insulating sleeving and tubing





Whatever your problem, heat, cold, flexibility miniaturization, high insulating or dielectric strength—Varflex can supply the required reliability and delivery. Our rapidly expanding plant is fully equipped to supply sleeving for any combination of characteristics you may need. In addition to maintaining large stock for off-the-shelf delivery, Varflex has the productive capacity to provide prompt delivery (often 48 hours) on special orders. As insulation specialists, we are ready to work with you on unusual specifications or applications.

Check your needs against this complete line:

VARGLAS SILICONE RUBBER. Tubing: The ultimate in flexibility, yet dielectric protection to 8000 volts. Class H-A-1 certified to meet Government Specification MIL-I-18057 (SHIPS). Class H-B-1 (4000 volts) available, also. Continuous exposure from minus 70° to 400°F. does not affect coating or Fiberglas braid. Sleeving: Made in Class H-C-1 (2500 volts), Class H-C-2 (1500 volts) and Class H-C-3.

VARGLAS SILICONE RESIN. Tubing: Class H-A-1 is recommended for applications requiring extremes of heat endurance and high dielectric strength (7000 volts). Class H-B-1 is identical except for dielectric guarantee (4000 volts). Good abrasion resistance. Both grades conform to MIL-I-3190A. Sleeving: Made in Classes H-C-1 (2500 volts), H-C-2 (1500 volts) and H-C-3.

SILFLEX SLEEVING. A light coating of Silicone resin on Fiberglas braid. Extremely flexible within a temperature range from minus 85°F. to 500°F.

VARGLAS SILICONE LEAD WIRE. Made from solid or stranded wire covered with one or more walls of Fiberglas braid and impregnated with Silicone. Built to your specifications.

VARGLAS SILICONE TYING CORDS. Continuous filament Fiberglass cords impregnated with Silicone resin, ¼" to ½" diameter. Specify Type 46 for dry cure, Type 48 for tacky cure.

VARGLAS CLASS F TUBING. Made with synthetic resins such as epoxy, polyester or urethane on glass braid and offering better than Class B heat resistance (up to 155°C for continuous operation) while maintaining good electrical properties.

VARFIL TUBING AND SLEEVING. Fiberglas braids impregnated with polyester resin. Four grades available in coils as well as 36" lengths in most sizes. In a class by itself because of its toughness, flexibility, high temperature resistance and ability to withstand bending and twisting without dielectric loss. Compatible with varnish. Over 1000 hours at 125°C., with intermittent operation at 150°C.

VARFLO TUBING AND SLEEVING. Class B insulation. For those who need flexibility, solvent, oil and moisture resistance. Has good shelf life and will not lose dielectric strength when subjected to severe twisting. Three grades . . . Classes B-A-1, B-B-1 and B-C-1. Flame and fungus resistant if specified. B-A-1 approved under MIL-1-21557. Passes proposed Navy 90° bend test after 2,000 hours at 300°F with 3500 volt end point.

VARGLAS VARNISHED TUBING. Flexible continuous coatings of flame resistant varnish built up over Fiberglas braid in eight or more carefully controlled operations. Varnished tubings have thinner walls and good heat resistance.

VARGLAS VARNISHED SLEEVING. NEMA Classes B-C-1, B-C-2 and B-C-3 are similar except for dielectric strength. The impregnant is oleoresinous varnish.

VARGLAS ACRYLIC CLASS F (155°C). Highly resistant to acids, organic solvents, oils and water and exhibits fair resistance to alkalies. It is compatible with polyester, acrylic, epoxy, phenolic and formvar wire enamels. Designed to perform for long periods in the 150°C-175°C range without loss of any electric or physical properties. All standard grades.

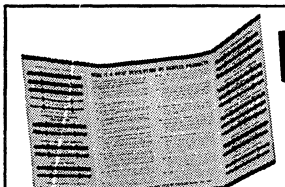
VARGLAS LECTON ACRYLIC. Specifically designed for hermetic motors. Non-contamination of Freon and other refrigerants in Class B motors. B-A-1, B-B-1, and B-C-1 grades.

VARGLAS NON-FRAY SLEEVINGS: Type H: The normalizing treatment given the Fiberglas braid removes the organic impurities and tends to hold the individual filaments together. The lack of any bonding agent means it may be subjected to temperatures as high as 1600°F. Recommended for applications where dielectric requirements are not of prime importance. Resists fungus and is noncorrosive. Type HP: Similar to Type H, but dyed various colors for coding purposes. Ideal as secondary insulation where primary covering might disintegrate due to high temperature or continual flexing. Colors may fade at 300°F. Type HO: A very light treatment of resin added after the braid has been normalized—just enough to hold the sleeving round for accurate cutting. Will distend to cover soldered joints or terminals. Available in eight colors. Colors fade at 300°F., but sleeving unaffected up to 1600°F. Better by 400° than formerly available.

VARGLAS LITEWALL SLEEVING. Wall thickness of Type A is .008" and of Type B, .006". Both types available untreated or treated. If treated, may be supplied in colors. Standard I.D. sizes 1/16" to ½" inclusive. Larger sizes on request.

SYNTHOLVAR EXTRUDED TUBING. Made from vinyl polymers. High dielectric and tensile strength. Will not support combustion nor absorb moisture. Smooth surface, thin wall and flexibility all make for ease in assembling operations. Super HH for installations where temperatures of 105°C. must be withstood. Type XLT will function at temperatures down to —65°C. Specify fungus resistant tubing where needed. Conforms to applicable MIL specifications.

COTTON OR RAYON TUBING. These tubings are furnished with varnish as the impregnant. They are braided from long staple yarns. Standard NEMA grades. They are Classes A-A-1 and A-B-1. Also, sleeving is available in three NEMA grades. Classes A-C-1, A-C-2 and A-C-3.



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Write for our folder containing 25 test samples.

VARFLEX CORPORATION

514 W. Court Street **Rome, N. Y.**

Varflex products meet or exceed applicable government specifications including: **MIL-I-18057A, MIL-I-3190B, MIL-I-7444B, MIL-I-631D, MIL-I-21557**

Varflex CORPORATION *Makers of Electrical Insulating Tubing and Sleeving*

ELECTRONIC SUB-CONTRACTING

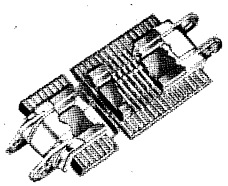
BUNKER RAMO AMPHENOL

Running Cables and Wired Products

Wired running cable assemblies offer the telephone industry the answer to one of its biggest operating questions: how to save time, effort, and money. Amphenol Cadre Division's wired running cables for key set installations are factory-wired.

With the plug-ended concept, the installer merely mates the Amphenol Micro-Ribbon® connectors (or plugs) on either end of the cable with another running cable key set, bridging adaptor or additional system component connectors. It takes seconds, is elementary, and is low in cost.

The Micro-Ribbon Connector



More than 100 million Micro-Ribbon Amphenol 57 Series Connectors are in use today, without a single reported failure.

Unlike pin-and-socket connectors, the Micro-Ribbon contacts are self-cleaning; all foreign matter is dislodged during insertion. Greater contact continuity is assured. And the ribbon type is less expensive, too, with off-the-shelf availability.

The Cable

Amphenol Cadre running cable is constructed of solid, annealed, bare copper wire insulated with high-density, heat-stabilized, color-coded, semi-rigid polyvinyl chloride. To minimize crosstalk, individual conductors are twisted in color-coded pairs. Outer jacket consists of polyvinyl chloride or equivalent material, resistant to moisture, weathering, abrasion, corrosion, heat, and environmental cracking. A nylon ripcord inserted between jacket and conductors allows free stripping of jacket without damage to conductors.

Electrical Characteristics

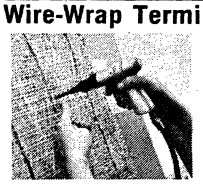
Conductor Size	24 AWG.
Maximum Conductor resistance at 68F (ohms/M ft.)	27.5
Average Mutual capacitance at 1 kHz (mf/M ft.)	0.17
Minimum Insulation resistance (megohms/M ft.)	100

25-Pair Running Cable Description — Ordering Information

Type No.	One End	Overall Cable Assembly Length (feet)	Other End	Type No.	One End	Overall Cable Assembly Length (feet)	Other End	Type No.	One End	Overall Cable Assembly Length (feet)	Other End
AC-A25B-SE-3	Connector	3.5	Raw-ended	AC-A25D-DE-15	Plug	15	Plug	AC-A25D-SE-75	Raw-ended	75	Plug
AC-A25B-DE-3	Connector	3.5	Connector	AC-B25A-DE-15	Connector	15	Plug	AC-A25B-SE-100	Connector	100	Raw-ended
AC-A25D-DE-3	Plug	3.5	Plug	AC-A25D-SE-15	Raw-ended	15	Plug	AC-A25B-DE-100	Connector	100	Connector
AC-B25A-DE-3	Connector	3.5	Plug	AC-A25B-SE-25	Connector	25	Raw-ended	AC-A25D-DE-100	Plug	100	Plug
AC-A25D-SE-3	Raw-ended	3.5	Plug	AC-A25B-DE-25	Connector	25	Connector	AC-B25A-DE-100	Connector	100	Plug
AC-A25B-SE-5	Connector	5	Raw-ended	AC-A25D-DE-25	Plug	25	Plug	AC-A25D-SE-100	Raw-ended	100	Plug
AC-A25B-DE-5	Connector	5	Connector	AC-B25A-DE-25	Connector	25	Plug	AC-A25B-SE-150	Connector	150	Raw-ended
AC-A25D-DE-5	Plug	5	Plug	AC-A25D-SE-25	Raw-ended	25	Plug	AC-A25B-DE-150	Connector	150	Connector
AC-B25A-DE-5	Connector	5	Plug	AC-A25B-SE-50	Connector	50	Raw-ended	AC-A25D-DE-150	Plug	150	Plug
AC-A25D-SE-5	Raw-ended	5	Plug	AC-A25B-DE-50	Connector	50	Connector	AC-B25A-DE-150	Connector	150	Plug
AC-A25B-SE-10	Connector	10	Raw-ended	AC-A25D-DE-50	Plug	50	Plug	AC-A25D-SE-150	Raw-ended	150	Plug
AC-A25B-DE-10	Connector	10	Connector	AC-B25A-DE-50	Connector	50	Plug	AC-A25B-SE-200	Connector	200	Raw-ended
AC-A25D-DE-10	Plug	10	Plug	AC-A25D-SE-50	Raw-ended	50	Plug	AC-A25B-DE-200	Connector	200	Connector
AC-B25A-DE-10	Connector	10	Plug	AC-A25B-SE-75	Connector	75	Raw-ended	AC-A25D-DE-200	Plug	200	Plug
AC-A25D-SE-10	Raw-Ended	10	Plug	AC-A25B-DE-75	Connector	75	Connector	AC-B25A-DE-200	Connector	200	Plug
AC-A25B-SE-15	Connector	15	Raw-ended	AC-A25D-DE-75	Plug	75	Plug	AC-A25D-SE-200	Raw-ended	200	Plug
AC-A25B-DE-15	Connector	15	Connector	AC-B25A-DE-75	Connector	75	Plug				

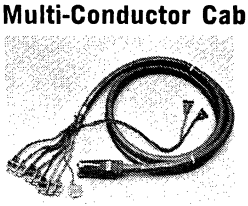
NOTE: The connector referred to in the table is Amphenol Part No. 57-10500-7, the plug is Amphenol Part No. 57-20500-14

Wire-Wrap Termination



Amphenol Cadre delivers as many as 200,000 manual and semiautomatic wraps per day in 22 to 30 gage single, twisted-pair, or triple-twisted wire. Panels with up to 8,000 wraps and incorporating unique routing and buss configurations are shipped within several days of order.

Multi-Conductor Cables



Amphenol Cadre specializes in multi-conductor cables and is expert in every phase of production. Each cable must meet rigidly controlled quality standards at every stage of production. Just before shipment, each cable is again completely tested on custom-modified automatic inspection equipment.

Electromechanical Assemblies

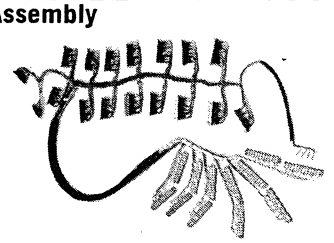
Amphenol Cadre can help keep you on schedule and your costs in line. Temporary plant overloads not only delay shipments but also tie up valuable time and material in process. Extended overtime and decreased efficiency rapidly begin to cut into profits. One way to avoid these problems and stay on schedule is by subcontracting the over-capacity production.

Amphenol Cadre's reaction time is such that we can quickly absorb short-term plant overloads usually at a price less than in-house cost.

Working closely with a customer's engineering laboratory, our production design people can competently turn engineering models into practical production realities.

Our design recommendations on chassis and printed circuit board layout, harness and cable configurations, molded plastic alternates for costly hardware, and connector and termination approaches have saved many manufacturers expensive trial and error prototype production and redesign.

Harness Assembly

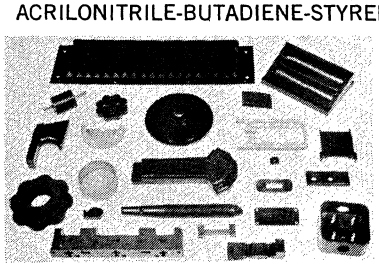


Amphenol Cadre has years of experience in harness manufacturing. One result has been a large accumulation of harness know-how. Many customers come to Amphenol Cadre for redesign of point-to-point wiring in engineering prototypes; others for high volume production of complex harness systems.

When advanced programs require optimum-reliability intra-unit connections, many defense contractors turn to Amphenol Cadre for high environmental harness systems.

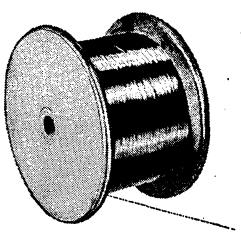
Custom Molding

POLYSTYRENE • POLYPROPYLENE • POLYCARBONATES • ACETALS • POLY-VINYL-CHLORIDE • POLYETHELENE • NYLONS • ACRILONITRILE-BUTADIENE-STYRENE • Others



We have a way with wire

(any way you want it)



For example. Let's take a spool of wire. We can straighten it and cut it. (Diameters from .004 to .125, in lengths from .020" to 12 feet). And form it into shapes of all kinds. Or coil it. Head it in sizes as fine as .008". Upset it even in multiples as fine as .009". Or flatten it wherever you want. Pierce it to specs. Swage it in many ways. Or chamfer one end or both ends–make a full radius on .025". And even give you any combination you may want.

Our range is from fine of .004" to heavy .125". Parts shown are subject to type of wire and temper. Send us your drawings and specs for an estimate. No obligation. And if you need **small metal stampings,** we do that too.

Write for free Bulletin 501

ART WIRE AND STAMPING CO.

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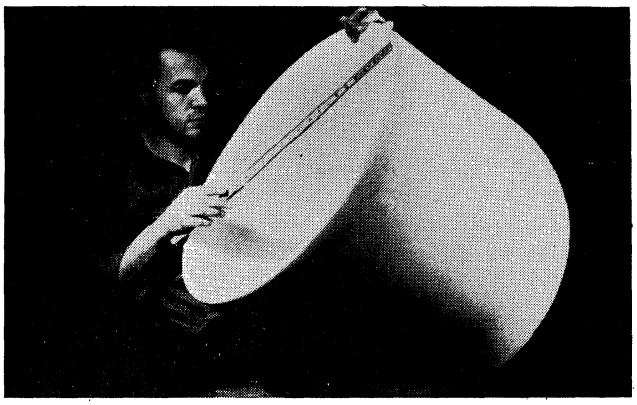
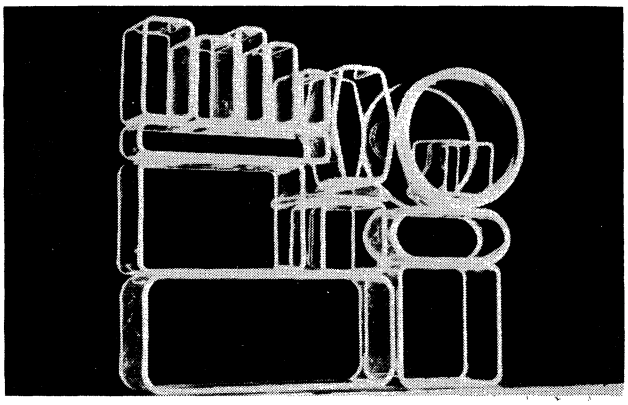
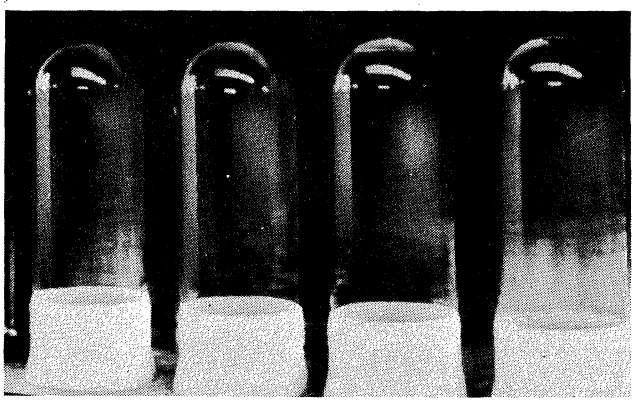
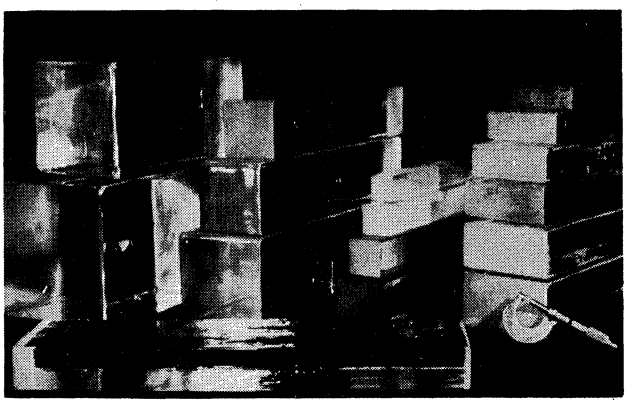








Fused quartz or fused silica. Call on Amersil.

When your plans call for fused quartz or fused silica, call us. Amersil produces both in forms that are highly pure, non-contaminating, resistant to acid and thermal shock, and exhibit high dielectric strength. Our materials can be ordered in a variety of forms and sizes that are either transparent, opaque, or combinations of each. Both types are available as furnace tubes, epitaxial reactors, bell jars, insulators, slice boats, diffusers, distillation apparatus, beakers, flasks, joints . . . and tubing, rod, plates and discs. Amersil is also sales agent for Worden Quartz microbalances and springs.

AMERSIL INC. FUSED SILICA AND QUARTZ

685 RAMSEY AVENUE
HILLSIDE, NEW JERSEY 07205

Triple header

Thermometals® for thermostatic functions

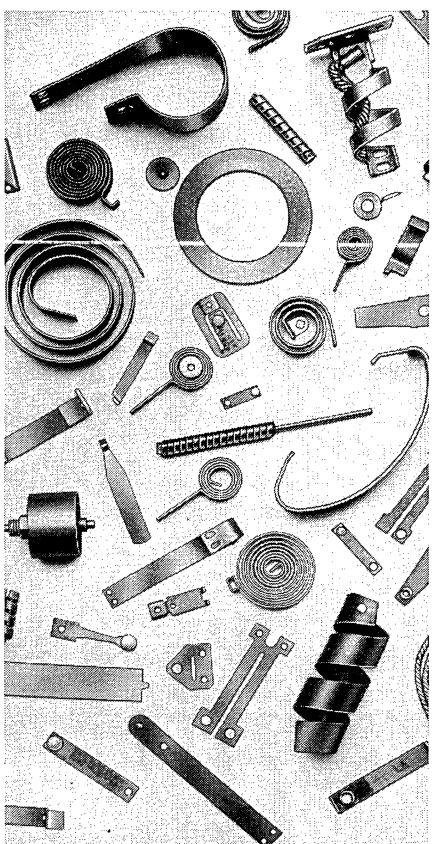
Thermometals are thermostatic bimetals that change shape with temperature and build up force with change of temperature when constrained. They can be used for Temperature Indication, Control and Compensation or Sequence Control. Thermometals can be rolled to any thickness, formed into almost any shape . . . plated, brazed or welded.

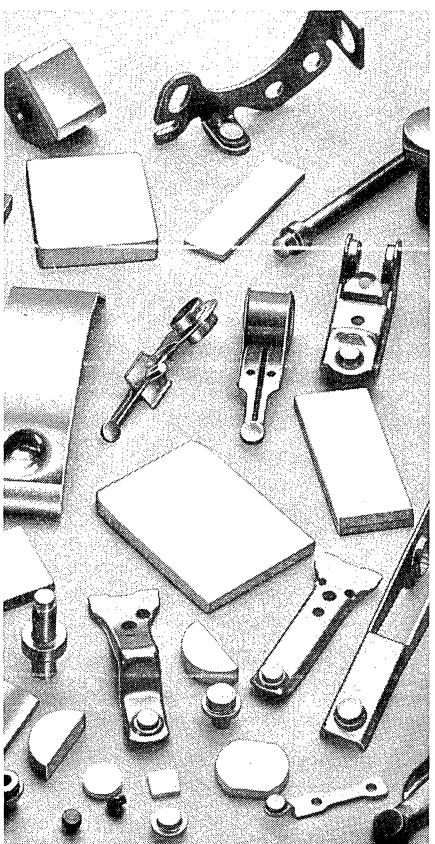
Tungsten and sintered metals for contacts

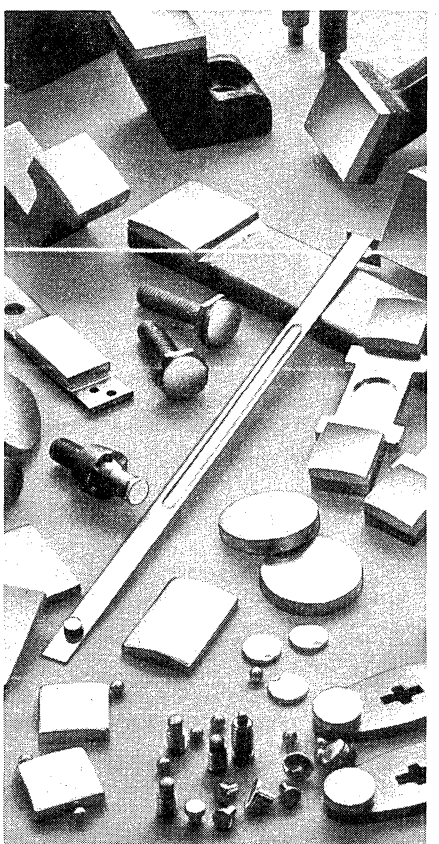
Ideal materials for contacts for heavy duty applications. Our special powder metallurgy processes make possible contacts of sintered materials that can't be alloyed. Available in rivet form, steelbacks, faced screws, discs, washers and special shapes. Assemblies available riveted, hot upset, welded or brazed.

Precious metals and alloys for contacts

Over 1750 precious and sintered metals for electrical contacts. With this variety we can produce every conceivable form of contact in sizes ranging from microminiature to 1¼ in. square (NEMA #6 & #7) motor starters. Whether it's for make and break or for rotating systems we can design and produce the contacts you need.







We have the experience, the engineering and production capabilities to solve any of your contact or thermostatic metal problems. For information and/or engineering assistance write the H. A. Wilson Technical Service Department.

ENGELHARD

ENGELHARD INDUSTRIES DIVISION
ENGELHARD MINERALS & CHEMICALS CORPORATION
2655 U. S. ROUTE 22, UNION, NEW JERSEY 07083

27

Amperex Resistors VARIABLE NON-LINEAR

CARBON POTENTIOMETER

Reliable trimmers, despite small size and low cost, for tube or transistorized PCs. Consist of annular carbon track riveted to base plate of resin bonded paper. Screw driver slot or plastic knob for readjustment. Available in seven mechanical types.

Dimensions

Type	Length	Width	Depth
E097	0.787	0.709	0.177
E086	0.394	0.394	0.150
	Diameter		Depth
440	.488 ± .002		.205 ± .008

Type E086: Linear Resistance Range: 100Ω to 1M ±20%: 13 ranges

Effective angle of rotation ..... 240 ±5°
Maximum permissible power dissipation (of total resistance) at an ambient temperature of 40°C 0.1W
Permissible ambient temperature range ..... −25° to +70°C

Type E097: Linear Resistance Range: 100Ω to 4.7M ±20%: 15 ranges

Effective angle of rotation ..... 220 ±5°
Maximum permissible power dissipation (of total resistance) at ambient temperature of 40°C 0.25W
Permissible ambient temperature range ..... −25° to +70°C

Type 440: Linear Resistance Range: 4700Ω, 10KΩ, 22KΩ, ±20%

Nominal resistance values 4.7K, 10K, 22K
Resistance law ..... linear and logarithmic
Working temperature range ..... −10° to +70°C
Life expectancy ..... in excess of 15,000 cycles

E086

E097

441

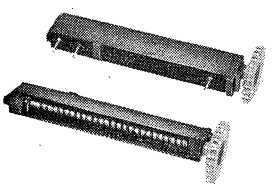
CARBON PRE-SET POTENTIOMETER

Application:
These potentiometers have been designed for pre-set resistance adjustment in capacitance diode television tuners. However, they can also be applied for capacitance diode tuning of other apparatus, e.g. radio receivers, or for any other fine resistance adjustment.

Construction:
The straight carbon track is fitted in a housing of black synthetic resin. The slider, which is connected to the centre contact, is activated by a silvered brass spindle. No damage occurs when one continues to turn the spindle after the slider has reached the extreme position. For adjustment the spindle is provided with a plastic knurled wheel.
The potentiometers are suited for mounting on printed-wiring boards.

Technical Performance

Nominal resistance values ..... 1K-2.2 Megohms
Tolerance on the nominal resistance ..... ±20%
Maximum permissible dissipation at 70°C (P_n) 0.125W
Maximum current through slider contact ..... 1 mA
Voltage range between pins 1 and 3 (or 4) at a voltage of 30 V_{dc} connected to pins 1 and 2 ..... 0.1±0.1 to 29.5+0.5 V_{dc}
Limiting voltage ..... 100 V_{rms}
Setting stability at ΔT_{amb} = 30°C and 0.1 P_n ..... ≤0.1%
Setting stability after damp-heat test (21 days, T_{amb} = 40°C, R.H. = 90—95%) and at 0.1 P_n ..... ≤0.5%
Repeatability (clockwise or counterclockwise) 0.1%
Operating-temperature range ..... −10 to +70°C
Operating torque ..... 0.5 — 1 Ncm
Number of effective operating turns 20



VOLTAGE DEPENDENT

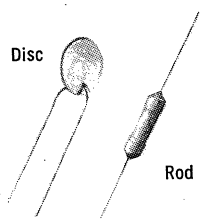
Most important property is the non-linearity between their resistance and the applied voltage. Voltage dependency is due to contact resistance between the silicon carbide crystals. Crystal contacts form a network of series and parallel resistors which determine the electrical characteristics.

Available Types

Disc types available: 0.8W to 3W
Rod types available: 0.7W

Applications

VDRs can be used in spark suppression and contact-protection applications, as well as in series with a resistor for voltage stabilization. Although the stabilizing circuit with a VDR cannot compete with more elaborate circuits, it has vital advantages of simplicity and small space adaptability.



POSITIVE TEMPERATURE COEFFICIENT THERMISTORS

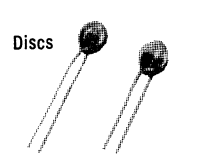
PTC Thermistors increase in resistance as the temperature increases. PTCs are disc shaped with connecting leads and are lacquer coated for protection against atmospheric influences.

Available Types

Standard Discs 1W 40 to 50V series
Standard Discs 0.5W 25V series

Applications

Resistance changes of 10%/°C or better permit the use of PTCs wherever any of the following factors are decisive: ambient temperature; dissipated power; inertia of PTC and positive temperature coefficient.



NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS

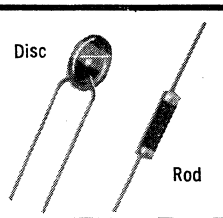
NTC thermistors are resistors which exhibit a high negative temperature coefficient of resistivity. They are made of semiconducting oxidic materials. The resistance of the oxides decreases rapidly when the temperature rises.

Available Types

Rod Type
Disc Type
Miniature Bead Type
Special Types for Automobiles
Special Types for Radio and TV

Applications

Resistance changes of 3% to 6% per °C permit the use of NTCs in applications such as: ambient temperature measurement and control; resistance determined by dissipation and time delays.



AMPEREX ELECTRONIC CORPORATION
Component Division: 35 Hoffman Ave., Hauppauge, N.Y.
Telephone: 516-234-7000 TWX 510-227-8552

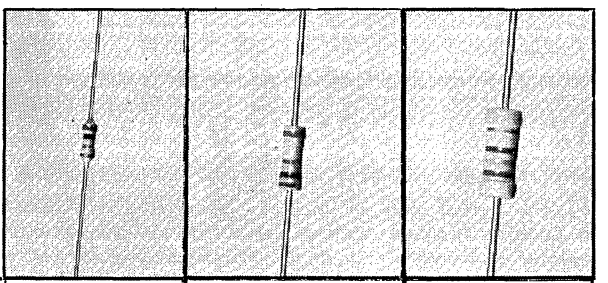
Amperex®
TOMORROW'S THINKING IN TODAY'S PRODUCTS
A NORTH AMERICAN PHILIPS COMPANY

Amperex CARBON FILM FIXED Resistors

High stability, very low noise level, and exceptionally long life make these resistors ideal for applications requiring a steady low power drop. Their accuracy and consistency are relatively unaffected by adverse climatic conditions.

Resistors of 10Ω to 10MΩ have a homogenous film of pure carbon deposited on a high grade ceramic body by cracking a hydrocarbon gas. Resistors having values lower than 10Ω have a nickel film instead of cracked carbon.

Contact caps of special alloy are pressed onto the ends of the resistor body to which the tin coated electrolytic copper connecting wires are welded. Finally the resistors are coated with three or more layers of a special lacquer for electrical, mechanical and climatic protection. This special lacquer will withstand regular industrial cleaning solutions used for cleansing printed circuit boards.



SPECIFICATIONS	⅛W (CR16)	¼W (CR25)	½W (CR37)
Power rating P_{NOM} T_A <70°C	0.125W	0.25W	0.5W
Maximum voltage AC or DC	150V	250V	350V
Voltage (RMS) that may be applied for 1 sec. across insulated coat	300V	500V	700V
Insulation resistance	10^4MΩ	10^4MΩ	10^4MΩ
ALL TYPES			
Ambient temperature	−55 to +155°C		
Temperature coefficient	see figure 2		
Noise voltage	see figure 1		

Voltage Breakdown

2x limiting voltage for 1 min. between terminals of resistor and metal foil ..... no breakdown or flashover

Short Term Overload (Room Temperature)

loaded 5 sec. at 6.25 P_{MAX} at 25°C (not to exceed 2x maximum voltage)
10 cycles: 5 sec on 10 sec off

ΔR_{MAX} 1%

Shelf Test at 25°C_{NOM} for 12 months

ΔR_{MAX} for R < 1MΩ 1.5%
R > 1MΩ 3%

Temperature Cycling

5 cycles: 3 hours −55°C
3 hours +155°C
ΔR_{MAX} .....0.5% or 0.5Ω

Humidity Specifications

After long-term exposure to damp heat at 40°C, 5 VDC
RH = 90-95% for 56 days with no drying
5 VDC

ΔR_{MAX} for R_{NOM} = 10Ω to 100 kΩ 1%
R_{NOM} = 100 kΩ to 1MΩ 2%
R_{NOM} = 1 MΩ or higher 3%

Solder Test (thermal shock)

Terminations immersed for 3 sec. up to .24 inches from end cap in solder bath at 350°C

ΔR_{MAX} .....0.5% or 0.5Ω

Lead Test

a. Tensile: diameter .024-.032 inches; load 2.20 lbs; 10 sec.
diameter > .032 inches; load 4.41 lbs;
10 sec. .....no damage

b. Bending: diameter .024-.032 inches; load 1.10 lbs; 4 x 90°
diameter > .032 inches; load 2.20 lbs;
4 x 90° .....no damage

c. Torsion: 2 x 360° in opposite directions .....no damage

ΔR_{MAX} (for all tests) .....0.5% or 0.5Ω

Shock Test

3 x 1500 shocks in three directions: 50 G;

ΔR_{MAX} .....0.5% or 0.5Ω

Vibration

Frequency: 10-500 Hz
Displacement 0.06 in. or acceleration 10G; three directions; total 9 hrs.

ΔR_{MAX} .....0.5% or 0.5Ω

Voltage Coefficient 5PPM/Volt (0.0005%/Volt)

Resistor Range

Style	Limiting Voltage (Vdc or Vrms)	Resistance Range	Tolerance ±
CR16 (⅛ Watt)	150	10Ω to 220kΩ 270kΩ to 1MΩ	5% 10%
CR25 (¼ Watt)	250	1Ω to 9.1Ω 10Ω to 1MΩ 1.2MΩ to 10MΩ	5% 2% or 5% 10%
CR37 (½ Watt)	350	1Ω to 9.1Ω 10Ω to 1MΩ 1.2Ω to 10MΩ	5% or 10% 2%, 5%,or 10% 10%

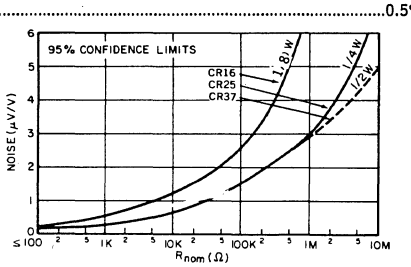


Figure 1. Noise as a function of the resistance value, applicable to all resistor wattages (as per IEC specifications 195; Method of measurement of current noise generated in fixed resistors).

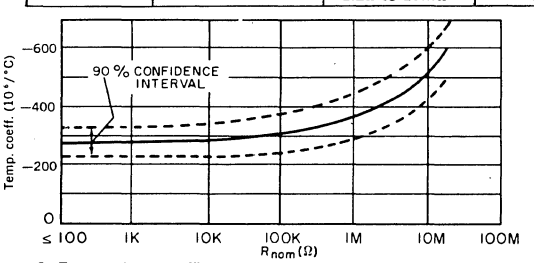


Figure 2. Temperature coefficient as a function of the resistance value, applicable to all resistor wattages.

AMPEREX ELECTRONIC CORPORATION
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A NORTH AMERICAN PHILIPS COMPANY

Balco marstan
BALCO ELECTRONICS, INCORPORATED
307 Washington Street, Orange, N.J. 07050 • (201) 677-1200
TWX 710-994-5812

PRECISION WIRE-WOUND RESISTORS

Balco/Marstan brings together the precision capacitor experience of Balco Capacitors and the precision resistor capability of Marstan Electronics. Balco/Marstan specializes in the design of ultraprecision film capacitors, wirewound resistors, and networks — resistive, capacitive, or RC. The product line — special or standard — is designed for the user who needs a combination of demanding performance parameters such as high stability, low temperature coefficient, and tight tolerance over a wide range of environmental extremes.

BALCO/MARSTAN ENCAPSULATED RESISTORS
Feature:

- Accuracies to 0.005%
- Matching of Sets to 0.005%
- Tracking of 1 PPM/°C
- Available Per MIL-R-93D

RESISTANCE WIRE CHARACTERISTICS

The following chart lists typical specifications. Special techniques developed by Marstan permit reliable combination winding of the listed alloys to provide any value of temperature coefficient from −10 to +6000 PPM/°C.

WIRE TRADE NAME	TEMPERATURE COEFFICIENT (PPM/°C)	THERMAL EMF vs COPPER (μV/°C)	RESISTIVITY (ohms/cmf)	USES
Moleculoy III Alloy COJ	0 ±5 0 ±5	+3.0 +10.0	800 1040	For high resistance values and very low temperature coefficient requirements. Excellent for resistive network applications.
Moleculoy Allow 800 Evanohm	0 ±20 0 ±20 0 ±20	+3.0 +2.5 +2.0	800 800 800	For high resistance values and low temperature coefficient requirements. Good for resistive network applications.
Neutroloy Alloy 45 Cupron	0 ±20 0 ±20 0 ±20	−43.0 −43.0 −43.0	300 300 300	For low resistance values and low temperature coefficient requirements. Good for resistive network applications.
Protoloy Alloy A Tophet A	+80 ±20 +65 +85	+6.0 +6.0 +4.7	650 650 650	For high resistance values and positive temperature coefficient requirements. Used for matching capacitor temperature coefficient in RC network applications.
Electroloy Alloy C Tophet C	+150 +150 +150	+2.0 +2.0 +0.6	675 675 675	For high resistance values and positive temperature coefficient requirements. Used for matching capacitor temperature coefficient in RC network applications.
Pelcoloy Balco	+4500 +4500	−40.0 −40.0	120 120	For high temperature coefficient requirements. Good for temperature sensitive resistor applications.
Nickel 270 HP Nickel	+5000 +6000	−22.0 −22.0	60 50	For very high temperature coefficient requirements. Excellent for temperature sensitive resistor applications.

For Precision Capacitors see pages 2346 and 2347; for Precision RC Networks see page 1296.

PRECISION RESISTOR TYPES

MAW axial lead resistors are suitable for point to point wiring. Standard units are supplied with 2 inch solderable leads, but can be provided with weldable leads. Available in a range from 0.1 ohm to 20 megohms and 0.1 watt (0.093″ diameter x 0.188″ long) to 2 watts (½″ diameter x 2″ long).

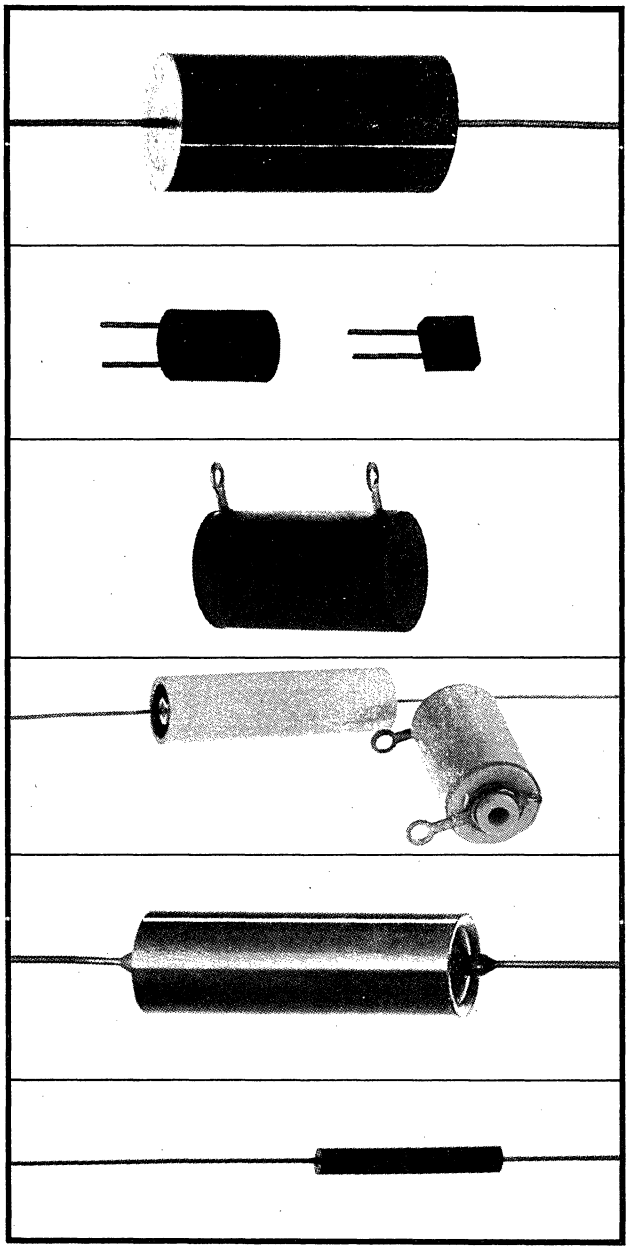
MPC printed circuit style resistors are designed for applications where board space is critical. They are available in a range from 0.1 ohm to 10 megohms and ¼ watt (¼″ diameter x ⅜″ long) to 1½ watts (½″ diameter x 1½″ long).

MRL radial lug resistors are designed for center hole mounting to provide a rugged, space saving configuration. They can be provided with radial lead wire, if required. Available in ranges from 0.1 ohm to 15 megohms and ¼ watt (¼″ diameter x ¼″ long) to 2½ watts (⅞″ diameter x 2⅛″ long).

MCRL and **MCAW** ceramic bobbin resistors provide exceptionally high stabilities under wide extremes of temperature. Axial leads are standard on the MCAW series, while radial lugs or leads are available on the MCRL series.

MAHS hermetically sealed resistors provide exceptionally high stabilities under extreme environments. The MOA oil filled, hermetically sealed series is designed to permit more effective transmission of heat from the winding to the metal case and to provide greater long term stabilities.

Specials include the MTS series of temperature sensitive resistors with matched temperature coefficient characteristics, MNS "needle" shape and Multi Tap Precision Resistors. Many special sizes and shapes can be tailored to meet your specifications.

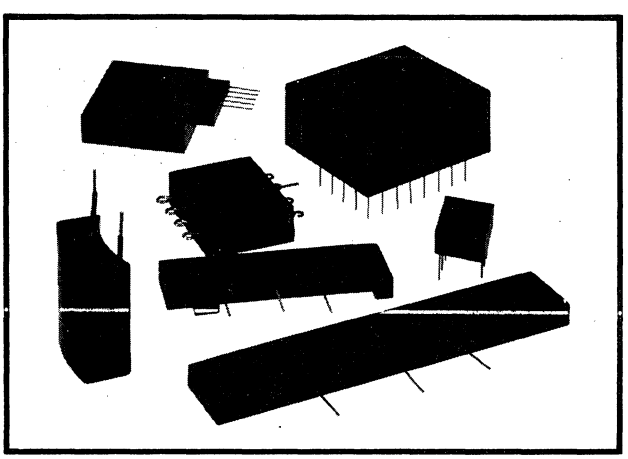


PRECISION NETWORKS

Our unique side by side resistor and capacitor processing ensures the ultimate in component compatibility and overall network performance. Resistors and capacitors can be precisely matched to track over wide temperature ranges.

Typical Networks Manufactured by Balco/Marstan:

- Matched impedance Attenuators
- Summing Networks
- Integrators
- Voltage Dividers
- Phase Shifters
- Binary Resistance Networks
- Twin T Networks
- Bridges
- A/D and D/A Converters
- Timing Networks



Balco marstan

BALCO ELECTRONICS, INCORPORATED

307 Washington Street, Orange, N.J. 07050 • (201) 677-1200
TWX 710-994-5812

ALLEN-BRADLEY
Milwaukee, Wisconsin 53204

S-Level Hot-Molded Fixed Resistors.

Allen-Bradley hot-molded composition resistors are approved for the S-LEVEL of MIL-R-39008 in all wattage ratings and resistance values. Available in this high reliability category are style RCR05—⅛ watt, RCR07—¼ watt, RCR20—½ watt, RCR32—1 watt and RCR42—2 watt.

Allen-Bradley's exclusive hot-molding process molds the resistance material, insulation, and lead wires into a solid, integral structure. The result is a uniform, rugged unit that has excellent thermal characteristics.

RELIABLE—Recognized as the most reliable of all electronic components. We have accumulated over 300-million test hours in accordance with MIL-R-39008.

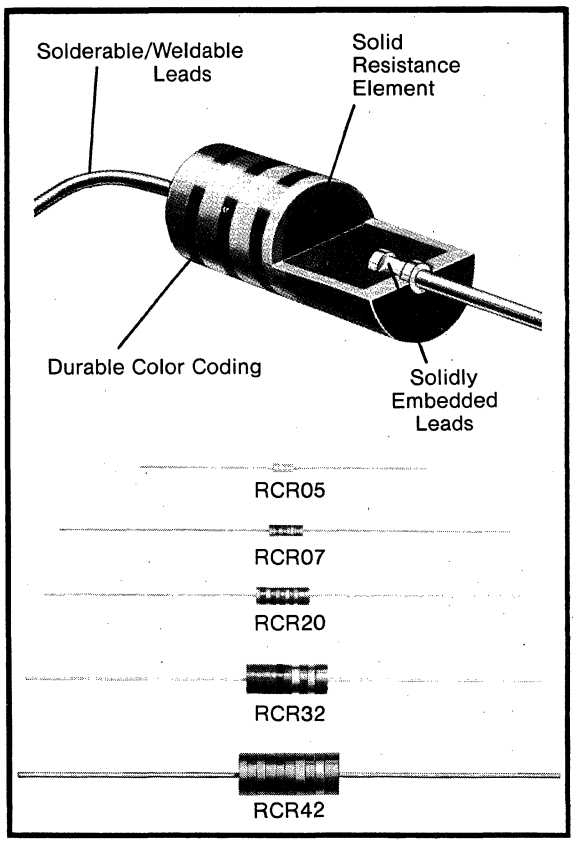
TRACKING—When tested in flip-flop circuits, pairs of A-B resistors randomly drawn from the same package or reel track with each other throughout changes of temperature, humidity, and load.

CONSERVATIVE RATINGS—All performance specifications are based on extensive testing, protracted field experience, and substantial safety factors.

TEMPERATURE STABLE — Between 0°C and 85°C, A-B hot-molded resistors exhibit a very low temperature characteristic, typically less than two or three percent deviation from room temperature values.

SOLDERABLE/WELDABLE LEADS—The hot-solder coated, oxygen-free copper leads are suitable for soldering or welding.

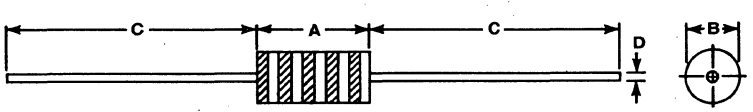
MASSIVE RESISTANCE ELEMENT—Large, uniform cross-section of the conducting material results in low current density without hot spots. This means a high overload capacity.



SOLIDLY EMBEDDED LEADS—Lead wire ends are formed to provide secure embedment and large contact area.

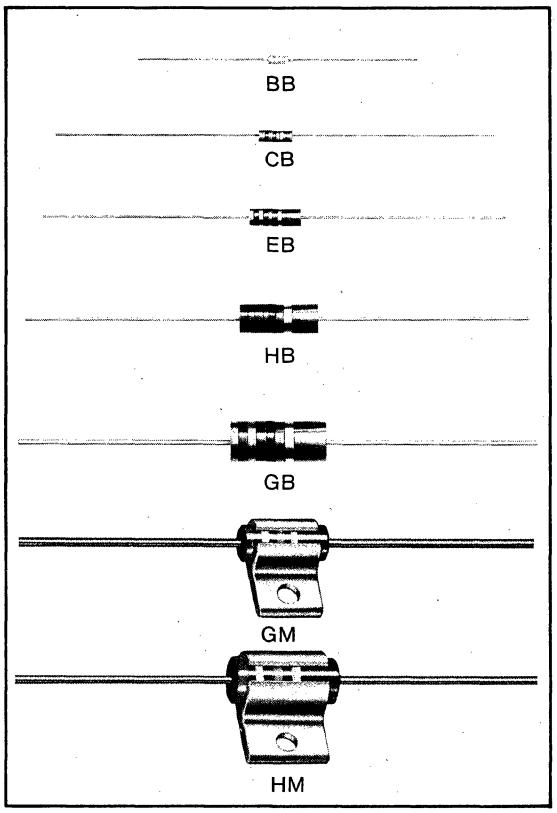
PERMANENT COLOR CODING—Bright, baked-on colors are highly resistant to commonly used solvents.

Style	Power at 70°C	Resistance Range	Tolerance	Voltage Rating (RMS)	Dimensions (Inches)			
					a	b	c	d
RCR05	1/8 watt	2.7 ohms to 22 megohms	±5% ±10%	150 V	0.145	0.062	1.0	0.015
RCR07	1/4 watt			250 V	0.250	0.090	1.5	0.025
RCR20	1/2 watt			350 V	0.375	0.140	1.5	0.033
RCR32	1 watt			500 V	0.562	0.225	1.5	0.041
RCR42	2 watt	10 ohms to 22 megohms		500 V	0.688	0.312	1.5	0.045



ALLEN-BRADLEY

Milwaukee, Wisconsin 53204



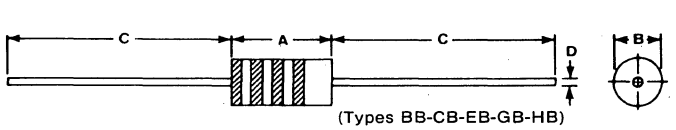
Hot-Molded Fixed Resistors.

Allen-Bradley hot-molded composition resistors are high-quality units intended for general purpose use in the electronics industry. They are backed by many years of manufacturing experience comprising billions of resistors. All units feature rugged and reliable construction, solderable/weldable leads, uniform tracking characteristics, temperature stability, and conservative ratings.

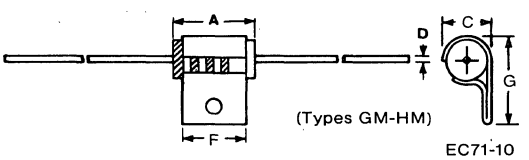
These resistors are available in five ratings—⅛ watt (BB), ¼ watt (CB), ½ watt (EB), 1 watt (GB), and 2 watt (HB). Because of their small size, uniformity, ruggedness and moderate cost, they are equally at home in industrial or consumer product applications. Units are available in all standard EIA and MIL resistance values.

Copper-clad hot-molded resistors (Types GM and HM) are vested with copper clamps for rigid mounting directly on metal chassis or panel. Such mounting is an advantage in equipment subject to shock and vibration. The copper efficiently conducts heat from the resistors to the chassis or panel. Insulation resistance is greater than 100,000 megohms. And the electrical insulation between the leads and the copper clamp can easily withstand 1500 volts. Capacitance between lead wires and clamp is approximately 5.6 MMF for Type GM and 9 MMF for Type HM.

Type	Power At 70°C	Resistance Range	Tolerance	Voltage Rating (RMS)	Maximum Ambient Temperature	Dimensions (Inches)						
						a	b	c	d	e	f	g
BB	1/8 watt	2.7 ohms to 100 megohms	±5% ±10% ±20%	150 V	+130° C	0.145	0.062	1.0	0.015			
CB	1/4 watt	2.7 ohms to 100 megohms		250 V	+150° C	0.250	0.090	1.5	0.025			
EB	1/2 watt	1.0 ohms to 100 megohms		350 V		0.375	0.140	1.5	0.033			
GB	1 watt	2.7 ohms to 100 megohms		500 V		0.562	0.225	1.5	0.041			
HB	2 watts	10 ohms to 100 megohms		750 V		0.688	0.312	1.5	0.045			
GM	3 watts	2.7 ohms to 22 megohms	±5% ±10%	500 V		0.562	0.305	1.5	0.041	0.305	7/16	21/32
HM	4 watts	10 ohms to 22 megohms		750 V		0.688	0.391	1.5	0.045	0.391	9/16	49/64



(Types BB-CB-EB-GB-HB)



(Types GM-HM)

EC71-10

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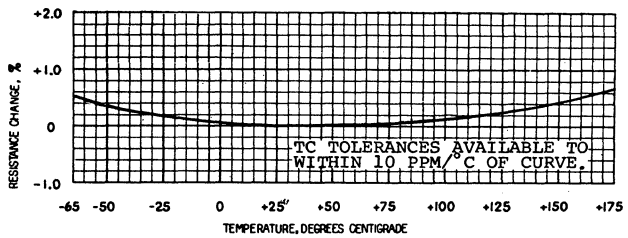
CADDOCK ADVANCED STATE OF THE ART

MICRONOX* Resistance Films

Micronox resistance films are produced exclusively by Caddock Electronics. They are composed of complex oxides fired in air at temperatures above 1400°F. The resulting films are relatively insensitive to high ambient temperatures and thermal shock. Precision resistors, useable to 1000°F. can be made with these films. The films show negligible effect from moisture.

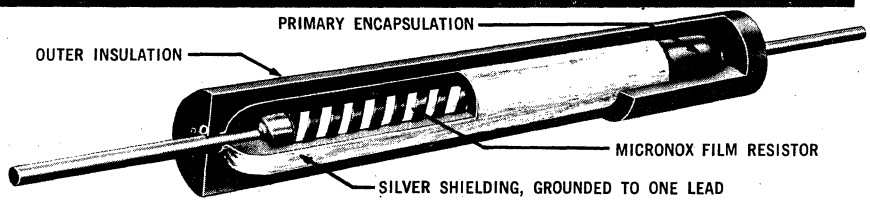
This totally new approach to precision resistors and networks opens new design possibilities because of the wide resistance range, precise temperature characteristics, and high temperature and power capability. Temperature coefficient can be accurately reproduced (±10ppm/°C. if required). The typical curve shown will vary slightly with resistivity of the film and configuration of the substrate.

Micronox oxide systems provide an almost continuous range of resistivity from 5 ohms per square to 25,000 ohms per square, without degradation of electrical characteristics throughout this range.

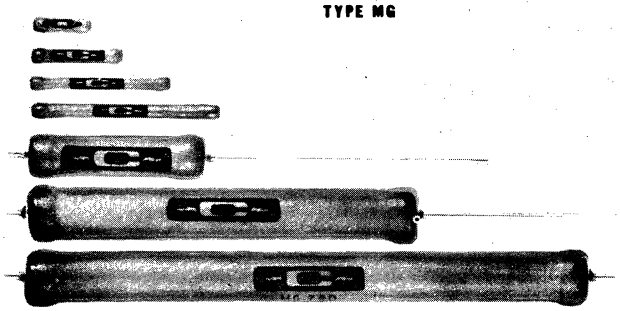


TYPE MG & MH Miniature Megohm Resistors

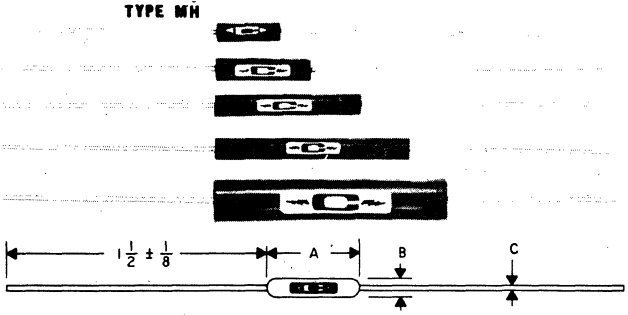
EXCLUSIVE SHIELDED RESISTOR MODEL MH711, designed for extremely high voltage applications, in very high resistance strings. Unit remains exceptionally stable since shielding prevents film degradation from corona developed in high voltage fields.



TYPE MG



TYPE MH

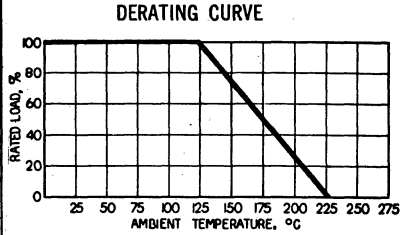


Miniaturized to one-fifth the size of conventional types, covering the 1 to 220 megohm range. Micronox film sintered on high strength core. End cap construction.

Resistance Tolerance: ±1% (tolerances to .2% on special order). **Insulation Resistance:** 100 megohms, minimum. **Overvoltage:** 1.5 times working voltage for 5 seconds, R shift .8% max. **Thermal Shock:** MIL-STD-202, method 107, cond. C, R shift .5% max. **Moisture Resistance:** MIL-STD-202, method 106, R shift .8% max. **Loadlife:** 1000 hours at rated power, R shift .8% max.

Model No.	Wattage	Max. Voltage	Oper. Temp. (Max.)	Dielect. Str'gth	TC ppm/°C†	Resistance Min.	Resistance Max.	Dimensions A	Dimensions B	Dimensions C	Encapsulation	Leadwire
MG 650	.5	600	225°C	750	80	500 K	5 meg	.313 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MG 660	.6	1000	225°C	750	80	1 meg	10 meg	.500 ±.030	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MG 680	.8	1500	225°C	750	80	1 meg	15 meg	.750 ±.030	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MG 710	1.0	2000	225°C	750	80	1 meg	20 meg	1.000 ±.040	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MG 714	1.0	1000	225°C	750	80	1 meg	20 meg	.562 ±.060	.150 ±.030	.032 ±.002	Silicone Conformal	Gold Plated Dumet
MG 721	2.0	2500	225°C	1000	80	1 meg	30 meg	1.000 ±.050	.240 ±.030	.040 ±.002	Silicone Conformal	Tinned Copperweld
MG 750	3.0	3000	225°C	1000	80	3 meg	150 meg	2.125 ±.060	.315 ±.030	.040 ±.002	Silicone Conformal	Tinned Copperweld
MG 780	5.0	4000	225°C	1000	80	4 meg	220 meg	3.125 ±.060	.315 ±.030	.040 ±.002	Silicone Conformal	Tinned Copperweld
MH 651	.5	600	225°C	750	80	500 K	5 meg	.313 ±.020	.094 ±.006	.025 ±.002	Black Molded Type	Gold Plated Dumet
MH 661	.6	1000	225°C	2000	80	1 meg	10 meg	.500 ±.030	.114 ±.010	.025 ±.002	Black Molded Type	Gold Plated Dumet
MH 681	.8	1500	225°C	2000	80	1 meg	15 meg	.750 ±.030	.114 ±.010	.025 ±.002	Black Molded Type	Gold Plated Dumet
MH 682	.8	800	225°C	1000	80	1 meg	12 meg	.400 ±.020	.150 ±.010	.025 ±.002	Black Molded Type	Gold Plated Dumet
MH 713	1.0	2000	225°C	2000	80	1 meg	20 meg	1.000 ±.030	.114 ±.010	.025 ±.002	Black Molded Type	Gold Plated Dumet
Type MH with special internal shielding, designed to eliminate degradation due to corona												
MH 711	1.0	2000	225°C	2000	80	1 meg	20 meg	1.200 ±.040	.220 ±.015	.025 ±.002	Black Molded Type	Gold Plated Dumet

DERATING CURVE



†Temperature Coefficient: Referenced to 25°C, ΔR taken at −15°C and +105°C

*Trade Mark

CADDOCK ELECTRONICS

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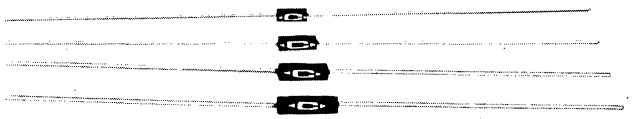
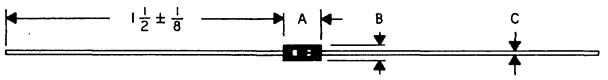
MICROMINIATURE FILM RESISTORS

TYPE ML & MM Precision Film Resistors

Micronox film on high strength core for greater resistance range. End cap construction. Molded type case for increased resistance to abrasion and solvents. Twice the power rating of metal film resistors of a given size.

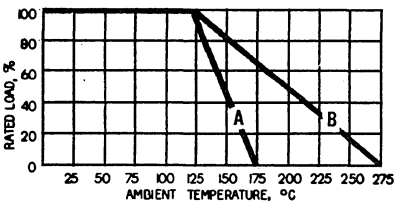




Resistance Tolerance: ±1% (tolerances to .1% on special order). **Insulation Resistance:** 100 megohms, minimum. **Overload:** 5 times rated power for 5 seconds, R shift .5% max., or .5 ohms max., whichever is greater. **Overvoltage:** 1.5 times max. voltage for 5 seconds, R shift .5% max., or .5 ohms max., whichever is greater. **Thermal Shock:** MIL-STD-202, method 107, cond. B, R shift .2% max., or .5 ohms max., whichever is greater. **Moisture Resistance:** MIL-STD-202, method 106, R shift .5% max., or .5 ohms max., whichever is greater. **Loadlife:** 1000 hours at rated power, R shift .5% max., or .5 ohms, whichever is greater.

Model No.	Wattage	Max. Voltage	Oper. Temp. (Max.)	Dielect. Str'gth	TC ppm/°C†	Resistance Min.	Resistance Max.	Dimensions A	Dimensions B	Dimensions C	Encapsulation	Leadwire
ML 104	.08	200	175°C	400	50	50Ω	300 K	.160 ±.010	.065 ±.010	.016 ±.002	Green Molded Type	Gold Plated Dumet
ML 114	.15	200	175°C	500	50	50Ω	500 K	.188 ±.020	.070 ±.015	.020 ±.002	Green Molded Type	Gold Plated Dumet
ML 124	.25	300	175°C	750	50	50Ω	600 K	.250 ±.020	.094 ±.006	.025 ±.002	Green Molded Type	Gold Plated Dumet
ML 131	.4	500	175°C	750	50	50Ω	1 meg	.313 ±.020	.094 ±.006	.025 ±.002	Green Molded Type	Gold Plated Dumet
ML 181	.6	600	175°C	750	50	50Ω	5 meg	.400 ±.020	.150 ±.010	.025 ±.002	Green Molded Type	Gold Plated Dumet
MM 112	.12	200	275°C	400	50	10Ω	500 K	.160 ±.010	.065 ±.010	.016 ±.002	Black Molded Type	Gold Plated Dumet
MM 125	.25	200	275°C	500	50	10Ω	1 meg	.188 ±.020	.070 ±.015	.020 ±.002	Black Molded Type	Gold Plated Dumet
MM 152	.4	300	275°C	750	50	10Ω	2 meg	.250 ±.020	.094 ±.006	.025 ±.002	Black Molded Type	Gold Plated Dumet
MM 177	.6	500	275°C	750	50	20Ω	5 meg	.313 ±.020	.094 ±.006	.025 ±.002	Black Molded Type	Gold Plated Dumet
MM 215	1.0	800	275°C	1000	50	10Ω	10 meg	.400 ±.020	.150 ±.010	.025 ±.002	Black Molded Type	Gold Plated Dumet

DERATING CURVE

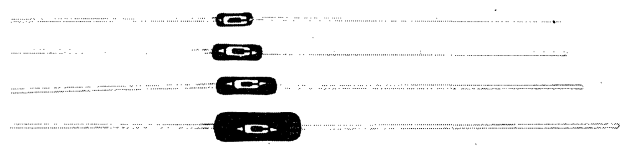


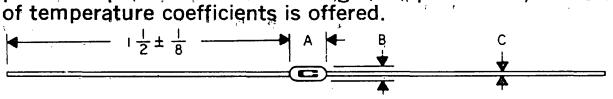
A—ML B—MM

†Temperature Coefficient: Referenced to 25°C, ΔR taken at −15°C and +105°C

TYPE MR & MS Power Film Resistors

Micronox film on high strength core. End cap construction. Featuring smallest size for given power ratings. Specially designed with a wide range of resistance values for high temperature operation. For less stringent requirements, a choice of temperature coefficients is offered.

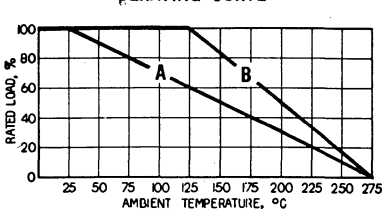




Resistance Tolerance: ±1% (tolerances to .1% on special order). **Insulation Resistance:** 100 megohms, minimum. **Overload:** 5 times rated power for 5 seconds, R shift .5% max., or .5 ohms max., whichever is greater. **Overvoltage:** 1.5 times max. voltage for 5 seconds, R shift .5% max., or .5 ohms max., whichever is greater. **Thermal Shock:** MIL-STD-202, method 107, cond. C, R shift .5% max., or .5 ohms max., whichever is greater. **Moisture Resistance:** MIL-STD-202, method 106, R shift .5% max., or .5 ohms max., whichever is greater. **Loadlife:** 1000 hours at rated power, R shift .5% max., or .5 ohms max., whichever is greater.

Model No.	Wattage	Max. Voltage	Oper. Temp. (Max.)	Dielect. Str'gth	TC ppm/°C†	Resistance Min.	Resistance Max.	Dimensions A	Dimensions B	Dimensions C	Encapsulation	Leadwire
MR 129	.25	200	275°C	500	150	10Ω	500 K	.188 ±.020	.070 ±.015	.020 ±.002	Silicone Conformal	Nickel
MR 154	.40	300	275°C	750	150	10Ω	1 meg	.250 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Nickel
MR 178	.60	500	275°C	750	150	20Ω	3 meg	.313 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Nickel
MS 126	.25	200	275°C	500	50	10Ω	1 meg	.188 ±.020	.070 ±.015	.020 ±.002	Silicone Conformal	Gold Plated Dumet
MS 150	.5	—	275°C	500	50	10Ω	2 K	.188 ±.020	.070 ±.015	.020 ±.002	Silicone Conformal	Gold Plated Dumet
MS 151	.5	300	275°C	750	50	10Ω	2 meg	.250 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MS 175	.75	—	275°C	750	50	10Ω	2 K	.250 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MS 176	.75	500	275°C	750	50	20Ω	5 meg	.313 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MS 210	1.0	—	275°C	750	50	20Ω	3 K	.313 ±.020	.094 ±.015	.025 ±.002	Silicone Conformal	Gold Plated Dumet
MS 220	2.0	—	275°C	750	50	50Ω	4 K	.400 ±.060	.140 ±.030	.025 ±.002	Silicone Conformal	Tinned Copperweld

DERATING CURVE



A—Models MS150, MS175, MS210, MS220
B—all MR models, and MS126, MS151, MS176

†Temperature Coefficient: Referenced to 25°C, ΔR taken at −15°C and +105°C

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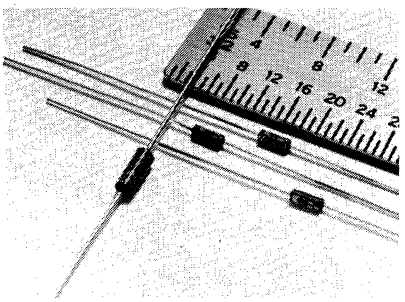
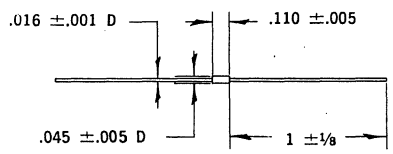
NEW FILM RESISTORS

MICROMINIATURE PRECISION FILM RESISTOR — MODEL ML 103





The ML 103 is the newest addition to the Caddock line of microminiature precision film resistors; reduced to less than half the overall size of the RN50 without sacrificing environmental performance characteristics. Construction is Micronox film on high strength core. Molded case provides environmental protection.

SPECIFICATIONS:

Resistance Range:
10Ω to 250K

Power Rating:
.06 Watt @ 125°C (Derated to 0 @ 175°C)

Resistance Tolerance:
±1% (Tolerances to 0.1% on special orders)

Encapsulation:
Green Molded Type

Leadwire Material:
Gold Plated Dumet

Insulation Resistance:
100 megohms minimum

Temperature Coefficient:
±50 PPM/°C (Reference 25°C, ΔR at −15°C and +105°C)

Overload:
5 times rated power for 5 seconds, R Shift .5% Max.

Overvoltage:
1.5 times max. voltage for 5 seconds, R Shift .5% Max.

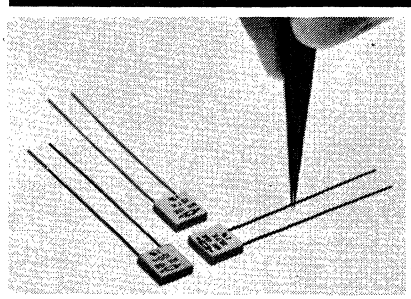
Thermal Shock:
Mil-Std 202, Method 107, Cond. B, R Shift .2% Max.

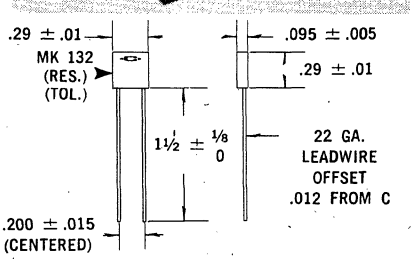
Moisture Resistance:
Mil-Std 202, Method 106, R Shift .5% Max.

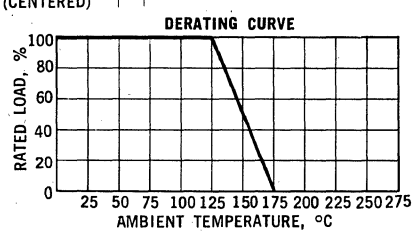
Loadlife:
1000 hours at rated power, R Shift .5% Max.

Marking:
Caddock Logo, Model Number, Resistance Value, Tolerance

LOW COST NON-INDUCTIVE PRECISION FILM RESISTOR IN RECTANGULAR CASE — MODEL MK 132







New precision film resistors encased in rectangular molded cases with radial leads are low cost units designed for high density packaging in large volume printed circuit applications. Non-inductive pattern makes these units desirable for high frequency or fast response applications.

The new resistor incorporates the same high stability Micronox resistive film and quality materials used in other aerospace components in the Caddock precision resistor line.

SPECIFICATIONS:

Resistance Range:
10 ohms to 5 meg

Tolerance:
±1% (Tolerances to ±.1% on special order)

Wattage:
.75 Watt @ 125°C (Derated to 0 @ 175°C)

Max. Working Voltage:
400 Volts

Operating Temperature:
−55°C to 175°C

Temperature Coefficient:
50 PPM/°C (Ref. 25°C, ΔR taken at −15°C and +105°C)

Encapsulation:
Molded silicone

Leadwire Material:
Tinned copper

1000 Hour Load Life:
R Shift .4% Max. or .2Ω

Moisture Resistance:
R Shift .5% Max. or .2Ω

Low Temp. Operation:
R Shift .05% Max. or .2Ω

Temperature Cycling:
R Shift .2% Max. or .2Ω

Short Time Overload:
R Shift .15% Max. or .2Ω

Low Temp. Storage 4 Hour @ −40°C:
R Shift .05% Max. or .2Ω

Soldering:
R Shift .03% Max. or .2Ω

Insulation Resistance:
$> 10^9$ ohms

Shock:
R Shift .05% Max. or .2Ω

Vibration:
R Shift .05% Max. or .2Ω

Lead Pull 5 lbs.:
R Shift .04% Max. or .2Ω

Marking:
Caddock Logo, Model Number, Resistance Value, Tolerance

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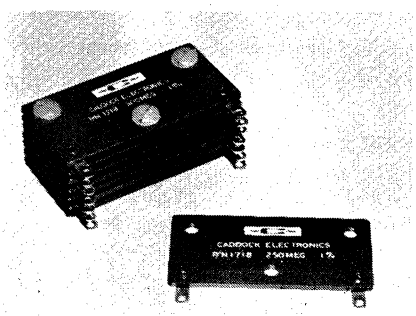
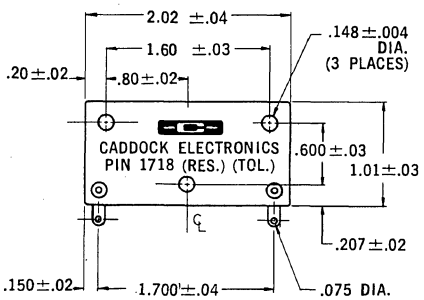
MULTI-MEGOHM FILM RESISTOR EXCLUSIVE MODULAR STACK-UP PACKAGE

MODEL 1718





This Multi-Megohm Resistor is designed to provide non-inductive high resistance values with precise resistance-temperature characteristics. These are especially useful in high resistance voltage dividers where fast response is important. On special order, resistor sets can be provided with voltage ratio accuracy to ±.01% and temperature tracking within 2ppm/°C.

Construction is high strength alumina substrate with fired-on Micronox resistance film and coated with material specially selected to prevent parallel leakage throughout temperature range. Units are compatible with most RTV potting.

SPECIFICATIONS:

Resistance Range:
1 meg-333 meg

Power Rating:
3 Watts @ 25°C

Max. Working Voltage:
12000 Volts

Resistance Tolerance:
±1% (Tolerances 0.2% on special order)

Terminal Material:
Gold Plated Copper

Encapsulation:
Conformal Coating

Insulation Resistance:
100,000 Megs, Min. when mounted as specified below

Temperature Coefficient:
±80 PPM/°C. Referenced to 25°C, ΔR taken at −15°C and +105°C

Thermal Shock:
Mil Std 202, Method 107, R Shift .5% Max.

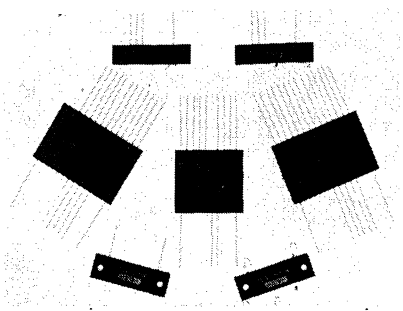
Loadlife:
1000 hours at rated power, R Shift .8% Max.

Mounting:
Three 6-32 Nylon Screws with Standoff Spacers, .050 Thick, Supplied with unit

Operating Temperature:
−55°C to +125°C

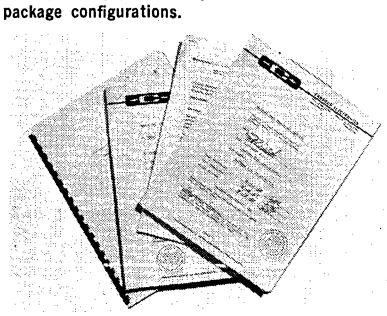
SPECIAL RESISTIVE DEVICES

- **HIGH RESISTANCE RESISTORS to 5000 megs, 1%, 80 PPM/°C**
- **PRECISION VOLTAGE DIVIDERS with tracking as close as 2 PPM/°C**
- **DAC LADDER NETWORKS to 12 bits, and DECADE NETWORKS to your specs**

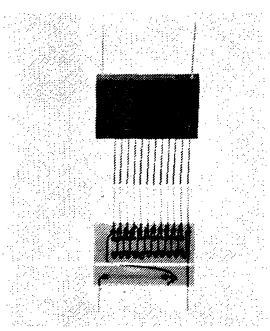


MOLDING FACILITIES equipped to produce your package design, or mold your networks in available package configurations.

Caddock produces miniature wirewound and film resistors, as well as networks on ceramic substrate. We can combine the best of these techniques in producing your special resistor or network requirement.



TESTING FACILITIES to supply output and performance data under actual operating temperature extremes. Qualifying test data available to satisfy qualification requirement on similar devices.



X-RAY FACILITIES available to verify and assure integrity and soundness of package — up to 100% inspection.

SEND US PRINTS OR SKETCHES ON YOUR SPECIFIC REQUIREMENTS FOR A PROMPT DESIGN AND COST PROPOSAL.

CADDOCK ELECTRONICS

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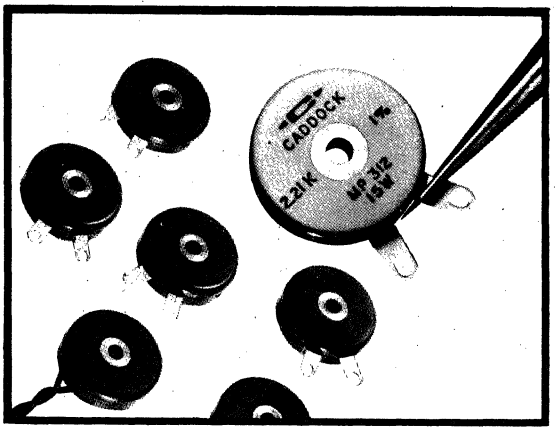
NEW TYPE MP POWER FILM RESISTORS*

CHASSIS MOUNTED

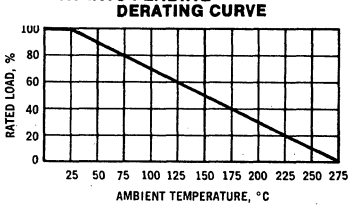


Features: High Stability Micronox Film Element ▪ Non-Inductive ▪ Higher Resistance Range ▪ Lower Cost ▪ Low Profile—Smaller Size—Lighter Weight

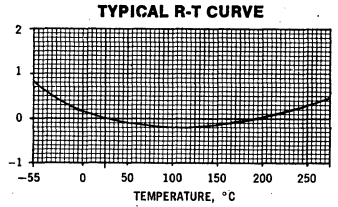
Micronox film is fired on high strength ceramic substrate; then mounted on anodized aluminum base. This construction gives vastly improved efficiency in heat transfer from resistor element to chassis. Molded silicone encases the electrical elements for high environmental performance.

* PATENTS PENDING

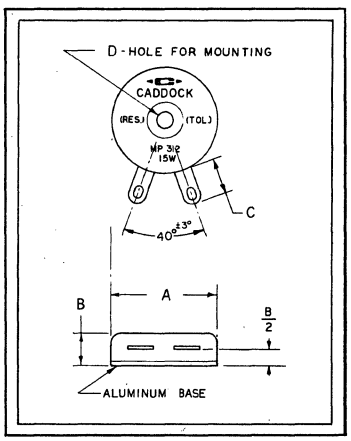
DERATING CURVE



TYPICAL R-T CURVE



Model No.	Power Rating†	Max. Voltage	Diel. Str.	High Temp. TC‡	Resistance Range		Dimensions				Terminals
					Min.	Max.	A	B	C	D	
MP311	15 Watts	300	600	50	50Ω	200 K	.600	.188	—	.092	12" Min Teflon Leads 26AWG 7x34
MP312	15 Watts	300	600	50	10Ω	200 K	.600	.188	.185	.092	Gold Plated Solder Lugs
MP329	30 Watts	450	1000	50	50Ω	200 K	.850	.250	—	.142	12" Min Teflon Leads 22AWG 7x30
MP330	30 Watts	450	1000	50	10Ω	200 K	.850	.250	.250	.142	Gold Plated Solder Lugs



†Power rating based on chassis mounting — MP311 and MP312 on 6"x4"x2"x.040 aluminum chassis
MP329 and MP330 on 5x7x2x.040 aluminum chassis

‡TC — 50ppm Referenced to 25°C, ΔR taken at +150°C and +275°C. (Low temp. TC will be nominally —85ppm/°C at —55°C. See typical R-T curve.)

Resistance Tolerance: ±1% standard (Other tolerances on special order.)
Insulation Resistance: 10,000 Megohms, dry. Method — Mil-R-18546D, para. 4.6.8.
Solderability: Per Mil-R-18546D, para. 3.7, para. 4.6.4.
Terminal Strength: Per Mil-Std-202, Method 211, Cond. A (Pull Test), 5 lbs., and Cond. B (Bend Test). Max ΔR, .2% or .2Ω, whichever is greater.
Thermal Shock: Per Mil-R-18546D, para. 4.6.9, max. ΔR, .5% or .2Ω, whichever is greater.
Momentary Overload: 2 times rated power or 1.5 times max. allowable working voltage, whichever gives the lower power, for 5 seconds. Max. ΔR, .5% or .2Ω, whichever is greater.
Moisture Resistance: Mil-Std-202, Method 106B, less steps 7a and 7b, max. ΔR, .5% or .2Ω, whichever is greater.
Life: Per Mil-R-18546D, para. 4.6.12, 1,000 hrs., Max. ΔR 1% or .2Ω, whichever is greater.
Shock, Medium Impact: 50G, per Mil-Std-202, Method 205, Cond. C.
Vibration, High Frequency: Per Mil-Std-202, Method 204, Cond. B, Max. ΔR .2% or .2Ω, whichever is greater, through shock and vibration sequence.

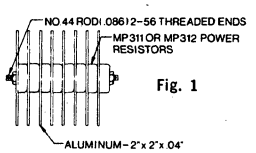


Fig. 1

Fig. 1. **Stacked Assembly** shows **high density packaging** of power resistors. By stacking with 2 inch square aluminum plates between the resistors, heat can be dissipated in three ways:

1. **Convection with plates oriented horizontally.** The power rating per graph, Fig. 2, is 4 watts each resistor and would be useful in rating applications where horizontal installation is necessary or where equipment is rotating and part orientation is variable.
2. **Convection with plates oriented vertically.** The power rating, per graph, Fig. 2, is 6 watts each resistor.
3. **Ducted Air Flow.** This method of application permits the highest possible power density and offers the additional advantage of ducting heat out of the equipment.

Fig. 3. **Power Rating vs. Chassis Area** provides design information for conventional application of MP resistors, per Mil-R-18546, by mounting on aluminum chassis or panel.

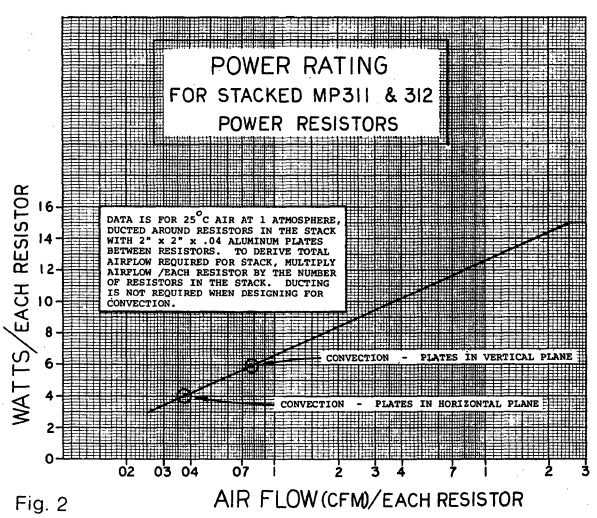


Fig. 2

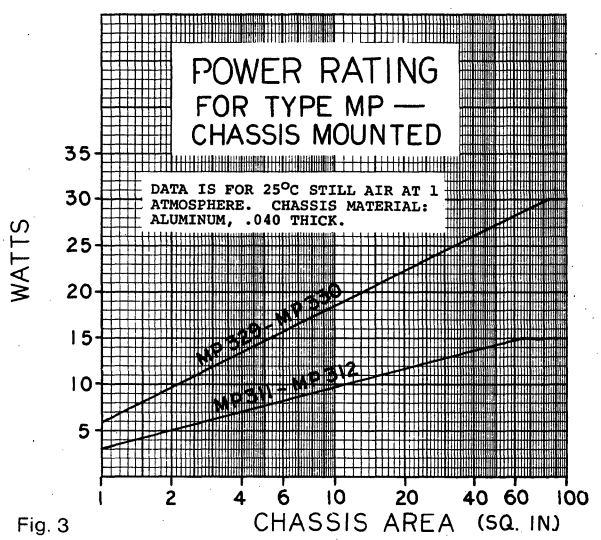


Fig. 3

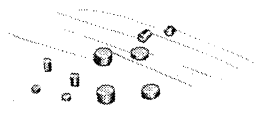
CADDOCK ELECTRONICS

3127 Chicago Avenue, Riverside, California 92507 • Telephone: (714) 683-5361

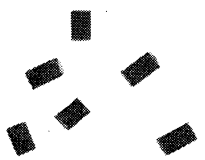
CTS CORPORATION ELKHART, INDIANA

RESISTORS & RESISTOR MODULES

SOLID CERMET PELLET AND CHIP RESISTORS



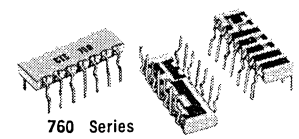
Ceradot® Resistors



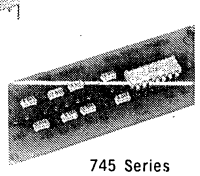
150 Series

	Series					
	A	B	C	E	150	151
Size, Dia. x Length	.050" x .030"	.100" x .062"	.050" x .062"	.100" x .030"	.075" x .050" x .030"	.090" x .050" x .030"
Minimum Resistance	50Ω	25Ω	100Ω	15Ω	200Ω	200Ω
Maximum Resistance	100KΩ	50KΩ	200KΩ	25KΩ	350KΩ	350KΩ
Wattage Rating at 125°C	1/10	1/8	1/10	1/10	1/8	1/8
Temp. Coefficient, ppm/°C	±300	±300	±300	±300	±300	±300
Voltage Rating	50V	50V	50V	50V	50V	50V
Standard Res. Tolerance	±10%	±10%	±10%	±10%	±10%	±10%
Spec. Res. Tol. Avail.	5%, 2%, 1%	5%, 2%, 1%	5%, 2%, 1%	5%, 2%, 1%	5%, 2%, 1%	5%, 2%, 1%
Termination—Gold	Yes	Yes	Yes	Yes	Yes	Yes
Termination—Plat. Gold	Yes	Yes	Yes	Yes	Yes	Yes
Termination—Tinned	Yes	Yes	Yes	Yes	Yes	Yes
Termination—Silver	Yes	Yes	Yes	Yes	Yes	Yes
Termination—Leaded	Yes	Yes	Yes	Yes	No	No
Order From	Lafayette	Lafayette	Lafayette	Lafayette	Lafayette	Lafayette

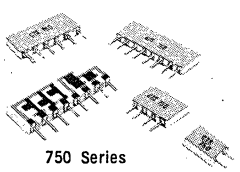
CERMET RESISTOR MODULES



760 Series



745 Series

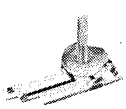


750 Series

	Series		
	745	750	760
Description	.094" x .190" 2 pin resistor on .100" lead centers	2, 4, 6, and 8 pin in-line modules on .125" lead centers	8, 14, 16 and 18 pin in-line modules on .100" lead centers
Minimum Resistance	10Ω	10Ω	10Ω
Maximum Resistance	1 MegΩ	1 MegΩ	1 MegΩ
Wattage Rating	.25 watt	2 pin — .5 watt 4 pin — 1.0 watt 6 pin — 1.5 watts 8 pin — 2.0 watts	8 pin — .75 watt 14 pin — 1.5 watts 16 pin — 1.75 watts 18 pin — 2.0 watts
Std. Temp. Coefficient in ppm/°C	±250	±250	±300
Spl. Temp. Coefficient in ppm/°C	±100	±100	±100
Std. Resistance Tol.	±5%	±5%	±5%
Spl. Resistance Tol.	±1%	±0.5%	±1%
Order From	Berne	Berne	Berne

HIGH RESISTANCE/HIGH VOLTAGE CERMIDE® POTENTIOMETER-RESISTOR NETWORK

670 SERIES



A potentiometer-resistor network for high voltage circuits where an adjustable pick-off is desired.

Resistance Range:
R1 — 1-50 Megohms
R2 — 1-30 Megohms
R3 — 1-25 Megohms
R4 — 1-10 Megohms

Standard Resistance Tolerance: ±30%

Minimum Resistance Tolerance:
R1, R3 & R4 — ±10%
R2 — ±25%

Max. Voltage Rating (through Series combination) — 8,500 V

Power Rating — 3 watts @ 55°C derated to no load at 105°C

Mfg. at Elkhart

HIGH RESISTANCE/ HIGH VOLTAGE CERMIDE® RESISTOR

680 SERIES

High resistance, high voltage Cermide® resistor available with and without taps. It is designed for bleeder resistor, voltage divider networks and other high voltage applications.

Resistance Range:
20K Ohms to 1,000 Megohms

Standard Resistance Tolerance — ±30%

Minimum Resistance Tolerance — ±10%

Max. Voltage Rating — 30,000 V not to exceed power rating

Power Rating — 3 watts @ 55°C derated to no load at 105°C

Mfg. at Elkhart

ORDERING INFORMATION:

Place orders at locations shown above, using the following addresses:

CTS of Berne, Inc., 406 Parr Road, Berne, Indiana 46711 • Telephone 219-589-3111 • TWX 810-323-1580
CTS Microelectronics, Inc., P.O. Box 1278, Lafayette, Indiana 47902 • Telephone 317-463-2565 • TWX 810-342-1882
CTS of Elkhart, Div., 1142 W. Beardsley Ave., Elkhart, Indiana 46514 • Telephone 219-523-0210 • TWX 810-294-2256

CAL-R® INC. RESISTOR DIVISION

a subsidiary of CapTech, Inc.

PRECISION POWER RESISTORS

FEATURES

1. Copperweld leads standard. Nickel A or Alloy 180 available.
2. Core-alumina and steatite ceramics.
3. Silicone coating to give maximum wire protection and extra high resistance to moisture.
4. Failure rates of less than .006% per 1000 hours @ +25°C with 60% confidence.

ELECTRICAL CHARACTERISTICS

A. TOLERANCES: 5.0% to .01%. 1% standard for off-shelf delivery. Special matching available to .001% tolerance.
B. TEMPERATURE COEFFICIENT: 20 ppm/degree C standard. Special T.C.'s to 5 ppm/degree C available.
C. Dielectric strength greater than 1000 V.A.C.
D. Special configurations available on request.
E. SA (X) Types Thermal shock proof from 275°C to —55°C.
F. SAV (X) Types Thermal shock proof from 350°C to —55°C.
G. STABILITY: consistent with tolerances, all parts stabilized in production. Less than 0.1% drift in 2000 hours operation at full Cal-R wattage rating for 1% tolerance parts.
H. RESISTANCE RANGES: .05 ohms to 250K ohms.
I. INDUCTIVE TYPES: Single layer space wound with largest wire permissible.
J. Non-inductive Types feature dual balanced windings for minimum inductance.

ENVIRONMENTAL

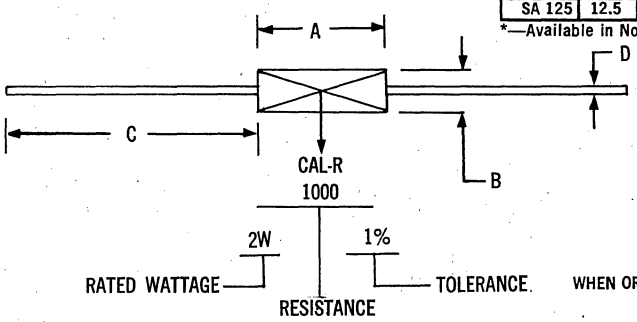
Meet or exceed applicable paragraphs of MIL-R-26E and MIL-R-39007.

STANDARD RESISTANCE & TOLERANCE RANGES

*Type SA and SAX (Non-inductive)	1 Rated Wattage	*Type SAV and SAVX (Non-inductive)	2 Rated Wattage	MIL Equiv. MIL-R-26E & 39007	Dimensions A ± .062	Dimensions B ± .032 3	Dimensions C ± .062	D ± .002	4 Tolerances & Max. Resistance Based on .0007 Min. Wire Dia. 1% & Higher	.5%, .25%, .1% & .05%
SA 01	.4	SAV 03	.5		.250	.078	1½	.020 24 Ga.	1.4KΩ	950Ω
SA 02	.5	SAV 06	.6	RW 81U RWR 81	.250	.085	1½	.020 24 Ga.	2KΩ	1.2KΩ
SA 04	.75	SAV 09	.9		.312	.078	1½	.020 24 Ga.	3KΩ	1.3KΩ
SA 05	.8	SAV 12	1.2		.312	.094	1½	.020 24 Ga.	4.9KΩ	2.4KΩ
SA 10	.9	SAV 22	2.2		.344	.094	1½	.020 24 Ga.	5KΩ	2.5KΩ
SA 15	1.0	SAV 25	2.5	RW 70U RW 80U RWR 80	.406	.094	1½	.020 24 Ga.	7KΩ	3.5KΩ
SA 17	1.0	SAV 26	2.6		.531	.094	1½	.020 24 Ga.	10KΩ	5KΩ
SA 20	2.0	SAV 33	3.0		.500	.156	1½	.032 20 Ga.	15KΩ	7.5KΩ
SA 30	2.5	SAV 41	4.1	RW 69V	.500	.188	2	.032 20 Ga.	20KΩ	10KΩ
SA 31	3.0	SAV 45	4.5	RWR 89 RW 79U	.560	.187	2	.032 20 Ga.	25KΩ	12KΩ
SA 32	2.0	SAV 46	4.6	RWR 71	.812	.188	2	.032 20 Ga.	40KΩ	20KΩ
SA 35	3.0	SAV 52	5.2		.625	.250	2	.040 18 Ga.	35KΩ	17KΩ
SA 50	5.0	SAV 74	7.4	RWR 74 RW 74U RWR 84	.875	.312	2	.040 18 Ga.	60KΩ	30KΩ
SA 55	5.5	SAV 82	8.2	RW 67V	1.00	.313	2	.040 18 Ga.	70KΩ	35KΩ
SA 70	7.0	SAV 96	9.6		1.219	.312	2	.040 18 Ga.	90KΩ	45KΩ
SA 95	9.5	SAV 106	11.0	RW 55V	1.375	.469	1½	.040 18 Ga.	160KΩ	80KΩ
SA 100	10.0	SAV 145	14.5	RWR 78 RW 78U RW 68V	1.781	.375	2	.040 18 Ga.	200KΩ	100KΩ
SA 125	12.5	SAV 150	15.0	RW 56V	2.000	.469	1½	.040 18 Ga.	250KΩ	140KΩ

*—Available in Noninductive (code symbol "X").

1 —Nominal, based on maximum 275°C. Hot spot at 25°C. Ambient. (char. U)
2 —Nominal, based on maximum 350°C. Hot spot at 25°C. Ambient. (char. Y)
3 —Tolerance for noninductive types below 150Ω ±.062.
4 —Noninductive maximum resistances are one-half of listed values.



WHEN ORDERING SPECIFY: TYPE, WATTAGE, RESISTANCE AND TOLERANCE.

POWER RESISTORS

OUTSTANDING FEATURES

1. Copperweld leads hot tin dipped for maximum solderability.
2. Completely welded construction terminal to terminal.
3. High density extruded aluminum housing provides superior heat conduction.
4. Housing deep finned for maximum heat dissipation under natural and forced convection.
5. Windings—High uniformity single layer space wound, designed to give maximum core coverage for even heat dissipation. MCX (non-inductive) types have dual balanced windings for minimum inductance.
6. Core—Steatite ceramic, centerless ground for uniformity.
7. Silicone coated resistance element to give maximum wire protection and extra high resistance to moisture.

ELECTRICAL CHARACTERISTICS

Tolerances—5.0% to .05%, 1% standard for off-shelf delivery.

Temperature Coefficient—20 ppm/degree C standard. Special T.C.'s to 5 ppm/degree C available.

Dielectric strength greater than 1000 V.A.C. on MC-100 and MC-250, and greater than 2000 V.A.C. on MC-500.

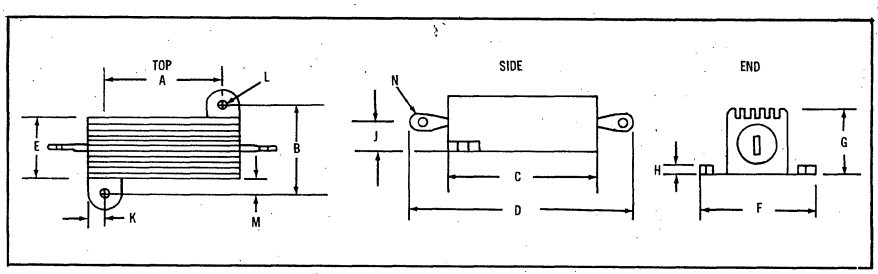
Dielectric Test—performed on 100% basis.

Stability—consistent with tolerances, all parts stabilized in production. Less than 0.5% drift in 1000 hours operation at full Cal-R wattage rating for 1% tolerance parts. Resistance ranges—.05 ohms to 210K ohms.

ENVIRONMENTAL

Meet or exceed all requirements of MIL-R-18546D, including "N" characteristic and MIL-R-39009.

FOUR STANDARD MC TYPE RESISTOR SPECIFICATIONS IN MIL-R SIZES



DIMENSIONS

Type	A	B	C	D	E	F	G	H	J	K	L	M	N
MC-80	.444	.490	.600	1.125	.334	.646	.317	.075	.139	.078	.093	.078	.050
MC-100	.562	.625	.750	1.375	.438	.873	.408	.094	.172	.093	.093	.094	.086
MC-250	.719	.781	1.063	1.938	.500	1.094	.531	.094	.219	.171	.125	.141	.086
MC-500	1.563	.844	1.969	1.781	.563	1.156	.625	.094	.281	.203	.125	.141	.086
TOL. ±	.005	.005	.016	.063	.031	.031	.031	.016	.031	.010	.005	.016	.015

STANDARD RESISTANCE & TOLERANCE RANGES

Type	Mil Equiv. Mil-R-18546C Mil-R-39009	Cal-R Watts Normal Rating	Watts Mil-R Rating	Weight MC	Weight MCX	TOLERANCES AND MAXIMUM RESISTANCES* 1% Up	.5%	.25%	.1%	.05%
MC-80 (X)	RE 60 (N) RER 60	8	5	3.0 gr	3.3 gr	.5 Ω to 20 K Ω	1 Ω to 10 K Ω	2.5 Ω to 10 K Ω	3 Ω to 10 K Ω	5 Ω to 10 K Ω
MC-100 (X)	RE 65 (N) RER 65	10	10	6.5 gr	8.8 gr	.5 Ω to 25 K Ω	1 Ω to 10 K Ω	2.5 Ω to 10 K Ω	3 Ω to 10 K Ω	5 Ω to 10 K Ω
MC-250 (X)	RE 70 (N) RER 70	25	20	12.5 gr	16.5 gr	.1 Ω to 70 K Ω	.2 Ω to 30 K Ω	.3 Ω to 30 K Ω	.5 Ω to 30 K Ω	1 Ω to 30 K Ω
MC-500 (X)	RE 75 (N) RER 75	50	30	27 gr	30.8 gr	.1 Ω to 200 K Ω	.2 Ω to 80 K Ω	.3 Ω to 80 K Ω	.5 Ω to 80 K Ω	1 Ω to 80 K Ω

Available in Noninductive (code symbol "X"—Cal-R) (code symbol "N"—Mil)

*Noninductive maximum resistances are one-half of listed values.

POWER RESISTORS . . . Cont'd.

T-5 (5 WATTS) OUTSTANDING FEATURES

1. Copperweld leads hot tin dipped — Gold plated DUMET or "A" nickel available.
2. High density extruded aluminum housing provides superior heat conduction.
3. Housing deep finned for maximum heat dissipation.
4. Windings — high uniformity single layer space wound, designed to give maximum core coverage for even heat dissipation. T5X (non-inductive) types have dual balanced windings for minimum inductance.
5. Core — Alumina ceramic, centerless ground for uniformity.

T-3 (3 WATTS) OUTSTANDING FEATURES

1. Windings — Reverse pie wound — all pies filled for maximum heat dissipation.
2. Unique recessed end cap designed to isolate winding termination from all lead stress.
3. Protective overcoating covering entire resistor before molding insures maximum protection and secures winding without introducing stress.
4. Resistor element encased in nonburning epoxy by transfer molding techniques.
5. Copperweld leads hot tin dipped standard — Gold plated DUMET or "A" nickel available.

STANDARD RESISTANCE & TOLERANCE RANGES

Type	Normal Rating	Weight	Tolerances and Maximum Resistances 1% UP	.5%	.25%	.1%	.05%
T5	5 WATTS	.8 gr	1Ω-5K	1Ω-5K	5Ω-3K	10Ω-2.5K	10Ω-2.5K
T3*	3 WATTS	.8 gr	3K-300K	3K-300K	3K-300K	3K-300K	3K-300K

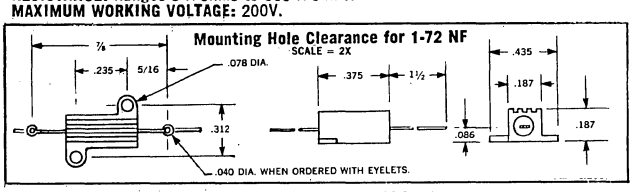
*200 VAC MAX.

T-5 ELECTRICAL CHARACTERISTICS

TOLERANCES: 5.0% to .05%. 1% standard for off-shelf delivery.
TEMPERATURE COEFFICIENT: 30 ppm/°C standard. Special T.C.'s to 5 ppm/°C available.
STABILITY: consistent with tolerances, all parts stabilized in production. Less than 0.5% drift in 1000 hours operation at full CAL-R wattage rating for 1% tolerance parts.
RESISTANCE RANGES: .5 ohms to 3 K ohms.
DIELECTRIC STRENGTH: greater than 500 V.A.C.
DIELECTRIC TEST: performed on 100% basis.

T-3 ELECTRICAL CHARACTERISTICS

TOLERANCE: 1 to .005% absolute. To .002% matching tolerance for matched sets.
TEMPERATURE COEFFICIENT: 10 ppm/°C is standard. Special TCs in ranges from +6000 ppm to 2 ppm/°C available.
STABILITY: consistent with tolerances. All parts stabilized in production, including 1% parts. Components available with stability of .002% per year.
WINDINGS: multiple pie reversed type to minimized inductance. Special windings available to provide fast rise times.
RESISTANCE: Ranges 3 K ohms to 300 K ohms.
MAXIMUM WORKING VOLTAGE: 200V.



PRECISION RESISTORS

OUTSTANDING FEATURES

1. All pies filled for maximum heat dissipation.
2. Unique recessed end cap designed to isolate winding termination from all lead stress.
3. Terminals welded to end cap for maximum strength — will withstand 15 lbs. linear pull.
4. Double slots tangent to mandrel to prevent shorting between pie windings eliminating space-wasting construction features or the need for insulating tape.
5. Protective overcoating covering entire resistor before molding insures maximum moisture protection and secures winding without introducing stress.
6. Standard leads — copperweld hot tin dipped or annealed Dumet gold plated.
7. Special matching available to .001% tolerance.

EECTRICAL CHARACTERISTICS

TOLERANCE: 1 to .005% absolute. To .002% matching tolerance for matched sets.

TEMPERATURE COEFFICIENT: 10 ppm/°C is standard. Special TCs in ranges from +6000 ppm to 2 ppm/°C available.

STABILITY: consistent with tolerances. All parts stabilized in production, including 1% parts. Components available with stability of .002% per year.

WINDINGS: multiple pie reversed type to minimized inductance (except on Miniature Series). Special windings available to provide low rise times.

RESISTANCE: Ranges 1 ohm to 10 megohms.

PHYSICAL CHARACTERISTICS

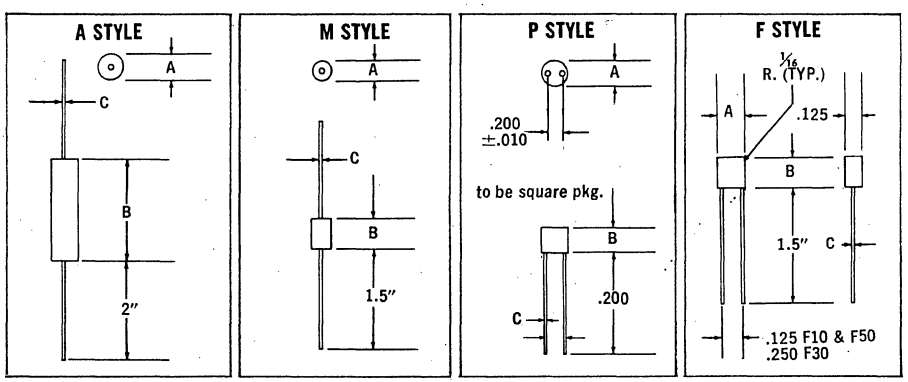
MATERIAL: Hi-Temp epoxy with matching coefficient of expansion between core and case. Leads are gold over Dumet.

ENVIRONMENTAL

Meet or exceed all requirements of MIL-R-93C and MIL-R-39005.

STANDARD RESISTANCE & TOLERANCE RANGES

CAL-R Part No.	Dimensions "A" ±.010	"B" ±.010	"C"	Rated Wattage	MIL Equiv. MIL-R-93C MIL-R-39005	Tolerances and Maximum Resistances ±1%	±.5%	±.1%	±.05%	±.01%
M10	.080	.200	.016 #26 AWG	.05		100Ω100K	300Ω-80K	1K-80K	3K-50K	10K-25W
M20	.100	.200	.016 #26 AWG	.06		25Ω-150K	50Ω-100K	100Ω-100K	500Ω-80K	2.5K-50K
M30	.125	.250	.020 #24 AWG	.08		10Ω-250K	20Ω-250K	80Ω-250K	300Ω-200K	1.5K-150K
M40	.125	.375	.020 #24 AWG	.10		10Ω-400K	20Ω-400K	80Ω-400K	300Ω-300K	1.K-200K
A2525	.250	.250	.032 #20 AWG	.2	RBR75	10Ω-750K	20Ω-750K	50Ω750K	200Ω-650K	1.K-500K
A2537	.250	.375	.032	.25	RB56 RBR56	10Ω-1MEG	20Ω-1MEG	50Ω-1MEG	200Ω-1MEG	800Ω-800K
A2550	.250	.500	.032	.25	RB55 RBR55 AFRT10	10Ω-2.5MEG	20Ω-2.5M	50Ω-2.5M	100Ω-2.5M	500Ω-2.5M
A2575	.250	.750	.032	.35	RB54 RBR54 AFRT11	5Ω-3M	10Ω-3M	50Ω-3M	100Ω-3M	500Ω-3M
A25100	.250	1.00	.032	.4		5Ω-3.5M	10Ω-3.5M	50Ω-3.5M	100Ω-3.5M	500Ω-3.5M
A3775	.375	.750	.032	.5	RB53 RBR53 AFRT12	5Ω-4M	10Ω-4M	50Ω-4M	100Ω-4M	400Ω-3M
A37100	.375	1.00	.032	1.0	RB52 RBR52 AFRT13	2Ω-5.5M	4Ω-5.5M	20Ω-5.5M	50Ω-5.5M	300Ω-4.5M
A5050	.500	.500	.032	.5		10Ω-4M	20Ω-4M	50Ω-4M	100Ω-4M	400Ω-3M
A5062	.500	.625	.032	.5						
A5070	.812	.312	.032	.5	RBR76	5Ω-5.5M	10Ω-5.5M	50Ω-5.5M	100Ω-5.5M	400Ω-4.5M
A50100	.500	1.00	.032	1.0	RB57 AFRT14	1Ω-7MEG	5Ω-7M	20Ω-7MEG	50Ω-7MEG	200Ω-5MEG
P2531	.250	.312	.025 #22 AWG	.12		10Ω-1MEG	20Ω-1M	50Ω-1M	100Ω-1M	800Ω-800K
P3750	.375	.500	.025	.35		5Ω-1.5M	10Ω-1.5M	30Ω-1.5M	100Ω-1.5M	800Ω-1.MEG
F10	.250	.250	.032 #20 AWG	.125		10Ω-750K	20Ω-750K	50Ω-750K	200Ω-650K	1.K-500K
F30	.500	.250	.032	.25		10Ω-1M	20Ω-1MEG	50Ω-1M	200Ω-1M	800Ω-800K
F50	.250	.500	.032	.25		5Ω-1.3M	10Ω-1.3M	20Ω-1.3M	100Ω-1.3M	200Ω-1.M

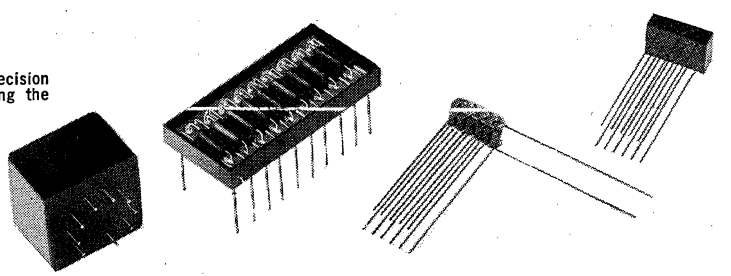


PRECISION NETWORKS

Cal-R engineers, specialists in advanced network design, offer precision assemblies, packaged to meet the most exacting specifications, allowing the circuit designer maximum freedom without costly packaging problems.

GENERAL SPECIFICATIONS

RESISTOR VALUES: From 1 ohm thru 5 megohms
FULL SCALE ACCURACY: to .005%
TEMPERATURE COEFFICIENT TRACKING: to 1 PPM/°C.
TEMPERATURE COEFFICIENT ABSOLUTE: to 2 PPM/°C.
AMBIENT TEMPERATURE RANGE: —55°C to +125°C.
STANDARD TEMPERATURE COEFFICIENT: 0 to ±10 PPM.
STABILITY: to 10 PPM per year.
FAST RECOVERY TIME: to within .02% of final value within 100 ns.



CAL-R® INC.
a subsidiary of CapTech, Inc.
RESISTORS • CAPACITORS • THERMISTORS • MICROELECTRONICS
1601 OLYMPIC BOULEVARD, SANTA MONICA, CALIFORNIA 90404 (213) 451-9761 • TWX 910-343-6966

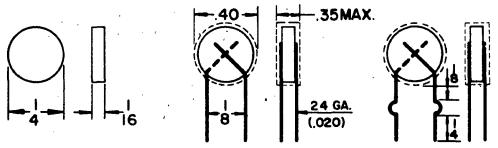
CARBORUNDUM® VARISTORS

DISCS

551BNR

DIMENSIONS OVER COATING

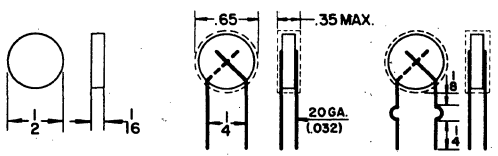
FIG. 1 FIG. 2 FIG. 3



Specifications: 1. Continuous Power Rating @ 40°C—0.30 Watt. 2. Voltage Rating—100 Volts, Peak. 3. Coating (Dielectric & Moisture Resistant)—Fig. 1—None. Figures 2 & 3—PVC or Red Enamel (Glyptal®). 4. Standard Leads are Tinned Copper.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
1.0	9.0	2.4	3.1	551BNR-26
1.0	11.0	2.3	3.7	551BNR-27
1.0	14.0	2.2	3.7	551BNR-28
1.0	18.0	2.1	3.9	551BNR-29
1.0	24.0	2.0	4.2	551BNR-30
1.0	29.0	1.9	4.5	551BNR-31
1.0	40.0	1.8	4.8	551BNR-32
1.0	54.0	1.8	4.9	551BNR-33
1.0	68.0	1.8	5.0	551BNR-34
1.0	88.0	1.8	5.1	551BNR-35

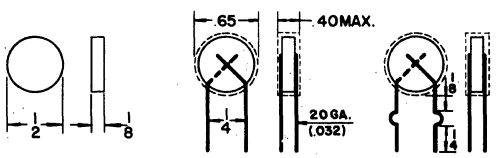
432BNR



Specifications: 1. Continuous Power Rating @ 40°C—0.50 Watt. 2. Voltage Rating—100 Volts, Peak. 3. Coating—same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
1.0	6.0	2.9	2.5	432BNR-101
1.0	7.5	2.5	3.0	432BNR-102
1.0	10.0	2.3	3.2	432BNR-103
1.0	12.0	2.2	3.3	432BNR-104
1.0	17.0	2.0	3.7	432BNR-105
1.0	24.0	1.8	4.2	432BNR-106
1.0	30.0	1.8	4.2	432BNR-107
1.0	40.0	1.8	4.2	432BNR-108
1.0	48.0	1.8	4.6	432BNR-109
1.0	70.0	1.8	4.6	432BNR-110
1.0	90.0	1.7	4.8	432BNR-111

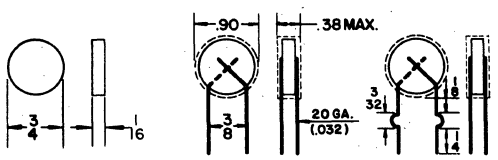
379BNR



Specifications: 1. Continuous Power Rating @ 40°C—0.50 Watt. 2. Voltage Rating—200 Volts, Peak. 3. Coating—Same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
1.0	12.0	2.9	2.5	379BNR-10
1.0	15.0	2.5	3.0	379BNR-11
1.0	20.0	2.3	3.2	379BNR-12
1.0	24.0	2.2	3.3	379BNR-13
1.0	34.0	2.0	3.7	379BNR-14
1.0	48.0	1.9	4.2	379BNR-15
1.0	60.0	1.8	4.2	379BNR-16
1.0	80.0	1.8	4.2	379BNR-17
1.0	100.0	1.8	4.6	379BNR-18
1.0	135.0	1.8	4.6	379BNR-19
1.0	180.0	1.7	4.8	379BNR-20

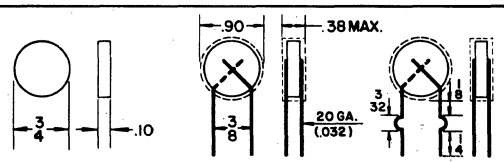
328BNR



Specifications: 1. Continuous Power Rating @ 40°C—0.75 Watt. 2. Voltage Rating—100 Volts, Peak. 3. Coating—same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
1.0	2.0	3.0	2.2	328BNR-40
1.0	3.0	2.7	2.5	328BNR-41
1.0	4.5	2.6	2.6	328BNR-42
1.0	6.0	2.4	3.0	328BNR-43
1.0	8.0	2.4	3.0	328BNR-44
1.0	12.0	2.2	3.7	328BNR-45
1.0	14.0	2.0	3.7	328BNR-46
1.0	18.0	1.9	4.2	328BNR-47
1.0	24.0	1.8	4.2	328BNR-48
1.0	33.0	1.8	4.2	328BNR-49
1.0	48.0	1.8	4.6	328BNR-50
1.0	60.0	1.8	4.6	328BNR-51
1.0	80.0	1.7	4.8	328BNR-52

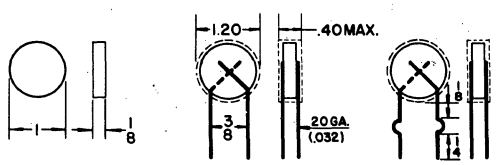
925BNR



Specifications: 1. Continuous Power Rating @ 40°C—0.75 Watt. 2. Voltage Rating—200 Volts, Peak. 3. Coating—Same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
1.0	12.0	2.4	3.0	925BNR-10
1.0	16.0	2.4	3.0	925BNR-11
1.0	24.0	2.0	3.7	925BNR-12
1.0	28.0	2.0	3.7	925BNR-13
1.0	36.0	1.9	4.0	925BNR-14
1.0	48.0	1.9	4.2	925BNR-15
1.0	68.0	1.8	4.2	925BNR-16
1.0	90.0	1.8	4.6	925BNR-17
1.0	120.0	1.8	4.6	925BNR-18
1.0	160.0	1.7	4.8	925BNR-19

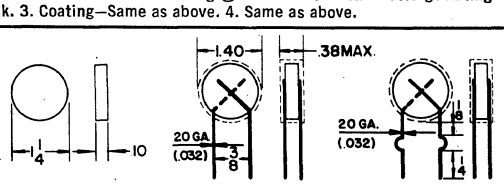
463BNR



Specifications: 1. Continuous Power Rating @ 40°C—1.50 Watt. 2. Voltage Rating—200 Volts, Peak. 3. Coating—Same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 5.0 ma / E @ 0.5 ma	Nominal "N"	Carborundum Part Number
5	16	2.2	3.3	463BNR-30
5	24	2.2	3.3	463BNR-31
5	28	2.0	3.7	463BNR-32
5	36	2.0	3.7	463BNR-33
5	48	1.9	4.2	463BNR-34
5	62	1.8	4.2	463BNR-35
5	85	1.8	4.2	463BNR-36
5	110	1.7	4.8	463BNR-37
5	140	1.7	4.8	463BNR-38
5	190	1.7	5.0	463BNR-39

927BNR



Specifications: 1. Continuous Power Rating @ 40°C—2.25 Watts. 2. Voltage Rating—200 Volts, Peak. 3. Coating—Same as above. 4. Same as above.

Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 5.0 ma / E @ 0.5 ma	Nominal "N"	Carborundum Part Number
5	9	2.7	2.6	927BNR-19
5	15	2.4	3.0	927BNR-20
5	25	2.3	3.1	927BNR-21
5	40	2.3	3.2	927BNR-22
5	70	2.2	3.5	927BNR-23
5	100	2.1	3.7	927BNR-24
5	140	1.9	4.8	927BNR-25

CARBORUNDUM® VARISTORS
RODS

	Current Milliamps	Voltage DC ±10%	Max. Ratio E @ 1.0 ma / E @ 0.1 ma	Nominal "N"	Carborundum Part Number
231BNR	1.0	100	2.1	3.1	231BNR-18
	1.0	135	2.0	3.4	231BNR-19
	1.0	180	1.9	3.6	231BNR-20
	1.0	240	1.8	4.1	231BNR-21
	1.0	320	1.8	4.1	231BNR-22
	1.0	430	1.7	4.7	231BNR-23
	1.0	575	1.7	4.8	231BNR-24
	1.0	750	1.7	4.8	231BNR-25

FIG. 1

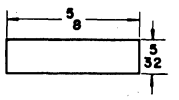
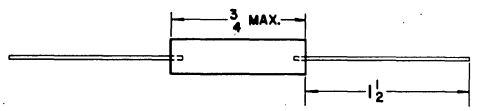


FIG. 2



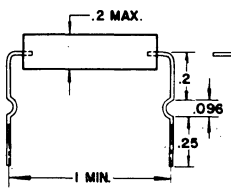


FIG. 3

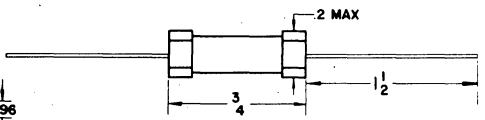


FIG. 4

Specifications: 1. Continuous Power Rating @ 40°C—0.75 Watt. 2. Voltage Rating—800 Volts, Peak. 3. Coating: Styles 2 & 3 Epoxy; Style 4 None. 4. Standard Leads—20 ga. Tinned Copper.

233BNR	1	68	2.2	3.3	233BNR-30
	1	88	2.2	3.3	233BNR-31
	1	110	2.0	3.7	233BNR-32
	1	140	2.0	3.7	233BNR-33
	1	175	1.8	4.2	233BNR-34
	1	250	1.8	4.2	233BNR-35
	1	320	1.8	4.2	233BNR-36
	1	410	1.7	4.8	233BNR-37
	1	520	1.7	4.8	233BNR-38
	1	710	1.7	5.0	233BNR-39

FIG. 1

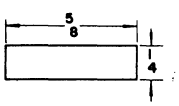
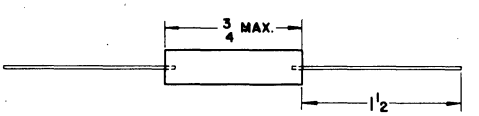


FIG. 2



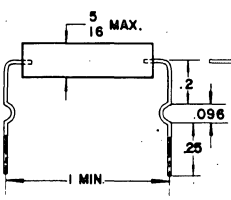


FIG. 3

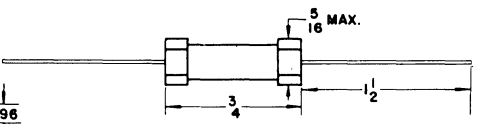


FIG. 4

Specifications: 1. Continuous Power Rating @ 40°C—1.00 Watt. 2. Voltage Rating—800 Volts, Peak. 3. Coating—Same as 231BNR. 4. Leads—Same as 231BNR.

234BNR	1	135	2.2	3.3	234BNR-42
	1	175	2.2	3.3	234BNR-43
	1	220	2.0	3.7	234BNR-44
	1	290	2.0	3.7	234BNR-45
	1	350	1.9	4.2	234BNR-46
	1	500	1.8	4.2	234BNR-47
	1	680	1.8	4.2	234BNR-48
	1	825	1.7	4.8	234BNR-49
	1	1050	1.7	4.8	234BNR-50

FIG. 1

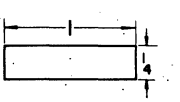
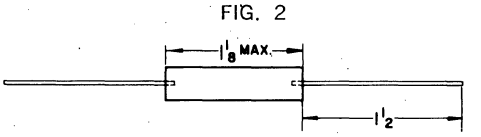


FIG. 2



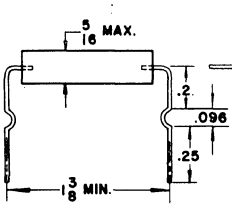


FIG. 3

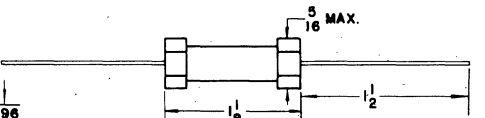


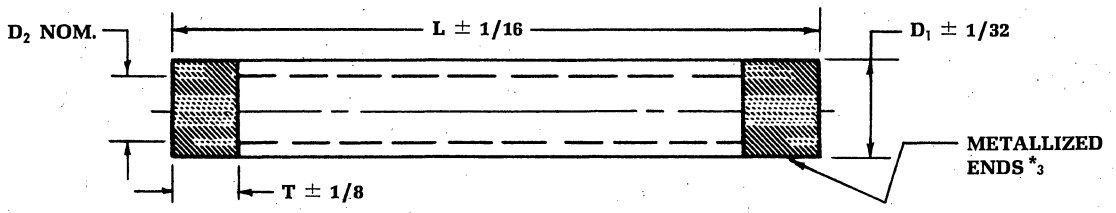
FIG. 4

Specifications: 1. Continuous Power Rating @ 40°C—1.50 Watt. 2. Voltage Rating—1500 Volts, Peak. 3. Coating—Same as 231BNR. 4. Leads Same as 231BNR.

CARBORUNDUM The Carborundum Company, Electronics Plant, Niagara Falls, N.Y. 14302, 716—278-2521

CARBORUNDUM® NON-INDUCTIVE POWER RESISTORS

GLOBAR®
Non-Inductive Resistor



Specifications

	Type AS	Type SP
Tolerances	Standard 10%, 5% and 20% available	Same
Load-life	Max 5% after 1,000 hrs. at rated load	Same
Short time overload (10 times rated. Power 5 seconds on–90 seconds off.)	2% change	Same
Temperature coefficent	−50°C to +230°C ± .075%/°C max	−55°C to +350°C ± .075%/°C max
Voltage coefficient	Max 1%/kilovolt per inch effective length	Same
Max operating temperature	230°C	350°C
Density	2.5 grams/CM³	2.2 grams/CM³
Specific heat	.15-.30 cal/gram/°C	.15-.30 cal/gram/°C
De-rating	Linearly to 0° watts @ 230°C	Linearly to 0° watts @ 350°C
Moisture resistance: Max 2.5% change tested per Mil Std 202B, Method 103		Same

Ceramic Carbon Composition Type AS

Type No.	Rated Power Watts @ 40° C	Allowable Injection Energy Joules *1	Max Peak Voltage (KV) *2 Standard	Special	Dimensions (inches) L	D_1	D_2	T	Resistance Range (ohms) *4 Min	Max
885	15	2,500	4.0	8.0	2½	¾	½	½	7.5	1,000
886	30	5,000	10.0	20.0	5	¾	½	⅝	20.0	2,500
887	50	15,000	15.0	30.0	6	1	¾	½	15.0	2,500
888	75	20 000	22.5	45.0	8	1	¾	⅞	20.0	3,000
889	100	35,000	37.5	75.0	12	1	¾	⅞	30.0	5,500
890	150	50,000	60.0	120	18	1	¾	⅞	50.0	10,000

Ceramic Silicon Composition Type SP

884	22.5	200	1.5		2	½	7/32	¼	1.0	150
885	45	250	1.5		2½	¾	½	½	1.0	100
886	90	500	4.0		5	¾	½	⅝	1.0	250
887	150	1,600	5.0		6	1	¾	½	1.0	250
888	190	2,100	6.0		8	1	¾	⅞	1.0	300
889	275	3,200	10.0		12	1	¾	⅞	1.0	500
890	375	4,200	16.0		18	1	¾	⅞	1.0	750
891	750	15,000	16.0		18	2	1½	1	1.0	350
892	1,000	17,500	22.0		24	2	1½	1	1.0	500

*1. Allowable energy per one shot pulse. For continuous duty, pulse repetition rate and duration must be considered.

*2. Peak voltages. Up to 100% increase can be obtained by special dielectric coatings and/or anti-corona terminations.

*3. Nickel metallization standard for AS types. Aluminum metallization standard for SP types. Other metallization available upon request; example: copper, solder-tinned copper or silver.

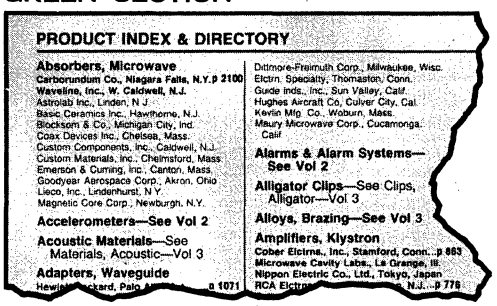
*4. Refer values other than shown to the plant for special quotation.

CARBORUNDUM The Carborundum Company, Electronics Plant, Niagara Falls, N.Y. 14302, 716–278-2521

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
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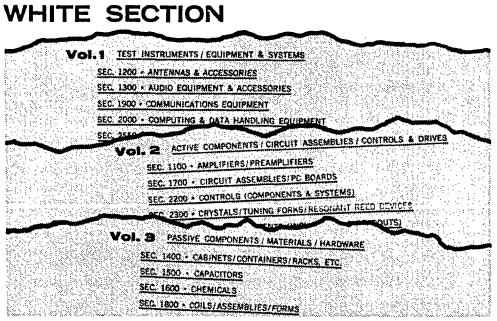
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT RECD DEVICES
[illegible] (INPUT/OUTPUTS)
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

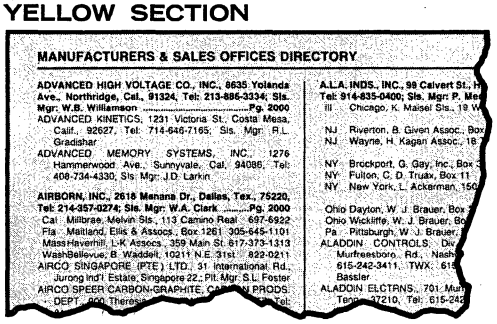
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

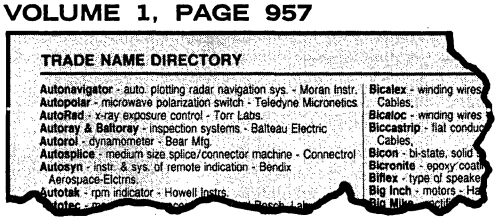
ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324; Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627; Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086; Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Menana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass: Haverhill, I-K Assocs., 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22.; Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, Ca[illegible] PRODS. DEPT., 900 Theres[illegible] Tel:

A.L.A. INDS., INC., 99 Calvert St., H[illegible] Tel: 914-835-0400; Sls. Mgr: P. Me[illegible]
Ill: Chicago, K. Maisel Sls., 19 W[illegible]
NJ: Riverton, B. Given Assoc., Box[illegible]
NJ: Wayne, H. Kagan Assoc., 18[illegible]
NY: Brockport, G. Gay, Inc., Box 3[illegible]
NY: Fulton, C. D. Truax, Box 11[illegible]
NY: New York, L. Ackerman, 150[illegible]
Ohio: Dayton, W. J. Brauer, Box[illegible]
Ohio: Wickliffe, W. J. Brauer, Bo[illegible]
Pa: Pittsburgh, W. J. Brauer,
ALADDIN CONTROLS, Div. Murfreesboro, Rd., Nashv[illegible] 615-242-3411, TWX: 615[illegible] Bassler
ALADDIN ELCTRNS., 701 Murf[illegible] Tenn. 37210; Tel: 615-242[illegible]

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - X-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible]
Bicalex - winding wires Cables.
Bicaloc - winding wires
Biccastrip - flat conduc Cables.
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha
Big Mik[illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

CORNING / ELECTRONICS / Houghton Park, Corning, New York 14830 / Phone 607, 962-4444

We make resistors for guys who can't stand failures

PRECISION, SEMI-PRECISION AND GENERAL PURPOSE RESISTORS

	CORNING STYLE	MIL TYPE	MIL SPEC. (MIL-R-)	WATTAGE RATINGS MAX. AMBIENT 70°C	WATTAGE RATINGS MAX. AMBIENT 125°C	VOLTAGE RATING MAX.	RESISTANCE RANGE	STD. TOL. (±)	BODY LENGTH MENISCUS CONTROL	BODY DIA.	STD. LEAD DIA.
PRECISION	NC3	RN50C	10509	1/10	1/20	200	49.9Ω-100K	1%	.145 ±.015"	.062 ±.004"	.016"
	NC4	RN55C	10509	1/8	1/10	200	49.9Ω-150K 10Ω -301K	½% 1%	.225 ±.020"	.090 ±.008"	.025"
	NC5	RN60C	10509	1/4	1/8	250	49.9Ω-499K 49.9Ω-1 Meg.	½% 1%	.355 ±.020"	.148 +.000" −.023"	.025"
	NC6	RN65C	10509	½	1/4	300	49.9Ω-1 Meg. 49.9Ω-2 Meg.	½% 1%	.544 ±.021"	.190 +.010" −.015"	.025"
	NC7	RN70C	10509	¾	½	350	51.1Ω-1 Meg.	½,1%	.719 ±.031"		
	NA55	RN55D	10509	1/8 (1/4	1/10 1/8)*	200	49.9Ω-150K 10Ω -301K	½% 1%	.225 ±.020"	.090 ±.008"	.025"
	NA60	RN60D	10509	1/4 (½	1/8 1/4)*	300	49.9Ω-499K 10Ω -1 Meg.	½% 1%	.355 ±.020"	.148 +.000" −.023"	.025"
	NA65	RN65D	10509	½	1/4	350	49.9Ω-1 Meg. 10Ω -2 Meg.	½% 1%	.544 ±.021"	.190 +.010" −.015"	.025"
	NA70	RN70D	10509	¾	½	500	51.1Ω-1 Meg.	½,1%	.719 ±.031"		
SEMI-PRECISION	C3	—	(22684) (10509)	1/8 1/10	— 1/20	200	10Ω-150K	1,2,5%	.145 ±.015"	.062 ±.004"	.016"
	C4	RL07S	22684 (10509)	1/4 1/8	(1/8)* 1/20	250	10Ω-301K	1,2,5%	.225 ±.020"	.090 ±.008"	.025"
	C5	RL20S	22684 (10509)	½ 1/4	(1/4)* 1/8	350	10Ω-1 Meg.	1,2,5%	.355 ±.020"	.148 +.000" −.023"	.032"
	C6	RL32S	22684 (10509)	1 ½	(½)* 1/4	500	10Ω-2 Meg.	1,2,5%	.544 ±.021"	.190 +.010" −.015"	.040"

ESTABLISHED RELIABILITY RESISTORS

	CORNING STYLE	MIL TYPE	MIL SPEC (MIL-R-)	WATTAGE RATING 70°C	WATTAGE RATING 125°C	STAND. TOL.(±)	RESISTANCE RANGE	BODY LENGTH MENISCUS CONTROL	BODY DIA.	LEAD DIA.	VOLTAGE RATING	TEMPERATURE COEFFICIENT
SEMI-PRECISION HC	HC3	RLR05C	39017	1/8	—	2,5%	10Ω-150K	.145" ±.015"	.062" ±.004"	.016"	200	100 ppm/°C
	HC4	RLR07C	39017	1/4	—	2,5%	10Ω-300K	.225" ±.020"	.090" ±.008"	.025"	250	100 ppm/°C
	HC5	RLR20C	39017	½	—	2,5%	10Ω-1 Meg.	.355" ±.020"	.148" +.000" −.023"	.032"	350	100 ppm/°C
	HC6	RLR32C	39017	1	—	2,5%	10Ω-1 Meg.	.554" +.026" −.021"	.190" +.010" −.015"	.040"	500	100 ppm/°C
PRECISION HH/HK	HH3/HK3	RNC50 HK[4]	55182	—	1/20	½,1%	100Ω-100K	.145" ±.015"	.062" ±.004"	.016"	200	50/100 ppm/°C
	HH4/HK4	RNC55 H/K[4]	55182	—	1/10	½,1%	49.9Ω-100K	.225" ±.020"	.090" ±.008"	.025"	200	50/100 ppm/°C
	HH5/HK5	RNC60 H/K[4]	55182	—	1/8	½,1%	49.9Ω-499K	.355" ±.020"	.148" +.000" −.023"	.032"	250	50/100 ppm/°C
	HH6/HK6	RNC50 H/K[4]	55182	—	1/4	½,1%	49.9Ω-1 Meg.	.554" +.026" −.021"	.190" +.010" −.015"	.040"	300	50/100 ppm/°C

LOW POWER RESISTORS

	CORNING STYLE	WATTAGE RATINGS MAX. AMBIENT 25°C	40°C	70°C	VOLT. RATING MAX.	RESISTANCE RANGE	STD. TOL. (±)	BODY LENGTH	BODY DIAMETER	STD. LEAD DIA.	STD. MARKING
FLAME PROOF LOW POWER INSULATED	FP½	—	—	½	350	10Ω-470K	2,5,10%	.360 ±.020"	.138 +.012" −.023	.032"	4 Band CC
	FP1	—	—	1	500	10Ω-1 Meg.	2,5,10%	.560 ±.031"	.190 +.010" −.015	.032"	4 Band CC
	FP2	3½	3	2	500	9Ω-1.5 Meg.	2,5,10%	.687 ±.031"	.315 ±.010"	.032"	4 Band CC
	FP3	4½	4	3	500	9Ω-125K	2,5,10%	.900 ±.055"	.315 ±.010"	.032"	4 Band CC
	FP4	—	5	4	500	16Ω-125K	2,5,10%	1.530 ±.035"	.315 ±.010"	.032"	Type Mark
	FP5	5½	7	5	600	19Ω-125K	2,5,10%	1.710 ±.035"	.315 ±.010"	.032"	Type Mark
	FP7	7	—	7	700	24Ω-125K	2,5,10%	2.040 ±.035"	.315 ±.010"	.032"	Type Mark
	FP10	—	10	—	700	24Ω-125K	2,5,10%	2.040 ±.035"	.315 ±.010"	.032"	Type Mark

NOTE: CORNING is QPL to MIL-R-39017 and MIL-R-55182

(1) MIL-R-39017 Parts receive a 100% power conditioning for 24 hours @ 1.5 rated wattage 25°C. Reject parts with Δ R>±.50%

(2) MIL-R-55182 Parts receive a 100% overload and temperature cycle Overload RNC50, RNC55, RNC60 RNC65 5 x rated wattage for 1 hour @ 25°C 4 x rated wattage for 1 hour @ 25°C Reject parts with combined ΔR>±.20%.

(3) MIL-R-55182 Failure rates "P", "R", "S" also receive a 100% Z-Ray.

(4) Terminal Substitution data. Resistors with style and terminal symbol "RNC" are a direct one-way substitute for resistors of symbol "RNR" provided all other characteristics are equal or better.

GLASS AND METAL OXIDE FILM RESISTORS

Perfect combination to handle resistor jobs.

Dependable resistor performance, tailored to specific circuit requirements results from CORNING® Materials and process skills.

High resistivity tin oxide film is combined with optical quality glass substrate yielding exceptionally strong, uniform resistance components.

This molecular bonding at red heat eliminates degradation normally experienced with films that are free to oxidize. The matched thermal expansions of the glass substrate and tin oxide film eliminate fatiguing stresses.

TEMPERATURE COEFFICIENT	LOAD LIFE 1000 HOURS RATED COND. ΔR MAX.	MOISTURE RESISTANCE ΔR MAX.	TEMP. CYCLE ΔR MAX.	SHORT TIME OVERLOAD ΔR MAX.	LOW TEMP. OPERATION ΔR MAX.	D.W.V. ΔR MAX.	EFFECT SOLDER HEAT ΔR MAX.	TERMINAL STRENGTH ΔR MAX.	SHOCK ΔR MAX.	VIBRATION ΔR MAX.	SHELF LIFE (PER YEAR) ΔR MAX.	CURRENT NOISE‡	CORNING STYLE
±50 ppm/°C from −55°C to +175°C	±.5%	±.5%	±.25%	±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.10%	−10 db −10 db −15 db −15 db	NC3 NC4 NC5 NC6
±100 ppm/°C from −55°C to +175°C	±.5% (±1%)* ±.5% (±1%)* ±.5%	±.5%	±.25%	±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.10%	−10 db −15 db −15 db	NA55 NA60 NA65
±100 ppm/°C from −55°C to +175°C	±1% ±.5% ±1% ±.5% ±1% ±.5% ±1% ±.5%	±.5%	±.25%	±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.10%	−10 db −10 db −15 db −15 db	C3 C4 C5 C6

TEMP. CYCLE ΔR MAX.	LOW TEMP. OPER. ΔR MAX.	TERM. STRENGTH ΔR MAX.	D.W.V. ΔR MAX.	EFFECT SOLDER ΔR MAX.	SHOCK ΔR MAX.	VIBRATION ΔR MAX.	SHORT TIME OVERLOAD ΔR MAX.	MOISTURE ΔR MAX.	LOAD LIFE RATED CONDITIONS ΔR MAX. 2000 HR.	LOAD LIFE RATED CONDITIONS ΔR MAX. 10,000 HR.	FAILURE RATE %/1000 HOURS (60% CONFIDENCE LEVEL)	CORNING STYLE
±.25%	±.25%	±.25%	±.25%	±.25%	±.25%	±.25%	±.50%	±.50%	±2%	±4%	MIL-R-39017[1]	HC3
±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.25%	±.50%	±2%	±4%	"M" = 1%/1000 Hours	HC4
±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.25%	±.50%	±2%	±4%	"P" = .1%/1000 Hours	HC5
±.25%	±.25%	±.10%	±.10%	±.10%	±.10%	±.10%	±.25%	±.50%	±2%	±4%	"R" = .01%/1000 Hours "S" = .001%/1000 Hours	HC6
(2)	±.15%	±.20%	±.15%	±.10%	±.20%	±.20%	(2)	±.4%	±.5%	±2%	MIL-R-55182[2] [3]	HH3/HK3
(2)	±.15%	±.10%	±.10%	±.10%	±.10%	±.10%	(2)	±.4%	±.5%	±2%	"M" = 1%/1000 Hours	HH4/HK4
(2)	±.15%	±.10%	±.10%	±.10%	±.10%	±.10%	(2)	±.4%	±.5%	±2%	"P" = .1%/1000 Hours	HH5/HK5
(2)	±.15%	±.10%	±.10%	±.10%	±.10%	±.10%	(2)	±.4%	±.5%	±2%	"R" = .01%/1000 Hours "S" = .001%/1000 Hours	HH6/HK6

TEMPERATURE COEFFICIENT	LOAD LIFE 1000 HOURS ΔR MAX.	HUMIDITY STEADY STATE ΔR MAX.	TEMP. CYCLE ΔR MAX.	SHORT TIME OVERLOAD ΔR MAX.	D.W.V. ΔR MAX.	EFFECT OF SOLDERING HEAT ΔR MAX.	TERMINAL STRENGTH ΔR MAX.	LOW TEMP. OPERATION ΔR MAX.	SHOCK ΔR MAX.	VIBRATION ΔR MAX.	SHELF LIFE (PER YEAR) ΔR MAX.	CORNING STYLE
±150 ppm/°C −55°C to +150°C	±1.5%	±2%	±1%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.2%	FP½
	±2%	±2%	±1%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.2%	FP1
±200 ppm/°C −55°C to +150°C	±5%	±1%	±1%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.5%	±.2%	FP2 (FP42) FP3 FP4 FP5 FP7 FP10

* COMMERCIAL RATING
† Typically less than

DALE® WIREWOUND RESISTORS

APPLICABLE MIL. ENVIRONMENTAL SPECIFICATIONS

■ MIL-R-26

TYPES RS, G, RLS & GL

TEST	MIL-R-26E REQUIREMENT	DALE MAXIMUM RS, G, RLS & GL*
Load Life	± (.5%+.05Ω) ΔR	± (.5%+.05Ω) ΔR
Moisture Resistance	± (.2%+.05Ω) ΔR	± (.2%+.05Ω) ΔR
Temp. Coefficient	30-90 PPM/°C Max.	See tables
Thermal Shock	± (.2%+.05Ω) ΔR	± (.2%+.05Ω) ΔR
Short Time Overload	± (.2%+.05Ω) ΔR	± (.2%+.05Ω) ΔR
Dielectric	± (.1%+.05Ω) ΔR	± (.1%+.05Ω) ΔR
Low Temp. Storage	± (.2%+.05Ω) ΔR	± (.2%+.05Ω) ΔR
High Temp. Exposure	± (.5%+.05Ω) ΔR	± (.5%+.05Ω) ΔR
Shock	± (.1%+.05Ω) ΔR	± (.1%+.05Ω) ΔR
Vibration	± (.1%+.05Ω) ΔR	± (.1%+.05Ω) ΔR
Terminal Strength	± (.1%+.05Ω) ΔR	± (.1%+.05Ω) ΔR

All ΔR figures shown are maximum, based on units with an initial tolerance of 1% and maximum operating temperature of 275°C.

*GL & RLS physical configurations are not covered in MIL-R-26. Environmental specifications will be same as for RS & G styles.

TYPES CW, HL, NHL, HLM, HLA, HLT & HLW

TEST	MIL-R-26E REQUIREMENT	DALE TYPICAL* HL Tubular & Flat	DALE TYPICAL CW
Load Life	± (3%+.05Ω) ΔR	± (2%+.05Ω) ΔR	± (0.5%+.05Ω) ΔR
Moisture Resistance	± (2%+.05Ω) ΔR	± (0.5%+.05Ω) ΔR	± (0.5%+.05Ω) ΔR
Temp. Coefficient	260-400 PPM/°C	±50 PPM/°C except on low values	±50 PPM/°C except on low values
Thermal Shock	± (2%+.05Ω) ΔR	± (0.5%+.05Ω) ΔR	± (0.2%+.05Ω) ΔR
Short Time Overload	± (2%+.05Ω) ΔR	± (0.5%+.05Ω) ΔR	± (0.2%+.05Ω) ΔR
Dielectric	± (0.1%+.05Ω)	± (0.1%+.05Ω) ΔR	± (0.1%+.05Ω) ΔR
Low Temp. Storage	± (2%+.05Ω) ΔR	± (0.2%+.05Ω) ΔR	± (0.2%+.05Ω) ΔR
High Temp. Exposure	± (2%+.05Ω) ΔR	± (1%+.05Ω) ΔR	± (1%+.05Ω) ΔR
Shock	± (0.2%+.05Ω) ΔR	N/A	± (0.1%'.05Ω) ΔR
Vibration	± (0.2%+.05Ω) ΔR	N/A	± (0.1%+.05Ω) ΔR
Terminal Strength	± (1%+.05Ω) ΔR	± (0.1%+.05Ω) ΔR	± (0.1%+.05Ω) Δ R

ΔR figures shown are based on units with an initial tolerance of 5% and maximum operating temperature of 350°C.

*NHL, HLM, HLA and HLW physical configurations are not covered in MIL-R-26. However, environmental specifications will be same as for HL tubular and HL flat styles.

■ MIL-R-18546

TYPES RH, HG & PH

TEST	MIL-R-18546	DALE TYPICAL RH, HG & PH*
Load Life	±(1%+.05Ω)ΔR	±(.5%+.05Ω)ΔR
Moisture Resistance	±(1%+.05Ω)ΔR	±(.5%+.05Ω)ΔR
Resistance Temperature Characteristic	±50 PPM to 2000Ω ±30 PPM over 2000Ω	See tables
Thermal Shock	±(.5%+.05Ω)ΔR	±(.25%+.05Ω)ΔR
Momentary Overload	±(.5%+.05Ω)ΔR	±(.25%+.05Ω)ΔR
Dielectric	±(.2%+.05Ω)ΔR	±(.1%+.05Ω)ΔR
High Temp. Storage	±(.5%+.05Ω)ΔR	±(.25%+.05Ω)ΔR
Shock	±(.2%+.05Ω)ΔR	±(.1%+.05Ω)ΔR
Vibration	±(.2%+.05Ω)ΔR	±(.1%+.05Ω)ΔR
Terminal Strength	±(.2%+.05Ω)ΔR	±(.1%+.05Ω)ΔR

All ΔR figures shown are based on units with an initial tolerance of 1% and maximum operating temperatures of 275° C.

*PH physical configuration is not covered in MIL-R-18546. However, environmental specifications will be same as for RH & HG styles.

■ MIL-R-93

TYPES WWA, MWA & WWP

TEST	MIL-R-93 REQUIREMENT	DALE MAXIMUM	DALE TYPICAL
Moisture	±(.1%+.05Ω)	±(.05%+.05Ω)ΔR	±.02% ΔR
T.C. (10 ohms and over)	± 20 ppm/°C	±20 ppm/°C	±15 ppm/°C
Short Time Overload	±(.1%+.05Ω)	±(.05%+.05Ω)ΔR	±.01% ΔR
Dielectric	±(.05%+.05Ω)	±(.02%+.05Ω)ΔR	±.00% ΔR
Low Temp. Storage	±(.2%+.05Ω)	±(.05%+.05Ω)ΔR	±.02% ΔR
High Temp. Exposure	±(.5%+.05Ω)	±(.10%+.05Ω)ΔR	±.04% ΔR
Low Temp. Operation	±(.25%+.05Ω)	±(.05%+.05Ω)ΔR	±.02% ΔR
Temperature Cycling	±(.2%+.05Ω)	±(.15%+.05Ω) ΔR	±.07% ΔR
Terminal Strength	±(.05%+.05Ω)	±(.01%+.05Ω)ΔR	±.00% ΔR
Salt Water	±(.25+.05Ω)	±(.15%+.05Ω)ΔR	±.03% ΔR
Life	±(.5%+.05Ω)	±(.25%+.05Ω)ΔR	±.09% ΔR
Shock	±(.1%+.05Ω)	±(.02%+.05Ω)ΔR	±.00% ΔR
Vibration	±(.1%+.05Ω)	±(.03%+.05Ω)ΔR	±.01% ΔR

All ΔR figures shown are based on units with an initial tolerance of 1% and maximum operating temperature of 145°C.

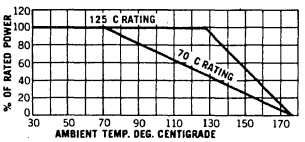
For Optimum Value in Resistors... DALE®

METAL FILM PRECISION RESISTORS, ESTABLISHED RELIABILITY

■ TYPE EMF

Failure Rate: Verified Failure Rate of .01% per 1000 hours at 60% confidence level. Estimated Failure Rate: .001% per 1000 hours per MIL-R-55182

DERATING
Dale EMF resistors have an operating temperature range of −65°C to +175° C. They must be derated according to the curve at right.



DALE TYPE	MIL. TYPE*	70° C RATING	125° C RATING	MAX. WT. (Grams)	MAX. WORKING VOLTAGE	RESISTANCE RANGE (OHMS) By T.C.**		
						T-1 (K)	T-2 (H)	T-9 (J)
EMF 50	RNR50	1/10 w	1/20 w	.11	200	49.9 to 100K	49.9 to 100K	49.9 to 100K
EMF 55	RNR55	1/8 w	1/10 w	.35	200	30.1 to 301K	49.9 to 200K	49.9 to 200K
EMF 60	RNR60	1/4 w	1/8 w	.45	250	24.9 to 1 Meg.	49.9 to 499K	49.9 to 499K
EMF 65	RNR65	1/2 w	1/4 w	.84	300	24.9 to 2 Meg.	49.9 to 1 Meg.	49.9 to 1 Meg.
EMF 70	RNR70	3/4 w	1/2 w	1.6	350	24.9 to 2.49 Meg.	24.9 to 1 Meg.	24.9 to 1 Meg.
EMF 75	—	—	1 w	4.4	500	24.9 to 4.07 Meg.	49.9 to 2.61 Meg.	49.9 to 2.61 Meg.

Standard Resistance Tolerances: .1% (B), .25%, .5% (D) and 1% (F).
*Available in corresponding RNC & RNN styles.
**Extended resistances above and below this range available as Non-MIL parts.

DIMENSIONS
See section on MF resistors. Dimensions on Types RNR50 thru RNR70 will conform to Types RN-50 thru RN-70.
Note: EMF 75 conforms to RN-75.

POWER RATING
Dale EMF power ratings are based on the following two conditions:
1. 0.5% maximum ΔR in 2000 hours load life.
2. 175° C maximum operating temperature.

WIREWOUND PRECISION RESISTORS, ESTABLISHED RELIABILITY

■ TYPE ARS*

Failure rate .000136% per 1000 hours at 50% rated power, 25°C ambient (60% confidence level). Failure defined as ΔR>0.5%.

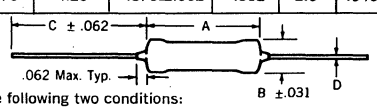
■ TYPE AGS*

Miniature version of ARS Series with BeO core for optimum thermal conductivity, operational stability and increased reliability. Significantly smaller size. Failure rate .000044% per 1000 hours at 50% rated power, 25°C ambient (60% confidence level). Failure defined as ΔR>0.5%.

*Available with solderable and weldable leads.

DALE TYPE	MIL-R-39007B TYPE	POWER RATING (watts)	MIN. RES. (ohms)	MAX. RES. (ohms)	MAX. WORKING VOLTAGE	MAX. WEIGHT (grams)	DIM. A	DIM. B	DIM. C	DIM. D
ARS-2	RWR-71	2	0.1	16.2K	180	1.6	.812±.062	.187	1.5	.032
ARS-5	RWR-74	5	0.1	12K	250	4.75	.875±.062	.312	2.0	.040
ARS-10	RWR-78	10	0.1	40K	650	12.00	1.780±.062	.375	2.0	.040
AGS-1	RWR-81	1	0.5	1.0K	25	.35	.250±.031	.085	1.5	.020
AGS-2	RWR-82	1.5	0.1	1.3K	32	.30	.312±.016	.078	1.5	.020
AGS-3	RWR-80	2.25	0.1	2.67K	52	.375	.406±.031	.094	1.5	.020
AGS-5	RWR-89	4	0.1	4.12K	112	1.25	.560±.062	.187	1.5	.032
AGS-10	RWR-84	7	0.1	12.4K	275	4.25	.875±.062	.312	2.0	.040

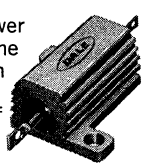
Tolerance: All established reliability resistors have a standard resistance tolerance of 1%.



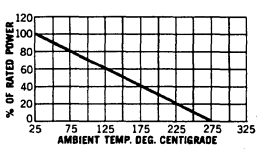
POWER RATING
Dale ARS and AGS power ratings are based on the following two conditions:
1. 0.5% maximum ΔR in 2000 hours load life. 2. 275°C maximum operating temperature.

■ TYPE ARH

Advanced design housed power wirewounds made on the same line and under the same high reliability standards as the ARS and AGS. Failure rate of .01% at 100% rated power.



DERATING ARS, AGS, ARH
At high ambient temperatures, the derating curve at right applies.



DALE TYPE	MIL-R-39009A TYPE	POWER RATING (watts)		RESISTANCE RANGES (ohms)		MAX. WORKING VOLTAGE	MAX. WT. GRAMS
		MTD.	FREE AIR	MIN.	MAX.		
ARH-5	RER-60	5	3	.1	4.12K	220	3
ARH-10	RER-65	10	6	.1	5.62K	340	8
ARH-25	RER-70	20	8	.1	12.1K	650	15
ARH-50	RER-75	30	10	1.0	39.2K	1400	32

Tolerance: All established reliability resistors have a standard resistance tolerance of 1%. Non-inductive versions also available.

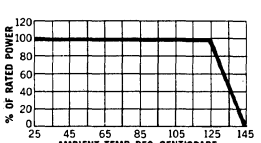
DIMENSIONS: See section on RH resistors. Types ARH-5 thru 50 will correspond with RH-5 thru 50.

POWER RATING
Dale ARH resistor ratings are based on the following requirements:
1. 275° maximum internal hotspot temperature
2. 1% maximum ΔR in 2000 hour load life
3. Proper heat sink
   4x6x2x.040 aluminum chassis = ARH-5 and ARH-10
   5x7x2x.040 aluminum chassis = ARH-25 and ARH-50

■ TYPE AWA

Established reliability epoxy-molded precision bobbin wirewound resistor with high stability and low T.C.; offers excellent moisture protection and low noise. Quality verified by acceptance testing.

DERATING
Dale AWA resistors have an operating temperature range of −55°C to +145°C. Derating is required for temperatures above 125°C. The curve at right applies.



DALE TYPE	MIL-R-39005B TYPE	POWER RATING (Watts)	MINIMUM RESISTANCE RANGE (Ohms)					MAX. RES. (Ohms) ALL TOL.	MAX. WORKING VOLTAGE	MAX. WT. (Grams)
			.01%	.02%	.05%	.1%	1%			
AWA-55	RBR-55	.15	10	10	10	10	.1	250K	200	1.2
AWA-54	RBR-54	.25	10	10	10	10	.1	450K	300	1.5
AWA-53	RBR-53	.33	10	10	10	10	.1	1.1 Meg.	300	3.1
AWA-52	RBR-52	.50	10	10	10	10	.1	1.21 Meg.	600	3.8

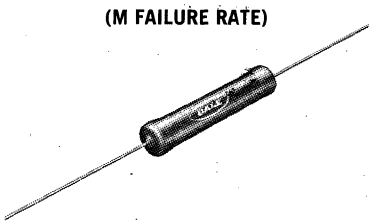
DIMENSIONS:
See section on WWA resistors. Dimensions on Types RBR-52 thru RBR-55 will conform to Types RB-52 thru RB-55.

POWER RATING
Dale AWA power ratings are based on the following two conditions:
1. 1% maximum ΔR in 2000 hours load life.
2. 125°C maximum operating temperature.

DALE® for Optimum Value in Wirewound Resistors

WIREWOUND PRECISION RESISTORS, ESTABLISHED RELIABILITY

(M FAILURE RATE)



■ **TYPE ESS** (Solderable Leads)
■ **TYPE ESW** (Weldable Leads)

■ **TYPE EGS** (Solderable Leads)
■ **TYPE EGW** (Weldable Leads)

These styles meet the requirements of MIL-R-39007 Failure Rate Level M (1%/1000 hours). See ARS and AGS for lower failure rates.

POWER RATING

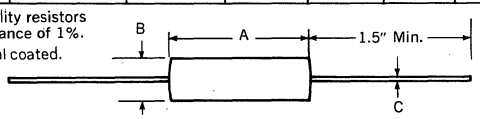
Power ratings are based on the following two conditions:

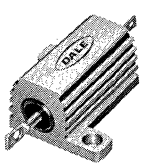
1. .5% maximum ΔR in 2000 hours load life.
2. 275° C maximum operating temperature.

DALE TYPE	MIL-R-39007 TYPE	POWER RATING (Watts)	RESISTANCE RANGE (Ohms) .1%	RESISTANCE RANGE (Ohms) .5% & 1%	MAX. WEIGHT (Grams)	DIMENSIONS A	DIMENSIONS B	DIMENSIONS C
EGS-1*	RWR-81S	1	.499-1000	.1-1000	.21	.250	.075	.020
EGW-1*	RWR-81W	1	.499-1000	.1-1000	.21	.250	.075	.020
EGS-2*	RWR-82S	1.5	.499-1300	.1-1300	.23	.312	.075	.020
EGW-2*	RWR-82W	1.5	.499-1300	.1-1300	.23	.312	.075	.020
EGS-3*	RWR-80S	2	.499-2670	.1-2670	.34	.422	.093	.020
EGW-3*	RWR-80W	2	.499-2670	.1-2670	.34	.422	.093	.020
ESS-2B	RWR-89S	3	.499-4120	.1-4120	.70	.560	.187	.032
ESW-2B	RWR-89W	3	.499-4120	.1-4120	.70	.560	.187	.032
ESS-5	RWR-74S	5	.499-12,100	.1-12,100	4.2	.875	.312	.040
ESW-5	RWR-74W	5	.499-12,100	.1-12,100	4.2	.875	.312	.040
EGS-10	RWR-84S	7	.499-12,400	.1-12,400	3.6	.875	.312	.040
EGW-10	RWR-84W	7	.499-12,400	.1-12,400	3.6	.875	.312	.040
ESS-10	RWR-78S	10	.499-39,200	.1-39,200	9.0	1.780	.375	.040
ESW-10	RWR-78W	10	.499-39,200	.1-39,200	9.0	1.780	.375	.040

Tolerance: All established reliability resistors have a standard resistance tolerance of 1%.
*Molded models. Other conformal coated.

DIMENSIONS





■ **TYPE ERH** (Inductive Winding)
■ **TYPE ENH** (Non-inductive Winding)

Meet the requirements of MIL-R-39009 Failure Rate Level M (1%/1000 hours). See ARH for lower failure rates.

POWER RATING

Dale ERH and ENH resistor ratings are based on the following requirements:

1. 275° C maximum internal hotspot temperature
2. 1% maximum ΔR in 2000 hour load life
3. Proper heat sink

4x6x2x.040 aluminum chassis = ERH-5 & ERH-10
5x7x2x.040 aluminum chassis = ERH-25 & ERH-50

DALE TYPE	MIL-R-39009 TYPE	POWER RATING (Watts) DALE*	POWER RATING (Watts) MIL	RESISTANCE RANGE (Ohms) 1%	MAX. WORKING VOLTAGE	MAX. WEIGHT (Grams)	STANDARD TEMPERATURE COEFFICIENT VALUE RANGES (Ohms) ±50PPM	±30PPM	±20PPM
ENH-5	RER-40	7.5 (5)	5	1 to 1.65K	110	3.3	1 to 9.9	10 to 25	26 to 1.65K
ENH-10	RER-45	12.5 (10)	10	1 to 2.8K	190	8.8	1 to 9.9	10 to 40	41 to 2.8K
ENH-25	RER-50	25	15	1 to 6.04K	390	16.5	1 to 9.9	10 to 85	86 to 6.04K
ENH-50	RER-55	50	30	1 to 19.6K	890	35.0	1 to 9.9	10 to 235	236 to 19.6K
ERH-5	RER-60	7.5 (5)	5	0.10 to 3.32K	160	3	1 to 9.9	10 to 49	50 to 3.32K
ERH-10	RER-65	12.5 (10)	10	0.10 to 5.62K	265	6	1 to 9.9	10 to 79	80 to 5.62K
ERH-25	RER-70	25	15	0.10 to 12.1K	550	13	1 to 9.9	10 to 169	170 to 12.1K
ERH-50	RER-75	50	30	0.10 to 39.2K	1250	28	1 to 9.9	10 to 469	470 to 39.2K

Tolerance: All established reliability resistors have a standard resistance tolerance of 1%. Non-inductive versions also available.

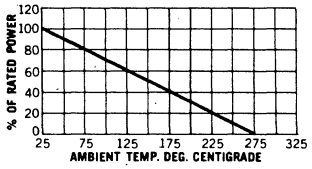
**Figures in parentheses indicate wattage printed on these resistors. They can be rated at 7.5 and 12 watts respectively, but will be printed with these higher ratings only upon request.

DIMENSIONS

See section on RH resistors. Types ENH and ERH-5 thru 50 will correspond with RH-5 thru 50.

DERATING
ESS, ESW, EGS, EGW, ERH, ENH

At high ambient temperatures, the derating curve at right applies.



DOCUMENTATION

Qualification, acceptance and failure-rate maintenance test data is retained by Dale and is available upon request. Lot traceability and identification data is maintained by Dale for 5 years.

RELIABILITY PROGRAMS

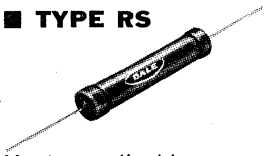
The established reliability series are the result of an extensive reliability program at Dale Electronics which includes basic design and materials improvement, special production and test facilities, and trained, reliability-oriented personnel. A separate program group has been set up to provide customer service on established reliability programs, and the facilities and know-how of the Dale established reliability organization can be directed toward the development of reliability programs for specific user requirements. Inquiries may be directed to your local Dale representative or to the factory.

DALE® *for Optimum Value in Wirewound Resistors*

WIREWOUND PRECISION RESISTORS, SILICONE COATED OR MOLDED

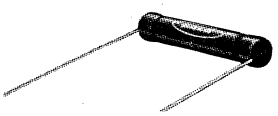
(Available with Weldable Leads)

■ TYPE RS



Meets applicable requirements of MIL-R-26E, MIL-R-26C and MIL-R-23379. Non-inductive styles available.

■ TYPE RLS



Radial leads for printed circuit board mounting. Meets applicable requirements of MIL-R-26E. Non-inductive styles available.

DALE TYPE	MIL-R-26E TYPE*	DALE RATING U .05% thru 5%	DALE RATING V 3% & 5%	RESISTANCE RANGES (OHMS) .05% .1%, .25%	RESISTANCE RANGES (OHMS) .5%, 1% 3%, 5%	MAX.** WORKING VOLTAGE U	MAX.** WORKING VOLTAGE V	MAX. WT. GRAMS	STANDARD TEMPERATURE COEFFICIENT VALUE RANGES (OHMS)† ± 90 PPM	± 50 PPM	± 30 PPM	± 20 PPM
RS-¼	—	.4 W	—	10 to 950	1 to 3.4K	20	—	.21	Below 1 Ω	1 to 6.9	—	7 to 3.4K
RS-½	—	.75 W	—	10 to 1.3K	1 to 4.9K	29	—	.23	Below 1 Ω	1 to 9.9	—	10 to 4.9K
RS-1A	RW-70	1.0 W	—	.1 to 2.7K	.1 to 10.4K	52	—	.34	Below 1 Ω	1 to 9.9	10 to 19	20 to 10.4K
RS-1B	—	1.1 W	—	1 to 4.0K	.1 to 15K	62	—	.40	Below 1 Ω	1 to 9.9	10 to 29	30 to 15K
RS-2	—	4.0 W	5.5 W	1 to 12.7K	.1 to 47.1K	210	250	2.1	Below 1 Ω	1 to 9.9	10 to 79	80 to 47.1K
RS-2A	—	3.25 W	4.75 W	1 to 11.4K	.1 to 42.1K	185	220	.90	Below 1 Ω	1 to 9.9	10 to 79	80 to 42.1K
RS-2B	RW-79	3.0 W	3.75 W	.1 to 6.5K	.1 to 24.5K	140	157	.70	Below 1 Ω	1 to 9.9	10 to 49	50 to 24.5K
RS-2C	—	2.5 W	3.25 W	1 to 8.6K	.1 to 32.3K	138	157	1.6	Below 1 Ω	1 to 9.9	10 to 59	60 to 32.3K
RS-2C-23	RW-69	2.5 W	3.25 W	.1 to 8.6K	.1 to 32.3K	138	157	1.6	Below 1 Ω	1 to 9.9	10 to 59	60 to 32.3K
RS-5	—	5.0 W	6.5 W	.1 to 25.7K	.1 to 95.2K	360	410	4.2	Below 1 Ω	1 to 9.9	10 to 169	170 to 95.2K
RS-5-69	RW-74	5.0 W	6.5 W	.1 to 24.5K	.1 to 91.0K	350	400	4.2	Below 1 Ω	1 to 9.9	10 to 169	170 to 91.0K
RS-5-70	RW-67	5.0 W	6.5 W	.5 to 25.7K	.1 to 95.2K	360	410	4.2	Below 1 Ω	1 to 9.9	10 to 169	170 to 95.2K
RS-7	—	7.0 W	9.0 W	.5 to 41.4K	.1 to 154K	504	576	4.7	Below 1 Ω	1 to 9.9	10 to 269	270 to 154K
RS-10	—	10 W	13 W	.5 to 73.4K	.1 to 273K	858	978	9.0	Below 1 Ω	1 to 9.9	10 to 469	470 to 273K
RS-10-38	RW-78	10 W	13 W	.1 to 71.5K	.1 to 265K	846	966	9.0	Below 1 Ω	1 to 9.9	10 to 469	470 to 265K
RS-10-39	RW-68	10 W	13 W	.1 to 73.4K	.1 to 273K	858	978	9.0	Below 1 Ω	1 to 9.9	10 to 469	470 to 273K

**Max. working voltage determined at .0008 dia. wire resistance values. †Consult factory for special T.C. requirements.

* MIL-R-26C, MIL-R-23379 TYPES

	MIL-R-26C (G & V)	MIL-R-23379
RS-1A	—	RWP-18
RS-2C	RW-69	—
RS-2C-23	—	RWP-20
RS-5	RW-67	RWP-21
RS-10	RW-68	RWP-23

POWER RATINGS RS, RLS, G SERIES

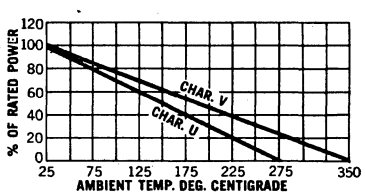
These Series have two power ratings, depending on operating temperature and stability requirements.

CHARACTERISTIC U: 1. 275°C maximum hotspot temperature
2. .5% maximum ΔR in 2000 hour load life

CHARACTERISTIC V: 1. 350°C maximum hotspot temperature
2. 3% maximum ΔR in 2000 hour load life

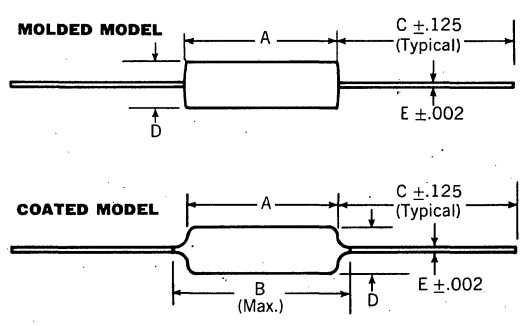
DERATING RS, RLS, G

RS, RLS and G coated resistors have an operating temperature range of −55°C to +350°C. Dale RS molded resistors have an operating temperature range of −55°C to +275°C. They must be derated at high ambient temperatures according to the curves below.



DIMENSIONS (Consult factory for RLS Types)

	TYPE	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E
MOLDED MODELS	RS-¼	.250±.015	—	1.500	.078±.015	.020
	RS-½	.312±.015	—	1.500	.078±.015	.020
	RS-1A	.422±.015	—	1.500	.093±.032	.020
	RS-1B	.575±.015	—	1.500	.093±.032	.020
COATED MODELS	RS-2	.625±.062	.765	2.000	.250±.032	.040
	RS-2A	.812±.062	.890	1.500	.188±.032	.032
	RS-2B	.560±.062	.622	1.500	.187±.031	.032
	RS-2C	.500±.062	.593	1.500	.218±.032	.040
	RS-2C-23	.500±.062	.593	1.500	.218±.032	.032
	RS-5	.875±.062	1.000	2.000	.312±.032	.040
	RS-5-69	.875±.062	.937	2.000	.312±.031	.040
	RS-5-70	.875±.062	1.000	1.500	.312±.031	.032
	RS-7	1.218±.062	1.281	2.000	.312±.032	.040
	RS-10	1.780±.062	1.875	2.000	.375±.032	.040
	RS-10-38	1.780±.062	1.842	2.000	.375±.031	.040
	RS-10-39	1.780±.062	1.875	1.500	.375±.031	.032



DALE® for Optimum Value in Wirewound Resistors

WIREWOUND PRECISION RESISTORS, SILICONE COATED *(Available with Weldable Leads)*

■ TYPE G

Beryllium oxide core for decreased size, increased stability. Meets applicable specifications of MIL-R-26 and MIL-R-23379. Non-inductive styles available.

■ TYPE GL

Radial leads for printed circuit board mounting. Meets applicable requirements of MIL-R-26E.

DALE TYPE	MIL-R-26E TYPE*	DALE RATING U (.05% thru 5%)	DALE RATING V (3% & 5%)	RESISTANCE RANGES (OHMS) .05%, .1%, .25%	RESISTANCE RANGES (OHMS) .5%, 1%, 3%, 5%	MAX.** WORKING VOLTAGE U	MAX.** WORKING VOLTAGE V	MAX. WT. GRAMS	STANDARD TEMPERATURE COEFFICIENT VALUE RANGES (OHMS)† ± 90 PPM	± 50 PPM	± 30 PPM	± 20 PPM
G-1	RW-81	1.0 W	—	.1 to 950	1 to 3.4K	33	—	.20	Below 1 Ω	1 to 6.9	—	7 to 3.4K
G-2	—	1.5 W	—	10 to 1.3K	1 to 4.9K	42	—	.21	Below 1 Ω	1 to 9.9	—	10 to 4.9K
G-3	RW-80	2.25 W	—	.1 to 2.7K	.1 to 10.4K	80	—	.34	Below 1 Ω	1 to 9.9	10 to 19	20 to 10.4K
G-5	—	4.0 W	5 W	1 to 6.5K	.1 to 24.5K	162	184	.80	Below 1 Ω	1 to 9.9	10 to 49	50 to 24.5K
G-5A	—	4.5 W	6.5 W	1 to 11.4K	.1 to 42.1K	214	257	.95	Below 1 Ω	1 to 9.9	10 to 79	80 to 42.1K
G-5C	—	5 W	7 W	1 to 8.6K	.1 to 32.3K	194	230	1.2	Below 1 Ω	1 to 9.9	10 to 59	60 to 32.3K
G-6	—	6 W	8 W	1 to 12.7K	.1 to 47.1K	258	298	2.0	Below 1 Ω	1 to 9.9	10 to 79	80 to 47.1K
G-10	—	7 W	10 W	.5 to 25.7K	.1 to 95.2K	425	508	3.6	Below 1 Ω	1 to 9.9	10 to 169	170 to 95.2K
G-12	—	10 W	12 W	.5 to 41.4K	.1 to 154K	607	665	4.2	Below 1 Ω	1 to 9.9	10 to 269	270 to 154K
G-15	—	15 W	18 W	.5 to 73.4K	.1 to 273K	1050	1150	7.6	Below 1 Ω	1 to 9.9	10 to 469	470 to 273K

**Maximum Working Voltage determined at .0008 dia. wire resistance values. †Consult factory for special T.C. requirements.

*MIL-R-26C, MIL-R-23379 TYPES

	MIL-R-26C	MIL-R-23379
G-1	—	RWP-17
G-3	—	RWP-19
G-5C	RW-69	—
G-5C-2	—	RWP-20
G-10	RW-67	RWP-21
G-15	RW-68	RWP-23

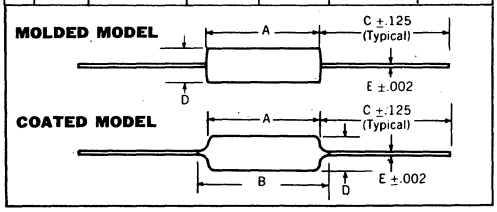
POWER RATING
Power ratings of Dale G resistors are 1.4 to 4 times higher than those of conventional wirewound resistors of equivalent size.

Stability When Dale G resistors are operated at the same ratings (Char. U) as conventional Dale RS resistors of equivalent size, the shift in resistance is 50% or less than that of the RS.

For additional power and derating information, see section on RS resistors.

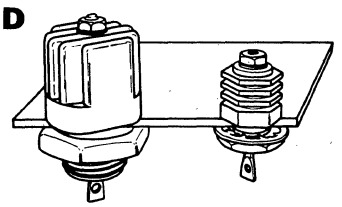
DIMENSIONS

	TYPE	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E
MOLDED MODELS	G-1	.250±.015	—	1.500	.078±.015	.020
	G-2	.312±.015	—	1.500	.078±.015	.020
	G-3	.422±.015	—	1.500	.093±.032	.020
COATED MODELS	G-5	.562±.062	.640	1.500	.188±.032	.032
	G-5A	.812±.062	.890	1.500	.188±.032	.032
	G-5C	.500±.062	.593	1.500	.218±.032	.040
	G-6	.625±.062	.765	2.000	.250±.032	.040
	G-10	.875±.062	1.000	2.000	.312±.032	.040
	G-12	1.218±.062	1.281	2.000	.312±.032	.040
	G-15	1.780±.062	1.875	2.000	.375±.032	.040



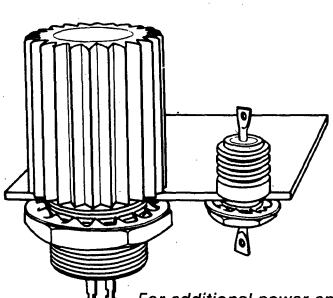
WIREWOUND POWER RESISTORS, HEAT SINK ENCASED

■ TYPE PH



TWO TERMINAL CONFIGURATIONS (PH-10-1, PH-25, PH-50 and PH-100). Thru chassis mounting—two connections required on one or both sides of panel. Meet electrical and environmental requirements of MIL-R-18546.

SINGLE TERMINATION, CHASSIS GROUND (PH-10-5 and PH-25-8). Speeds assembly time as only one connection is required. Often utilized as a drive line resistor in a high speed core memory system using a series termination technique. Non-inductive windings have low reactance properties giving exceptionally fast cycle time.



For additional power and derating information, see section on RH resistors

DALE TYPE	DALE RATING (WATTS)	RESISTANCE RANGES (OHMS) .05%, .1%, .25%	RESISTANCE RANGES (OHMS) .5%, 1%, 3%	MAX. WORKING VOLTAGE	MAX.* WT. (GRAMS)	STANDARD TEMPERATURE COEFFICIENT VALUE RANGES (OHMS)† ±50 PPM	±30 PPM	±20 PPM
PH-10A	10	1 to 12.7K	.1 to 47.1K	240	6	1 to 9.9	10 to 79	80 to 47.1K
PH-10-1	10	1 to 12.7K	.1 to 47.1K	240	6	1 to 9.9	10 to 79	80 to 47.1K
PH-10-5	10	.5 to 6.3K	.1 to 23.5K	170	6	1 to 9.9	10 to 79	80 to 23.5K
PH-25	25	.5 to 25.7K	.1 to 95.2K	425	22	1 to 9.9	10 to 169	170 to 95.2K
PH-25-8	25	.25 to 12.8K	.1 to 47.7K	300	22	1 to 9.9	10 to 169	170 to 47.7K
PH-50	50	3 to 52K	.1 to 75K	1500	80	1 to 99	100 to 999	1K to 75K
PH-100	100	5 to 35K	.1 to 50K	1700	186	1 to 99	100 to 999	1K to 50K

*A weight increase of 10% should be allowed for non-inductive types. †Consult factory for values below 1Ω and for special T.C. requirements.

DALE® *for Optimum Value in Housed Wirewound Resistors*

WIREWOUND POWER RESISTORS, HEAT SINK ENCASED

Patented design. Mount to the chassis. Provide high power and precision tolerance in a variety of sizes, mounting and terminal configurations. RH and HG types exceed MIL-R-18546. Non-inductive styles available.

■ TYPE RH

5 through 250 watts. Bonus power dissipation ability within MIL-R-18546 size.

■ TYPE HG

Beryllium oxide core for optimum heat dissipation. Doubles Mil. Spec. power at no increase in size. Exceptional stability at mil. levels.

DALE TYPE	MIL-R-18546 TYPE	POWER RATING* (WATTS)		RESISTANCE RANGES (OHMS)		MAX. WORKING VOLTAGE	MAX.† WT. GRAMS	STANDARD TEMPERATURE COEFFICIENT VALUE RANGES (OHMS)††		
		DALE**	MIL	.05%, .1%, .25%	.5%, 1%, 3%			±50 PPM	±30 PPM	±20 PPM
RH-5	RE-60	7.5 (5)	5	1 to 6.5K	.1 to 24.5K	160	3	1 to 9.9	10 to 49	50 to 24.5K
RH-10	RE-65	12.5 (10)	10	1 to 12.7K	.008 to 47.1K	265	6	1 to 9.9	10 to 79	80 to 47.1K
RH-25	RE-70	25	20	.5 to 25.7K	.01 to 95.2K	550	13	1 to 9.9	10 to 169	170 to 95.2K
RH-50	RE-75	50	30	.5 to 73.4K	.01 to 273K	1250	28	1 to 9.9	10 to 469	470 to 273K
RH-100	RE-77	100	75	.3 to 50K	.1 to 50K	1900	400	1 to 99	100 to 949	950 to 50K
RH-250	RE-80	250	120	.3 to 75K	.1 to 75K	2300	800	1 to 99	100 to 999	1K to 75K
HG-5	RE-60	15	5	1 to 6.5K	.1 to 24.5K	220	3	1 to 9.9	10 to 49	50 to 24.5K
HG-10	RE-65	20	10	1 to 12.7K	.1 to 47.1K	340	6	1 to 9.9	10 to 79	80 to 47.1K
HG-25	RE-70	35	20	.5 to 25.7K	.1 to 95.2K	650	13	1 to 9.9	10 to 169	170 to 95.2K
HG-50	RE-75	50	30	.5 to 73.4K	.1 to 273K	1400	28	1 to 9.9	10 to 469	470 to 273K

*Rating is based on chassis mounting area and stability.

**NOTE: Figures in parentheses on RH-5 and RH-10 indicate wattage printed on these resistors. New construction allows them to be rated at 7.5 and 12.5 watts—but they will be printed with these higher ratings only upon customer request.

†A weight increase of 10% should be allowed for non-inductive styles.

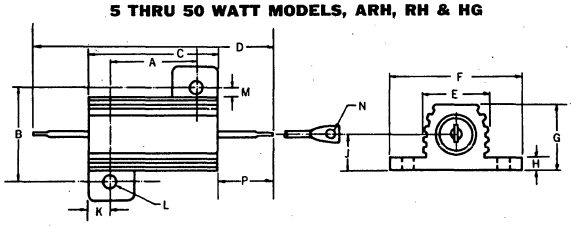
††Consult factory for values below 1 ohm and for special T.C. requirements.

POWER RATING RH, HG, PH TYPES

Dale housed resistor ratings are based on the following requirements:

1. 275°C maximum internal hotspot temperature
2. 1% maximum ΔR in 1000 hour load life for RH-5, 10, 25, 50; PH-10, 25, 50. 3% maximum ΔR in 1000 hour load life for RH-100, 250; PH-100.
3. Proper heat sink.
   4x6x2x.040 aluminum chassis = RH-5, 10; HG-5, 10; PH-10
   5x7x2.040 aluminum chassis = RH-25; HG-25, 50; PH-25
   12x12x.059 aluminum panel = RH-50
   12x12x.125 aluminum panel = RH-100, 250; PH-50, 100

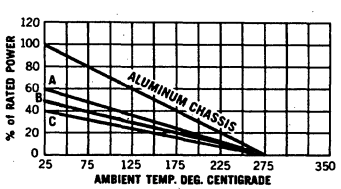
5 THRU 50 WATT MODELS, ARH, RH & HG



DERATING

Dale housed resistors have an operating temperature range of −55°C to +275°C. Derating is required for reduced chassis mounting area and for high ambient temperatures. The following curves apply to operation of unmounted resistors:

A = RH-5, 10
B = RH-25; PH-10, 25
C = RH-50, 100, 250; PH-50, 100; HG-5, 10, 25, 50

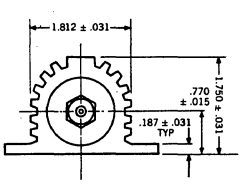


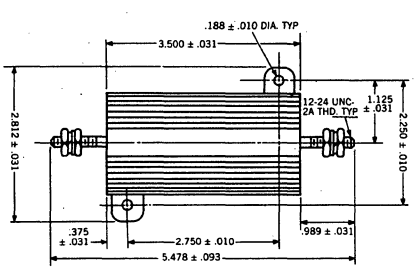
DIMENSIONS—5 thru 50 WATT MODELS—ARH, RH & HG

TYPE*	A	B	C	D	E	F	G	H	J	K	L	M	N	P
RH-5, HG-5	±.444 .005	±.490 .005	±.600 .031	±1.125 .062	±.334 .015	±.646 .015	±.320 .015	±.065 .010	±.133 .010	±.078 .010	±.093 .005	±.078 .015	±.050 .005	±.262 .062
RH-10, HG-10	±.562 .005	±.625 .005	±.750 .031	±1.375 .062	±.420 .015	±.800 .015	±.390 .015	±.075 .010	±.165 .010	±.093 .010	±.093 .005	±.102 .015	±.086 .005	±.312 .062
RH-25, HG-25	±.719 .005	±.781 .005	±1.062 .031	±1.938 .062	±.550 .015	±1.080 .015	±.546 .015	±.088 .010	±.231 .010	±.172 .010	±.125 .005	±.115 .015	±.086 .005	±.438 .062
RH-50, HG-50	±1.563 .005	±.844 .005	±1.968 .031	±2.781 .062	±.630 .015	±1.140 .015	±.610 .015	±.088 .010	±.260 .010	±.196 .010	±.125 .005	±.107 .015	±.086 .005	±.406 .062

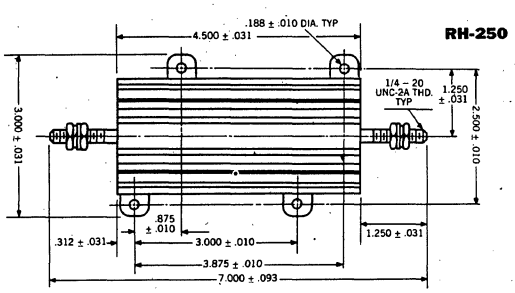
*Types ARH, ERH, ENH 5 thru 50 correspond with RH-5 thru 50.

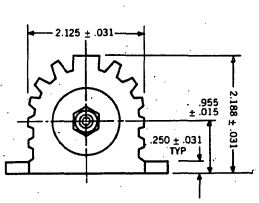
RH-100





RH-250





DALE® for Optimum Value in Bobbin Wirewound Resistors

WIREWOUND PRECISION RESISTORS, BOBBIN TYPE *(Available with Weldable Leads)*

Non-inductive precision resistors. Epoxy molded for high dielectric strength and complete environmental protection. Meet applicable requirements of MIL-R-93D.

DALE TYPE	MIL-R-93 TYPE	POWER RATING (WATTS)	MINIMUM RESISTANCE RANGE (OHMS)* .05%	.1%	.25%	.5%	1%	MAXIMUM RESISTANCE (OHMS) ALL TOLERANCES	MAXIMUM WORKING VOLTAGE	MAXIMUM WEIGHT (GRAMS)
MWA-8	–	.1	50	10	5	2	1	100K	27	.21
MWA-10	–	.125	50	10	5	2	1	160K	37	.23
WWA-13	–	.125	50	10	5	2	1	311K	50	.35
WWA-22	–	.15	130	20	5	.2	.1	600K	100	.9
WWA-23	RB-56	.15	105	12	5	.2	.1	650K	150	1.0
WWA-24	RB-55	.20	40	12	6	.2	.1	900K	200	1.2
WWA-26	RB-54	.25	20	10	5	.2	.1	1.72 Meg.	300	1.5
WWA-36	RB-53	.33	15	4	1	.2	.1	4 Meg.	300	3.1
WWA-38	RB-52	.50	10	3	1	.2	.1	5.4 Meg	600	3.8
WWA-44	†	.5	15	4	1	.2	.1	5.75 Meg.	500	3.4
WWA-45	†	.5	10	3	1	.2	.1	7.5 Meg.	550	5.4
WWA-48	RB-57	.75	10	3	1	.2	.1	11.5 Meg.	850	6.5
WWA-412	RB-58	.875	10	3	1	.2	.1	17.5 Meg.	1050	8.4
WWA-416	RB-59	1	10	3	1	.2	.1	23 Meg.	1400	15.5

*Consult factory for tolerances below .05%.

†Although there is no direct mil. model of the same physical size, the Dale type will meet the electrical and environmental requirements of MIL-R-93.

■ TYPE WWA

Patented design insures high stability. Special tolerances and matching available.

■ TYPE MWA

Subminiature size retains Dale's unique bobbin-type design and high protection molding coating.

SPECIAL MODIFICATIONS

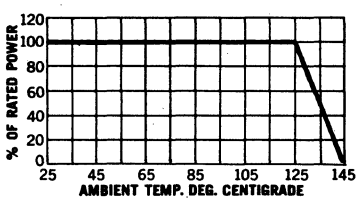
- Special tolerances are available to as low as .005%.
- Resistors can be matched to a tolerance of .001%.
- Special T.C.'s are available to ±2 ppm/° C over a limited temperature range.
- T.C.'s can be matched to an accuracy of 1 ppm/° C.

POWER RATING

MWA, WWA and WWP power ratings correspond to MIL-R-93 ratings and are based on .5% maximum ΔR in 1500 hours load life. For commercial applications, power ratings may be doubled.

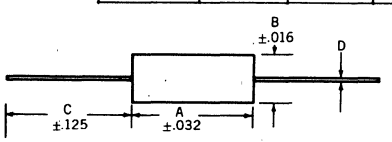
DERATING

Dale MWA, WWA and WWP resistors have an operating temperature range of −55° C to +145° C. Derating is required for temperatures above 125° C. The curve at right applies.



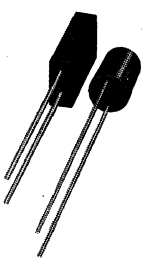
DIMENSIONS

TYPE	DIM. A	DIM. B	DIM. C	DIM. D
MWA-8	.250	.078	1.500	.020
MWA-10	.312	.078	1.500	.020
WWA-13	.375	.125	2.000	.020
WWA-22	.250	.250	2.000	.032
WWA-23	.375	.250	2.000	.032
WWA-24	.500	.250	2.000	.032
WWA-26	.750	.250	2.000	.032
WWA-36	.750	.375	2.000	.032
WWA-38	1.000	.375	2.000	.032
WWA-44	.500	.500	2.00	.032
WWA-45	.625	.500	2.00	.032
WWA-48	1.00	.500	2.00	.032
WWA-412	1.500	.500	2.00	.032
WWA-416	2.00	.500	2.00	.032



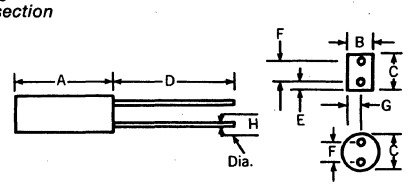
■ TYPE WWP

Rectangular or round printed circuit construction. High resistance per unit volume. Meets applicable requirements of MIL-R-93.



DALE TYPE	MIL-R-93D TYPE	POWER RATING (WATTS)	MINIMUM RESISTANCE RANGE (OHMS) .02%	.05%	.1%	.25%	.5%	1%	MAXIMUM RESISTANCE (OHMS) ALL TOLERANCES	MAXIMUM WORKING VOLTAGE	MAXIMUM WEIGHT (GRAMS)
WWP-18	–	⅛ W	1.5K	600	150	50	25	10	1 Megohm	150 V	1.0
WWP-14	–	¼ W	1K	400	150	50	25	10	1.5 Megohms	300 V	1.5
WWP-225	RB-71	⅛ W	–	105	12	5	.2	.1	515K	150 V	1.0

For additional Power Rating and Derating Information, see section on MWA and WWA styles.



DIMENSIONS

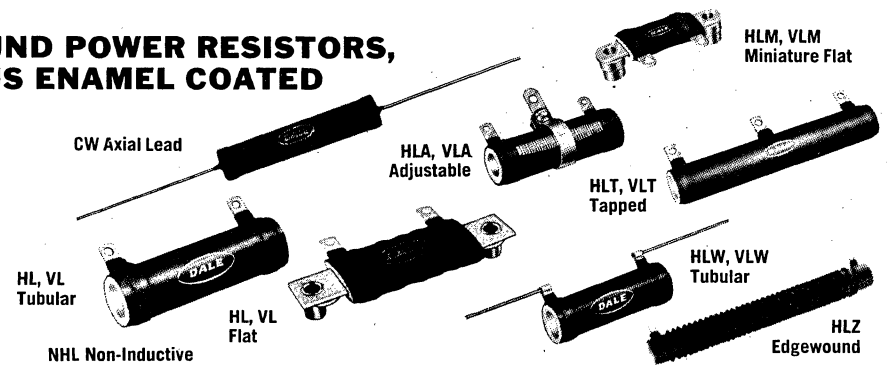
TYPE	A (±.020)	B (±.020)	C (±.020)	D (Min.)	E (±.010)	F (±.010)	G (±.010)	H
WWP-18	.300	.125	.250	1	.062	.125	.062	.032
WWP-14	.600	.125	.250	1	.062	.125	.062	.032
WWP-225	.312	–	.250	1	.025	.200	–	.025

DALE® for Optimum Value in Wirewound Resistors

INDUSTRIAL WIREWOUND POWER RESISTORS, SILICONE OR VITREOUS ENAMEL COATED

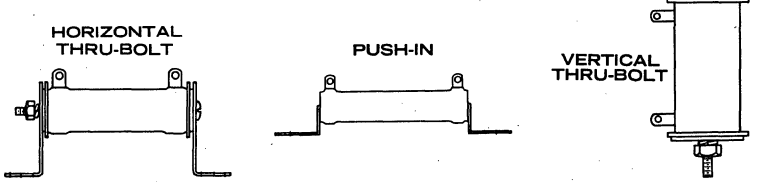
Dale's expanded industrial wirewound line provides both silicone and vitreous coated models. Silicone models are recommended where maintenance of tolerance and T.C. is of primary concern. Vitreous models are recommended where maximum resistance to chemical action is required.

CONTACT DISTRIBUTOR FOR PRICES.

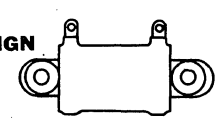


TYPE	APPLICATION	APPLICABLE MIL SPEC AND TYPES	WATTAGE RATING	RESISTANCE RANGE	CORE SIZES	TERMINALS	MOUNTINGS	TOLERANCE
CW Axial Lead	Axial leads. For applications requiring high performance at low cost	MIL-R-26 RW-67, 68, 69	2.5-13 watts	.1 ohm to 100K ohms	Body Dia. .188 to .375" Body Length .500 to 1.781" Leads 1.5 to 2"	Leads	Terminals	±5% (10% below 1 ohm)
HL, VL Tubular	General purpose wirewound resistors with a broad power range.	MIL-R-26 RW-29, 30, 31, 32, 33, 35, 36, 37, 38, 47	5-225 watts	.1 ohm to 1.3 Megohms	O.D. 1/4 to 1-1/8" Length 1-10½"	Lugs	Push-in bracket or thru-bolt	±5% (10% below 1 ohm)
NHL Non-Inductive	High frequency circuits and applications requiring low inductive effect and minimum distributed capacity	None	5-225 watts	1 ohm to 90K ohms	O.D. 1/4 to 1-1/8" Length 1-10½"	Lugs or Leads	Push-in bracket or thru-bolt	±5%
HL, VL Flat	For limited space requiring high power-to-size ratio. Vertical or horizontal stacking.	MIL-R-26 RW-20 thru RW-24	30-95 watts	.1 ohm to 150K ohms	Length 1¼ to 6"	Lugs	Spring push-in	±5% (10% below 1 ohm)
HLM, VLM Miniature Flat	For limited space, high power-to-size requirements particularly in high vibration areas.	None	10-20 watts	.1 ohm to 51K ohms	Length 3/4 to 2-1/16"	Lugs	Thru mount with spacers	±5% (10% below 1 ohm)
HLA, VLA Adjustable	For resistance or voltage adjustment	MIL-R-19365C RX-29, 32, 33, 35, 36 37, 38, 47	12-225 watts	1 ohm to 100K ohms	O.D. 5/16 to 1-1/8" Length 1½ to 10½"	Lugs	Push-in bracket or thru-bolt	±5%
HLT, VLT Tapped	For voltage divider networks	MIL-R-26 RW-22, 23, 24, 33, 35, 36, 37, 38, 47	11-225 watts	.1 ohm to 1.1 Megohms	O.D. 5/16 to 1-1/8" Length 1½ to 10½"	Lugs	Push-in bracket or thru-bolt	±10% each section (±10% total)
HLW, VLW Tubular	General application where terminal wires are required for direct electrical connection	None	3-20 watts	.1 ohm to 80K ohms	O.D. 13/64 to 7/16" Length 7/16" to 2"	Lugs with terminal wires	Terminals, thru-bolt or push-in bracket	±5% (10% below 1ohm)
HLZ Edge-wound	For heavy duty requirements where space is at a premium. High thermal capacity.	None	35-375 watts	.05 ohm to 32 ohms	O.D. 9/16 to 1-1/8" Length 2 to 10-1/2"	Lugs	Push-in bracket or thru-bolt	±10%

MOUNTING BRACKETS for TUBULAR STYLES



EXCLUSIVE BRACKET DESIGN FOR MINIATURE FLAT STYLE



Mounting strap fits snugly through core and is bound tightly against unit by two eccentric spacers. Eliminates expensive cements and improves heat transfer and power handling capabilities.

DALE® for Optimum Value in Power Wirewound Resistors

■ TYPE CP

- Fireproof inorganic construction
- Special inorganic potting compound provides high thermal conductivity.
- Superior moisture resistance

Construction: Resistance wire is high quality, premium grade wound onto a woven fiberglass core. Terminals are tinned copperweld crimped to the wound core with a special brass alloy.

Tolerance: ±10% standard. ±5% also available.

Operating Temperature: −55° C to +275° C.

Terminal Strength: 5 lbs.

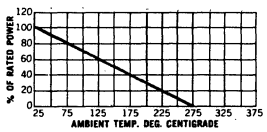
Ordering Information:

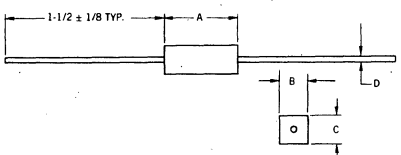
When ordering, please specify Dale type, wattage, resistance value and tolerance.

Example: A 2-watt CP resistor with resistance at 1000 ohms and tolerance of ±10% is designated as shown.

DALE TYPE	WATTAGE RATING	EIA STANDARD RS-344 TYPE	RESISTANCE	MAX. WORKING VOLTAGE	DIMENSIONS A±1/32	B±1/32	C±1/32	D±.001
CP-2	2	CRU2A	.1 to 2.4K	65	11/16	1/4	1/4	.032
CP-3	3	CRU3	.1 to 7.5K	150	7/8	5/16	5/16	.036
CP-5	5	CRU5	.1 to 8.5K	200	7/8	3/8	11/32	.036
CP-7	7	CRU7	.12 to 18K	350	1-25/64	3/8	11/32	.036
CP-10	10	CRU10	.18 to 30K	540	1-7/8	3/8	11/32	.036

DERATING



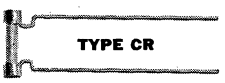


CP	2	1K	±10%
1	2	3	4

1. Resistor type
2. Wattage
3. Resistance
4. Tolerance

■ TYPES CA and CR

TYPE CA



TYPE CR

Construction:

Dale CA and CR Series have a high quality, premium resistance wire wound on woven fiberglass core impregnated and coated with a special grade silicone. Available with special smokeproof coating.

Resistance Range: .1 ohm minimum to 7K, dependent on resistor core length.

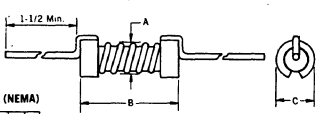
Tolerance: ±10% standard, ±5% also available.

Leads: Standard lead diameter is .036" (#19 AWG). .032" diameter (#20 AWG) is also available. Standard minimum lead length is 1½". Standard lead material is tinned copperweld. Axial lead pull strength on CA Series is 4 lbs.

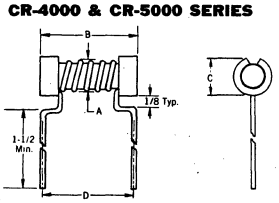
DIMENSIONAL AND POWER SPECIFICATIONS

DALE TYPE	DIM. A	DIM. B MIN.	DIM. B MAX.	DIM. C	DIM. D ±1/16	WATTAGE RATING PER INCH
CA-4000	.110	.5"	2.0"	.150	NA	4
CA-5000	.150	.5"	2.0"	.200	NA	5
CR-4000	.110	.4"	2.0"	.150	(B-.062")	4
CR-5000	.150	.4"	2.0"	.200	(B-.093")	5

CA-4000 & CA-5000 SERIES



CR-4000 & CR-5000 SERIES

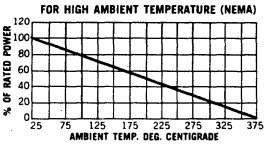


POWER RATINGS

4000 Series = 4 watts per inch
5000 Series = 5 watts per inch

DERATING

FOR HIGH AMBIENT TEMPERATURE (NEMA)



Ordering Information:

When ordering, please specify resistor body length, watts/inch, resistance and tolerance.

Example: A 1½" unit, 5 watts per inch; 350 ohms, ±10% radial lead unit is designated as shown.

CR	5	150	350Ω	±10%
1	2	3	4	5

1. Resistor type
2. Core diameter designation
3. Overall resistor body length
4. Resistance
5. Tolerance

■ TYPE RF FUSE RESISTOR

Dale RF resistors can reliably function as a fuse and as a wirewound resistor. RF resistors are similar in appearance to Type CA, CP or CR models, but are wound with special wire conforming to performance required. Contact factory for design assistance.

■ TYPES CL and CLC

TYPE CL

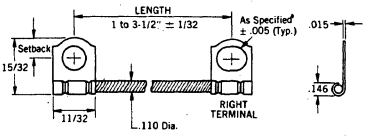
TYPE CLC

- Recessed core prevents resistance wire protrusion.
- Lugs are double-crimped for positive electrical contact and high terminal pull strength.
- Any variation of mounting hole and slot available. Construction, Resistance Range, Tolerance and Derating same as CA.

Resistance Identification: Resistance is always stamped on the left terminal tab.

Terminals: (CL Series) Mounting holes as shown are Dale standard. Any variation of hole and slot is available, also tabs with no holes are available. Standard terminal material is tin plated steel. Special tinned brass is available on request.

Ordering Information: Same as CA except (3) **3.** Mounting length between centers.

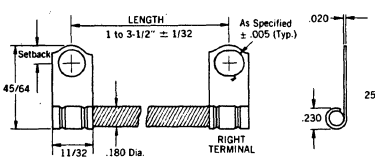


CL-4000 SERIES - 4½ watts per inch

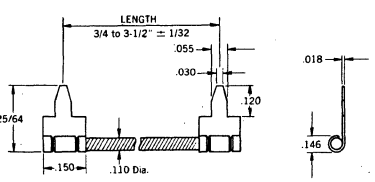
DIMENSIONS

	CL-4000	CL-6000
Setback	.145"	.135"
Left Terminal	.133" dia.	.215" dia.
Right Terminal	.133" x .153" slot	.215" dia.

Other terminal dimensional variations available on request.



CL-6000 SERIES - 6 watts per inch



CLC-4000 SERIES - 4½ watts per inch (Printed Circuit Tab)

METAL and CARBON FILM RESISTORS

APPLICABLE MIL. ENVIRONMENTAL SPECIFICATIONS MIL-R-10509

TYPES MF & MFF

These environmental performance figures are typical for MFF conformally coated resistors. However, this style is dimensionally smaller than the RN types per MIL-R-10509.

REQUIREMENT	CHAR. B		CHAR. D		CHAR. C		CHAR. E		CHAR. F	
Mil. Temp. Coefficient	± 500 PPM		+200 –500 PPM		±50 PPM		±25 PPM		±50 PPM	
Applicable Dale T.C. Code	T-00 (200 PPM)		T-1 (100 PPM) T-0 (150 PPM)		T-2 (50 PPM)		T-9 (25 PPM)		T-2 (50 PPM)	
POWER RATING	at 70°C		at 70°C		at 125°C		at 125°C		at 125°C	
ENVIRONMENTAL TEST	MIL. MAX.	DALE TYP.	MIL. MAX.	DALE TYP.	MIL. MAX.	DALE TYP.	MIL. MAX.	DALE TYP.	MIL. MAX.	DALE TYP.
Temperature Cycling	±0.5%ΔR	±0.10%	±0.5%ΔR	±0.10%	±0.25%ΔR	±0.10%	±0.25%ΔR	±0.10%	±0.25%ΔR	±0.10%
Low Temp. Operation	±0.5%ΔR	±0.05%	±0.5%ΔR	±0.05%	±0.25%ΔR	±0.05%	±0.25%ΔR	±0.05%	±0.25%ΔR	±0.05%
Short Time Overload	±0.5%ΔR	±0.02%	±0.5%ΔR	±0.02%	±0.25%ΔR	±0.02%	±0.25%ΔR	±0.02%	±0.25%ΔR	±0.02%
Dielectric Withstanding Voltage	±0.5%ΔR	±0.01%	±0.5%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%
Effect of Soldering	±0.5%ΔR	±0.02%	±0.5%ΔR	±0.02%	±0.1% ΔR	±0.02%	±0.1% ΔR	±0.02%	±0.1% ΔR	±0.02%
Moisture Resistance	±1.5%ΔR	±0.05%	±1.5%ΔR	±0.05%	±0.5% ΔR	±0.05%	±0.5% ΔR	±0.05%	±0.5% ΔR	±0.05%
Load Life	±1.0%ΔR	±0.05%	±1.0%ΔR	±0.05%	±0.5% ΔR	±0.15%	±0.5% ΔR	±0.15%	±0.5% ΔR	±0.15%
Shock	±0.5%ΔR	±0.01%	±0.5%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%
Vibration	±0.5%ΔR	±0.01%	±0.5%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%	±0.25%ΔR	±0.01%

All ΔR figures shown are based on units with an initial tolerance of 1%.

TYPES MC & DC

TYPE D This physical configuration is not covered in MIL-R-10509.

REQUIREMENT	CHAR. B		CHAR. D		CHAR. D		CHAR. C		CHAR. E	
Power Rating Temp.	70° C		70° C							
Temperature Coefficient	±500 PPM/° C		+200 – 500 PPM/° C							
ENVIRONMENTAL TESTS	MIL. MAX	DALE TYP.	MIL. MAX.	DALE TYP.	MIL. MAX	DALE TYP.	MIL. MAX.	DALE TYP.	MIL. MAX.	DALE TYP.
Temperature Cycling	± 0.5% ΔR	± 0.25% ΔR	± 0.5% ΔR	± 0.25% ΔR	± 0.5% ΔR	± 0.10%	± 0.25% ΔR	± 0.1%	± 0.25% ΔR	± 0.10%
Low Temp. Operation	± 0.5% ΔR	± 0.05% ΔR	± 0.5% ΔR	± 0.05% ΔR	± 0.5% ΔR	± 0.05%	± 0.25% ΔR	± 0.05%	± 0.25% ΔR	± 0.05%
Short Time Overload	± 0.5% ΔR	± 0.05% ΔR	± 0.5% ΔR	± 0.05% ΔR	± 0.5% ΔR	± 0.10%	± 0.25% ΔR	± 0.10%	± 0.25% ΔR	± 0.10%
Dielectric Withstanding Voltage	± 0.5% ΔR	± 0.01% ΔR	± 0.5% ΔR	± 0.01% ΔR	± 0.5% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%
Effect of Soldering	± 0.5% ΔR	± 0.01% ΔR	± 0.5% ΔR	± 0.01% ΔR	± 0.5% ΔR	± 0.05%	± 0.1% ΔR	± 0.05%	± 0.1% ΔR	± 0.05%
Moisture Resistance	± 1.5% ΔR	± 0.25% ΔR	± 1.5% ΔR	± 0.25% ΔR	± 1.5% ΔR	± 0.25%	± 0.5% ΔR	± 0.25%	± 0.5% ΔR	± 0.25%
Load Life	± 1.0% ΔR	± 0.10% ΔR	± 1.0% ΔR	± 0.20% ΔR	± 1.0% ΔR	± 0.5%	± 0.5% ΔR	± 0.5%	± 0.5% ΔR	± 0.5%
Shock	± 0.5% ΔR	± 0.10% ΔR	± 0.5% ΔR	± 0.10% ΔR	± 0.5% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%
Vibration	± 0.5% ΔR	± 0.10% ΔR	± 0.5% ΔR	± 0.10% ΔR	± 0.5% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%	± 0.25% ΔR	± 0.01%

DEPOSITED CARBON RESISTORS *(Available with Weldable Leads)*

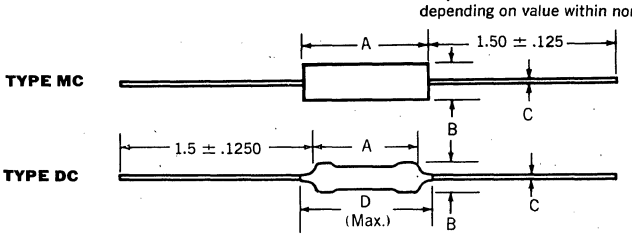
Made of pure crystalline carbon film bonded to selected ceramic cores. Excellent high frequency characteristics. Types MC and DC meet functional requirements of MIL-R-10509F.

■ TYPE MC Epoxy Molded

■ TYPE DC Epoxy Conformal Coated

DALE TYPE	MIL. TYPE MC	MIL. TYPE DC	POWER RATING (WATTS) B	POWER RATING (WATTS) D	MINIMUM RESISTANCE (OHMS)	MAXIMUM 1% RESISTANCE (OHMS)	MAXIMUM 2% RESISTANCE (OHMS)	MAX. WT. (GRAMS) MC	MAX. WT. (GRAMS) DC	MAXIMUM WORKING VOLTAGE
MC-1/10, DC-1/10	RN-55	—	1/10	1/8	2	400K	400K	.35	.20	200
MC-1/8, DC-1/8	RN-60	—	1/8	1/4	1	3 Megohms	5 Megohms	.45	.30	300
MC-1/4, DC-1/4	RN-65	RN-10	1/4	1/2	2	5 Megohms	6 Megohms	.85	.35	350
MCS-1/2, DCS-1/2	RN-70	RN-20	1/2	3/4	1	10 Megohms	15 Megohms	1.50	.80	500
MC-1, DC-1	RN-75	RN-25	1	—	1	15 Megohms	30 Megohms	4.50	2.8	500
MC-2, DC-2	RN-80	RN-30	2	—	2	100 Megohms	125 Megohms	8.25	5.5	750
— DC-5	—	—	—	5	5	150 Megohms	300 Megohms	—	21.9	14,000

*Applies to MC only. **Tolerance:** .5%, 1%, 2%. **Temperature Coefficient:** –200 PPM to –500 PPM, depending on value within normal resistance range.



DIMENSIONS

DALE TYPE	A	B	C	D
MC-1/10	.260±.010	.095±.005	.025 Dia.	–
MC-1/8	.406±.015	.135±.010	.025 Dia.	–
MC-1/4	.593±.015	.203±.015	.025 Dia.	–
MCS-1/2	.730±.020	.250±.015	.032 Dia.	–
MC-1	1.093±.020	.375±.015	.032 Dia.	–
MC-2	2.188±.020	.375±.015	.032 Dia.	–
DC-1/10	.249±.031	.094±.015	.025 Dia.	.381
DC-1/8	.343±.031	.109±.031	.025 Dia.	.453
DC-1/4	.468±.031	.125±.031	.025 Dia.	.578
DCS-1/2	.562±.062	.187±.031	.032 Dia.	.734
DC-1	.937±.062	.296±.031	.032 Dia.	1.187
DC-2	2.062±.062	.296±.031	.032 Dia.	2.312
DC-5	4.000±.125	.438±.031	.040 Dia.	4.300

POWER RATING
Dale MC and DC power ratings are based on 1% maximum ΔR in 1000 hours load life at 70° C.

DERATING
Dale MC and DC resistors have an operating temperature range of –55° C to +165° C. They must be derated at high ambient temperatures from 100% power at 70° C to 0% power at +165° C.

DALE® for Optimum Value in Metal Film Resistors

PRECISION METAL FILM RESISTORS *(Available with Weldable Leads)*

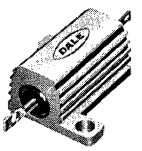
Vacuum-deposited metal film resistors. Good R.F. characteristics. Low noise level.
Wide choice of tolerances, T.C.'s and resistance.

■ TYPE MF, LMF, HMF

Epoxy molded. Meets MIL-R-10509.

■ TYPE MFF, CMF

Epoxy conformal coated.
Type MFF meets electrical and environmental characteristics of MIL-R-10509F, but is dimensionally smaller. Type CMF meets functional requirements of MIL-R-22684.



■ TYPE D

Molded in aluminum housing to utilize heat sink effect of chassis. Resistance ranges from 24.9Ω to 2.6 Meg., with power ratings of 4, 8 and 12 watts.

DALE TYPE	MIL-R-10509 TYPE	125° C RATING (Char. C & E)	70° C RATING (Char. D)	MIL-R-22684 Type	MIL-R-22684 Rating	MAX. WT. (Grams)	MAX. WORKING VOLTAGE	DIMENSIONS (See Drawing on opposite page) A	B	C	D
MF50, HMF50	RN-50	1/20 w	–	–	–	.11	200	.150 ± .020	.065 ± .015	.016 Dia.	–
MF-1/10, LMF-1/10, HMF-1/10	RN-55	1/10 w	1/8 w	–	–	.35	200	.260 ± .010	.095 ± .005	.025 Dia.	–
MF-1/8, LMF-1/8, HMF-1/8	RN-60	1/8 w	1/4 w	–	–	.45	300	.406 ± .015	.135 ± .010	.025 Dia.	–
MF-1/4, LMF-1/4, HMF-1/4	RN-65	1/4 w	1/2 w	–	–	.84	350	.593 ± .015	.203 ± .015	.025 Dia.	–
MFS-1/2, LMF-1/2, HMF-1/2	RN-70	1/2 w	3/4 w	–	–	1.6	500	.730 ± .020	.250 ± .015	.032 Dia.	–
MF-3/4, HMF-3/4	RN-70F	3/4 w*	–	–	–	1.9	500	.790 ± .020	.260 ± .015	.032 Dia.	–
MF-1, HMF-1	RN-75	–	1 w**	–	–	4.4	500	1.093 ± .020	.375 ± .015	.032 Dia.	–
MF-2	RN-80	–	2 w**	–	–	7.9	750	2.188 ± .020	.375 ± .015	.032 Dia.	–
CMF-1/10	–	1/10 w	1/4 w	RL-07	1/4 w	.25	200	.249 ± .031	.090 ± .008	.025 Dia.	.381
CMF-1/8	–	1/8 w	1/2 w	RL-20***	1/2 w	.50	300	.385 ± .031	.145 ± .015	.025 Dia.	.484
CMF-1/4	–	1/4 w	1 w	RL-32***	1 w	.80	500	.562 ± .031	.195 ± .015	.025 Dia.	.750
MFF-1/8	–	1/8 w	–	–	–	.40	300	.343 ± .031	.098 ± .015	.025 Dia.	.453
MFF-1/4	–	1/4 w	–	–	–	.65	350	.468 ± .031	.125 ± .015	.025 Dia.	.578
MFF-1/2	–	1/2 w	–	–	–	.95	500	.562 ± .031	.187 ± .031	.032 Dia.	.734
MFF-1	–	–	1 w**	–	–	2.7	500	.937 ± .062	.296 ± .031	.032 Dia.	1.187
MFF-2	–	–	2 w**	–	–	4.7	750	2.062 ± .062	.296 ± .031	.032 Dia.	2.312

*Characteristic F **Characteristic B ***MIL-R-22684. Lead diameters available.
Tolerance MIL-R-10509 ±1%, ±.5%, ±0.25%, ±0.10% standard, MIL-R-22684 ±2%, ±5%.
LMF and HMF ±1% standard. Special tolerances and matching on request.

STANDARD T.C. RESISTANCE RANGE (OHMS)*

TYPE	T-0 150 PPM	T-1 100 PPM	T-2 50 PPM	T-9 25 PPM
MF50	24.9-100K	49.9-100K	100-100K	100-100K
HMF50	100K-700K	100K-700K	100K-500K	100K-200K
LMF-1/10	1-9.9	5-30	10-30	15-30
MF-1/10, CMF-1/10	10-301K	30.1-301K	30.1-301K	30.1-301K
HMF-1/10	301K-2.5M	301K-2.5M	301K-2M	301K-500K
LMF-1/8	1-9.9	5-24	10-30	15-30
MF-1/8, MFF-1/8	10-1M	24.9-1M	30.1-499K	30.1-499K
CMF-1/8	10-1M	24.9-1M	30.1-499K	30.1-499K
HMF-1/8	1M-5M	1M-5M	499K-3M	499K-1M
LMF-1/4	1-9.9	5-24	10-30	15-30
MF-1/4, MFF-1/4	10-2M	24.9-2M	30.1-1M	30.1-1M
HMF-1/4	2M-15M	2M-15M	1M-10M	1M-2M
LMF-1/2	1-9.9	5-24	10-24	15-24
MFS-1/2, MFF-1/2	10-2.49M	24.9-2.49M	24.9-1M	24.9-1M
HMF-1/2	2.49M-30M	2.49M-30M	1M-20M	1M-3M
MF-3/4	10-2.49M	24.9-2.49M	100-1M	100-1M
HMF-3/4	2.49M-30M	2.49M-30M	1M-20M	1M-3M
MF-1, MFF-1	10-5.11M	24.9-4.02M	49.9-2.61M	49.9-2.61M
HMF-1	5.11M-50M	4.02M-50M	2.61M-30M	2.61M-5M
MF-2, MFF-2	30.1-10M	100-8M	100-6M	200-5.11M

*On Mil types, T-0 and T-1 = Char. D, T-2 = Char. C and T-9 = Char. E.
T-0 and T-1 are available in tolerance of ±.25% and greater only.
11 standard T.C.'s available in −55° C to +175° C range.

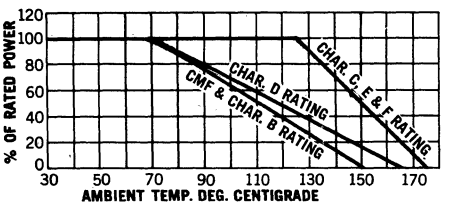
LOW T.C. RESISTANCE VALUE RANGES*

TYPE	L-1 (20 PPM)	L-2 (15 PPM)	L-3 (10 PPM)
CMF-1/10 MFF-1/8 MF-1/8	30.1Ω to 300KΩ	49.9Ω to 200KΩ	100Ω to 100KΩ
CMF-1/8 MFF-1/4 MF-1/4	30.1Ω to 499KΩ	49.9Ω to 300KΩ	100Ω to 200KΩ
MFF-1/2 MFS-1/2	30.1Ω to 750KΩ	49.9Ω to 500KΩ	100Ω to 400KΩ

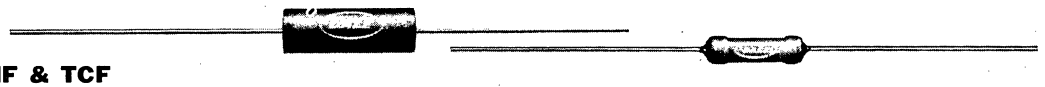
*Over temperature range from 0 to +80° C

POWER RATING
Dale metal film resistors have power ratings depending on operating temperatures of 70° C and 125° C as indicated above. All are based on a maximum ΔR of .5% in 1000 hour load life.

DERATING
Dale metal film resistors have an operating temperature range beginning at −65° C. They must be derated according to the curves at right.



DALE® for Optimum Value in Metal Film Resistors



■ TYPE TMF & TCF

Dale technology allows deposit of high resistivity film on conventional cores resulting in higher values than before available.

DALE TYPE	70°C RATING	MAX. WEIGHT (Grams) TMF	MAX. WEIGHT (Grams) TCF	MAX. WORKING VOLTAGE	RESISTANCE RANGE by T.C. (PPM/°C) *(Ohms) 0 ± 250	RESISTANCE RANGE by T.C. (PPM/°C) *(Ohms) 0 ± 1000
TMF-1, TCF-1	.25 W	.35	.30	300 V	10K-39M	40M-80M
TMF-2, TCF-2	.3 W	.45	.40	600 V	10K-84M	85M-175M
TMF-3, TCF-3	.625 W	.84	.65	1 KV	10K-159M	160M-320M
TMF-4, TCF-4	1.25 W	1.6	.95	2 KV	10K-299M	300M-600M
TMF-5, TCF-5	2.5 W	4.4	2.7	5 KV	10K-399M	400M-800M
TMF-6, TCF-6	5 W	7.9	4.7	10 KV	20K-699M	700M-1800M

***Standard Tolerance:** For 250 PPM values, 1%, 2%, 3%, 5% and 10%. For 1000 PPM values, 2%, 3%, 5% and 10%.

DIMENSIONS (See drawings below)

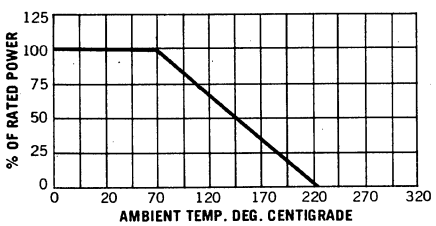
TYPE	DIM. A	DIM. B	DIM. C	DIM. D
TMF-1	.260±.010	.095±.005	.025	–
TMF-2	.406±.015	.135±.010	.025	–
TMF-3	.593±.015	.203±.015	.025	–
TMF-4	.730±.020	.250±.015	.032	–
TMF-5	1.093±.020	.375±.015	.032	–
TMF-6	2.188±.020	.375±.015	.032	–
TCF-1	.264±.031	.090±.008	.025	.381
TCF-2	.343±.031	.098±.015	.025	.453
TCF-3	.468±.031	.125±.015	.025	.578
TCF-4	.562±.031	.187±.031	.032	.734
TCF-5	.937±.062	.296±.031	.032	1.187
TCF-6	2.062±.062	.296±.031	.032	2.312

POWER RATING

Dale TMF and TCF power ratings are based on 1% maximum ΔR in 1000 hours load life at 70°C.

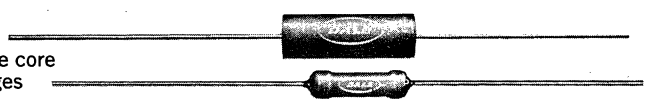
DERATING

Operating temperature range is –55°C to +220°C. They must be derated at high ambient temperatures according to the curve below.



■ TYPE MFB & CFB

Vacuum-deposited metal film on high thermal conductive core allows greater wattage rating and or lower resistor changes over long use (R) at conventional wattage ratings. This allows higher wattage rating at smaller sizes. Controlled T.C. Good high frequency characteristics.



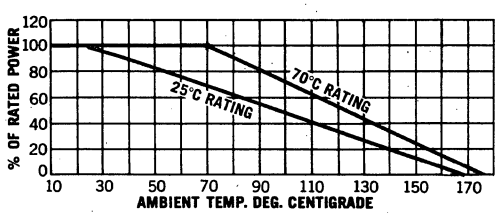
All Dale film resistors are provided with flame retardant coating or molding.

POWER RATING

Dale MFB and CFB resistors have two power ratings, depending on operating temperature of 25°C and 70°C and are based on maximum ΔR of .5% in 1000 hour load life.

DERATING

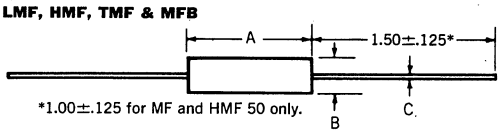
Operating temperature range is –65°C to +175°C. They must be derated according to the curves at right.



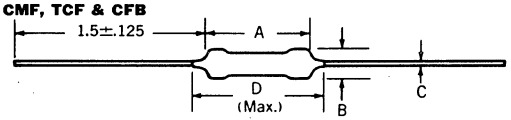
TYPE	MAX. WEIGHT (Grams)	MAX. WORKING VOLTAGE	25°C RATING	70°C RATING	RESISTANCE RANGE (Ohms)
MFB-1/2 CFB-1/2	1.6 .95	700V	3 W	1 W	100-2.49M
MFB-3/4 CFB-3/4	1.9 1.3	800V	4 W	2 W	10-2.49M
MFB-1 CFB-1	4.4 2.7	950V	7 W	3 W	10-5.11M
MFB-2 CFB-2	7.9 4.7	1200V	10 W	5 W	30.1-10M

Standard Tolerance: 10%, 5%, 2%. (±1% available on request.)
Standard Temperature Coefficient: T-00 (0±200 PPM/°C).

TYPE MF, LMF, HMF, TMF & MFB



TYPE MFF, CMF, TCF & CFB



DIMENSIONS

TYPE	A	B	C	D
MFB-1/2	.730±.020	.250±.015	.032	–
MFB-3/4	.790±.020	.260±.015	.032	–
MFB-1	1.093±.020	.375±.015	.032	–
MFB-2	2.188±.020	.375±.015	.032	–
CFB-1/2	.562±.031	.187±.031	.040	.734
CFB-3/4	.665±.062	.235±.031	.040	.852
CFB-1	.937±.062	.296±.031	.040	1.187
CFB-2	2.062±.062	.296±.031	.040	2.312

For complete information, write or phone:

DALE ELECTRONICS, INC.
P. O. Box 609 • COLUMBUS, NEBRASKA 68601
PHONE: 402-564-3131 • TWX: 910-626-8314 • TELEX: 048-6434
A subsidiary of The Lionel Corporation

General Resistance

ECONISTORS™

TO ±0.005% – SHIPPED FROM STOCK – LOW LOW COST

NOW IN STOCK NATIONALLY, ECONISTORS WILL BE SHIPPED IN ANY QUANTITY IN ANY STANDARD VALUE WITHIN 72 HOURS ARO!

ECONISTORS are in every important particular—see specifications—equivalent to other high accuracy components costing several times as much. ECONISTORS are available at prices comparable to, for example, thick film units although thick films cannot compare with ECONISTORS in terms of accuracy, stability, load life, hysteresis and other performance characteristics.

And General Resistance passes the ECONISTOR cost and delivery breakthrough along to its customers in the form of rock bottom prices, immediate availability and a quality, high reliability component proven in missile, space flight and other demanding applications.

SERIES 8E16 ECONISTORS – UNIT PRICES* – STANDARD VALUES**

1 PIECE to 99 PIECES

EXACT VALUE (OHMS)	±0.1% TOLERANCE			±0.025% TOLERANCE			±0.01% TOLERANCE			±0.005% TOLERANCE		
	Number of Pieces			Number of Pieces			Number of Pieces			Number of Pieces		
	1-9	10-49	50-99	1-9	10-49	50-99	1-9	10-49	50-99	1-9	10-49	50-99
10-20-30-40-50-60-70-80-90-100-200	$1.44	$1.37	$1.30	$1.68	$1.60	$1.52	$2.02	$1.92	$1.82	$4.40	$3.50	$2.60
250-300-400-500-600-700-800-900-1k-1.5k-2k-2.5k-3k-4k-5k-6k-7k-8k-9k-10k	1.32	1.25	1.19	1.54	1.46	1.39	1.85	1.75	1.67	3.95	2.99	2.05
20k-25k-30k-40k	1.44	1.37	1.30	1.68	1.60	1.52	2.02	1.92	1.82	3.95	2.99	2.05
50k-60k-70k	1.48	1.40	1.32	1.73	1.64	1.54	2.07	1.96	1.85	3.95	2.99	2.05
80k-90k-100k	1.53	1.44	1.34	1.79	1.68	1.57	2.14	2.02	1.88	4.15	3.25	2.35
180k-200k	1.92	1.81	1.72	2.25	2.11	2.01	2.69	2.53	2.41	4.40	3.50	2.65
250k-300k	2.07	1.93	1.83	2.42	2.26	2.14	2.90	2.70	2.56	4.55	3.65	2.80
400k-500k	2.40	2.28	2.16	2.81	2.67	2.53	3.36	3.19	3.02	5.15	4.25	3.35
1 Meg.	4.25	3.96	3.74	4.97	4.63	4.38	5.95	5.44	5.24	6.95	6.45	6.24

Minimum item charge $3; Minimum order charge $20.

MINIOHMS™

MINIATURE PRECISION WW RESISTORS— TO ±0.01%
IMMEDIATE DELIVERY!
IN STOCK NATION-WIDE! $\frac{5}{32}$"OD x $\frac{5}{16}$" LG

STANDARD (exact) VALUES: 10-20-30-40-50-60-70-80-90-100-200-250-300-400-500-600-700-800-900 OHMS; 1k-1.5k-2k-2.5k-3k-4k-5k-6k-7k-8k-9k-10k-20k-30k-40k-50k-60k-70k-80k-90k-100k-180k-200k-250k-300k OHMS

STANDARD TOLERANCE: ±0.01%; ±0.025%; ±0.1%

MINIOHMS are General Resistance's miniature, high accuracy, high stability precision wirewound resistors. Incorporating most of the high performance characteristics of GR's famous ECONISTORS, MINIOHM units are unsurpassed for those applications requiring the unique qualities of wirewounds where component densities are high and/or where size is critical. MINIOHMS are shipped from stock at prices slightly higher than low, low ECONISTOR prices.

CONDENSED SPECIFICATIONS—SERIES 5E10 MINIOHMS

Ohmic Values: See above; any non-standard value from 1 ohm to 300k ohms available with 2-week delivery
Accuracy @ 25°C: ±0.01% / ±0.025% / ±0.1%
Stability: ±50 PPM/year; ±75 PPM/3 years
T.C.: ±5 PPM/°C, -55°C to +125°C
Power Rating: .15 w @ +125°C; .2 w @ 85°C
Max. Voltage: 200 VDC or AC peak
Noise: Essentially non-measurable
Dimensions: $\frac{5}{32}$" OD x $\frac{5}{16}$" lg
Leads: Axial, #24 AWG tinned copper, 1.5" lg, min.
Encapsulation: Molded epoxy
Windings: Multiple Π ; balanced GR "Air Cushion", low reactance

MINIOHM PART NUMBERING
Example: 5E10 A 100K

5E10	A	100K
Style and Gen. Specs	Tolerance A = 0.01% B = 0.025% D = 0.1%	R value in Ohms

CURRISTORS™

4-TERMINAL PRECISION CURRENT-SENSING WW RESISTORS

GR's CURRISTORS: low resistance (0.01 ohm to 100 ohms), low reactance (0.2 henries, essentially non-measurable capacitance) 4-terminal wirewounds.

CURRISTORS are used: for precision current sensing; for analog summing; as precision loads or termination; as precision meter shunts; as secondary standard resistors; in calibration consoles, etc., etc.

CURRISTORS are produced using proprietary bi-filar and other winding techniques permitting their use in digital, high frequency pulse and AC circuit applications.

CONDENSED SPECIFICATIONS — SERIES 8C16 CURRISTORS

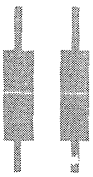
RESISTANCE RANGE: 0.01 ohm to 100 ohms, std; other values special order. TOLERANCE: ±0.01% / 0.02% / 0.05% / 0.1% / 0.25% / 1.0%. T.C.: As low as ±2 PPM/°C. POWER RATING: To 5 watts @ +125°C (depends upon model). STABILITY: ±20 PPM/year. ENCAPSULATION: Epoxy.

Write for Bulletin 501.

Data Subject to Change Without Notice.

GENERAL RESISTANCE, INC.

U.S.A.: 500 Nuber Avenue, Mt. Vernon, New York (914) 699-8010 **EUROPE:** 39 Rue Rothschild, Geneva, Switzerland (022) 31 81 80



···MOLDED PRECISION WIREWOUND RESISTORS

General Resistance

CONDENSED SPECIFICATIONS—ECONISTORS

Ohmic Values: See following charts
Accuracy: (@ 25°C) ±0.005% / 0.01% / 0.025% / 0.1%
T.C.: ±5 PPM/°C, max., -55°C to +125°C
±3 PPM/°C, typical, 0°C to +85° C
Stability: ±35 PPM/year; ±50 PPM, 3 years
Power Rating (+125°C): 0.25 watt;
(+85°C): 0.33 watt
Max. Voltage: 200 VDC or AC peak
Dimensions (8E16): 0.25″ OD x 0.5″ lg (values below 700K)
(8E24): 0.25″ OD x 0.75″ lg (values above 700K)
Leads: Axial wire; #22 AWG tinned copper; 1.5″ lg, min.

SERIES 8E16 ECONISTORS – UNIT PRICES* – STANDARD VALUES**

100 PIECES to 999 PIECES

EXACT VALUE (OHMS)	±0.1% TOLERANCE Number of Pieces			±0.025% TOLERANCE Number of Pieces			±0.01% TOLERANCE Number of Pieces			±0.005% TOLERANCE Number of Pieces		
	100-249	250-499	500-999[1]	100-249	250-499	500-999[1]	100-249	250-499	500-999[1]	100-249	250-499	500-999[1]
10-20-30-40-50-60-70-80-90-100-200	$1.23	$1.10	$0.87	$1.44	$1.29	$1.02	$1.72	$1.54	$1.21	$2.57	$2.55	$2.52
250-300-400-500-600-700-800-900-1k-1.5k-2k-2.5k-3k-4k-5k-6k-7k-8k-9k-10k	1.13	0.97	0.82	1.32	1.13	0.96	1.58	1.36	1.15	2.03	2.01	1.99
20k-25k-30k-40k	1.23	1.10	0.87	1.44	1.29	1.02	1.72	1.54	1.21	2.03	2.01	1.99
50k-60k-70k	1.26	1.13	0.89	1.47	1.32	1.04	1.76	1.58	1.25	2.03	2.01	1.99
80k-90k-100k	1.29	1.16	0.91	1.51	1.36	1.06	1.81	1.62	1.27	2.33	2.30	2.28
180k-200k	1.54	1.31	1.14	1.80	1.53	1.33	2.16	1.83	1.60	2.62	2.60	2.57
250k-300k	1.65	1.42	1.25	1.93	1.66	1.46	2.51	1.99	1.75	2.77	2.74	2.72
400k-500k	1.95	1.61	1.45	2.28	1.88	1.70	2.73	2.25	2.03	3.32	3.28	3.25
1 Meg.	3.32	2.81	2.55	3.47	3.29	2.98	4.65	3.93	3.57	5.65	4.95	4.55

*Per resistor; exact value; f.o.b. Mt. Vernon, N.Y., domestic
**Non-standard values: Available in all tolerances from 1 ohm to 1.1 megohms with 2 week delivery; write for Bulletin EC-17.
(1) For quantities above 999 pieces, please contact factory for price and delivery.

ECONISTOR PART NUMBERING
Example: 8E16 A 10K

8E16	A	10K
Style and Gen. Specs	Tolerance X = .005% A = .01% B = .025% D = .1%	R value in Ohms

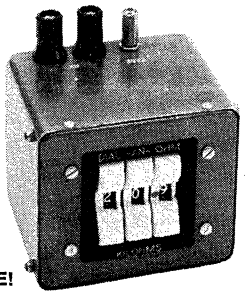
TEMPISTORS™

PRECISION TEMPERATURE-SENSING, COMPENSATING, CONTROLLING WW RESISTORS

TEMPISTORS offer the designer concerned with temperature sensing, compensating and/or control a unique new component with the perfected accuracy, stability, temperature-predictability and other characteristics of wirewound resistors but with temperature vs resistance characteristics permitting widespread use in temperature connected applications.

TEMPISTORS feature a proprietary compound element design permitting virtually any desired temperature coefficient from -10 ppm/°C to +6000 ppm/°C over operating temperature range from -55°C to +125°C. Ohmic values available are from 1 ohm to 900K ohms; tolerances are ±1%; 0.5%; 0.25%; 0.1%; 0.05%; 0.025%; 0.01%.

TEMPISTORS applications include: temperature sensing bridge circuits, thermocouple compensator circuits, temperature controllers, R/C circuit compensation; or any application requiring repeatable, accurate and linear temperature coefficients and absolute resistance accuracy. Basic construction conforms to MIL-R-93D. Prices are surprisingly low. Write for Bulletin TE-175.



DIAL-AN-OHM™

WITH 0.1% OR 0.01% ACCURACY, FOR AS LITTLE AS $18/DECADE!

General Resistance's Series DA "Dial-An-Ohm" units are universal resistance decades providing accuracies of either 0.1% or 0.01% in total "dialed" resistance. Over 50 basic models are available in OEM, console or test bench configurations with 3 to 7 decades providing total resistances from 99.9 ohms to 9999.99K ohms.

PRICES START AT LESS THAN $18. PER DECADE.

All Series DA units use an unique switching code allowing use of fewer resistors per decade with attendant cost reduction and improved performance. Total resistance value is selected for each decade via a rocker switch; this value appears numerically, in-line on the face of the unit.

CONDENSED SPECIFICATIONS—SERIES DA DECADES

Resistance Range: 0.1 ohm to 10 megohms
Accuracy: ≈ ±0.1% and 0.01% tolerance models available
Resistor T.C.: ±10 PPM/°C, typical; 50 PPM/°C, max.
Switching: Rocker type decade switching; make before break
Switch Life: Greater than 50,000 operations
Power: $\frac{1}{4}$ watt per resistor
Component Reactance: Less than 0.1° phase shift @ 10 KHz

Data Subject to Change Without Notice.

GENERAL RESISTANCE, INC.

EUROPE: 39 Rue Rothschild, Geneva, Switzerland (022) 31 81 80 **U.S.A.:** 500 Nuber Avenue, Mt. Vernon, New York (914) 699-8010

Charles T. Gamble Industries

New Jersey & Fairview Avenue • Riverside, New Jersey 08075 • 609-461-1900

PRECISION WIRE WOUND RESISTORS & NETWORKS

Charles T. Gamble Industries has engineered and designed non-inductive precision wire wound resistors to meet the requirements of Mil-R-93D. These resistors are completely sealed against the effects of high humidity and salt water immersion cycling. The material used in the manufacture of our resistors has a very high dielectric strength. The bobbin material used in winding the resistors is one and the same as the encapsulating material. All resistors use resistance wire with very low thermal E.M.F. to the copper leads. Where thermal effects can be disregarded, welded construction with nickel alloy leads may be specified.

Standard temperature coeficient is ±10 PPM/°C. Lower T.C.'s, and T.C.'s as high as 6000 PPM/°C can be supplied.

Tolerance available (non power styles): 1%, 0.5%, 0.1%, 0.05%, 0.025%, 0.02% and 0.01%. Resistors with tolerances of 0.1% and below are stabilized by artificial aging and temperature cycling.

NETWORKS: RC NETWORKS, LADDER NETWORKS, VOLTAGE DIVIDERS, BINARY NETWORKS

Sub-miniature Axial lead Precision resistors have been designed for applications where space is a prime factor.

Encapsulated printed circuit resistors are designed for printed circuit board application, where space is a factor.

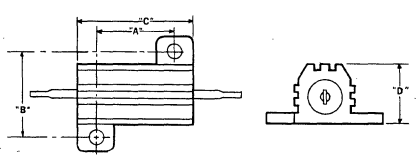
Radial lug type resistors have been designed to meet the requirements of Mil-R-93D.

All resistors are hermetically sealed with epoxy resin to protect the windings against the effects of high humidity and salt water immersion cycling. Resistors can either be inductive or non-inductive wound.

The materials used in the construction of radial lug type resistors are identical to those used in the construction of axial lead types.

These resistors are supplied with a thru hole for mounting to the chassis by means of a #6 thru bolt.

HEAT SINK MOUNTED PRECISION WIREWOUND POWER RESISTORS



POWER RATING	DIMENSIONS A	B	C	D	MAXIMUM OHMS
10 WATT	.562	.625	.750	.390	20,000
25 WATT	.718	.781	1.062	.542	60,000
50 WATT	1.563	.844	1.968	.610	70,000

Ratings shown are based upon use of appropriate chassis mounting.

STANDARD AXIAL LEAD PRECISION RESISTORS

Type	Military Specs. New	Old	Commercial Wattage Rating	Max. Resist. Based on .0007 E Alloy	Military Wattage Rating	Max. Volts	Size Length	Dia.
0808AL			.125W	300K		200V	¼″	¼″
1108AL	RB56		.125W	350K	.125W	250V	11/32″	¼″
1608AL	RB55	AFRT 10	.250W	400K	.15 W	184V	½″	¼″
1208AL			.200W	350K	.250W	225V	⅜″	¼″
2408AL	RB54	AFRT 11	.333W	1 meg.	.250W	300V	¾″	¼″
2412AL	RB53	AFRT 12	.500W	1.2 meg.	.333W	300V	¾″	⅜″
3212AL	RB52	AFRT 13	1.000W	2 meg.	.400W	600V	1″	⅜″
1616AL			.500W	1.3 meg.		300V	½″	½″
3216AL	RF57	AFRT 14	1.000W	3 meg.	.750W	600W	1″	½″
4816AL	RB58	AFRT 15	2.000W	6 meg.	1.000W	900V	1½″	½″
6416AL	RB59	AFRT 16	2.500W	10 meg.	1.250W	1200V	2″	½″
2008AL			.500W	.425 meg.		300V	⅝″	¼″
1612AL			.400W	.500 meg.		300V	½″	⅜″
2012AL			.750W	.600 meg.		600V	⅝″	⅜″
3208AL			.500W	1.1 meg.		300V	1″	¼″
2016AL			.750W	2 meg.		600V	⅝″	½″
1212AL			.250W	1 meg.		225V	⅜″	⅜″

SUB-MINIATURE AXIAL LEAD PRECISION RESISTORS

Type	Commercial Wattage Rating	Maximum Resistance based on .0007 E Alloy	Maximum Voltage	Size Length	Dia.
500156AL	.1W	70K	85 Volts	½″	5/32″
625156AL	.15W	100K	125 Volts	⅝″	5/32″
375125AL	.125	50K	72 Volts	⅜″	1/8″
109250AL	.120	25K	50 Volts	¼″	7/64″
375187AL	.1W	40K	65 Volts	⅜″	3/16″
375109AL	.120	30K	55 Volts	⅜″	7/64″
375093AL	.1	20K	55 Volts	⅜″	3/32″

ENCAPSULATED PRINTED CIRCUIT RESISTORS

Type	Military Specs.	Commercial Wattage	Military Wattage	Max. Volts	Max. Resist. Based on .0007	Sizes Length	Dia.	Lead Spacing	Lead Length
0808PC		.125W		90V	70K	¼″	¼″	.100	1″
1208PC		.200W		200V	200K	⅜″	¼″	.100	1″
1608PC		.250W		184V	400K	½″	¼″	.100	1″
2408PC		.333W		300V	1 meg.	¾″	¼″	.100	1″
3208PC		.500W		750V	1.1 meg.	1″	¼″	.100	1″
1008PC	RB71	.250W	.125W	240V	250K	5/16″	¼″	.200	1″
1612PC	RB70	.500W	.250W	150V	.301 meg.	½″	⅜″	.200	1″
3212PC		1.000W		1350V	1.75 meg.	1″	⅜″	.250	1″
3232PC		1.250W		1700V	2.50 meg.	1″	½″	.250	1″

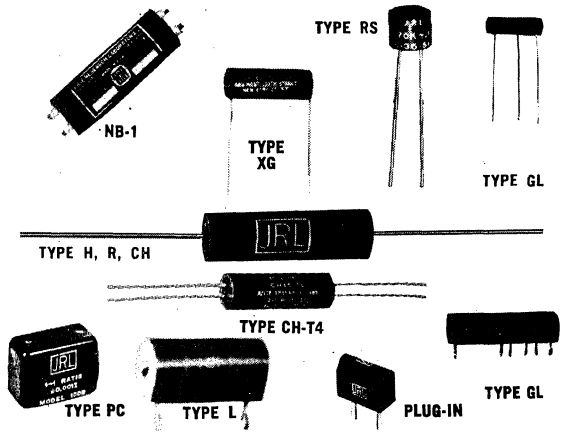
STANDARD RADIAL LUG PRECISION RESISTORS

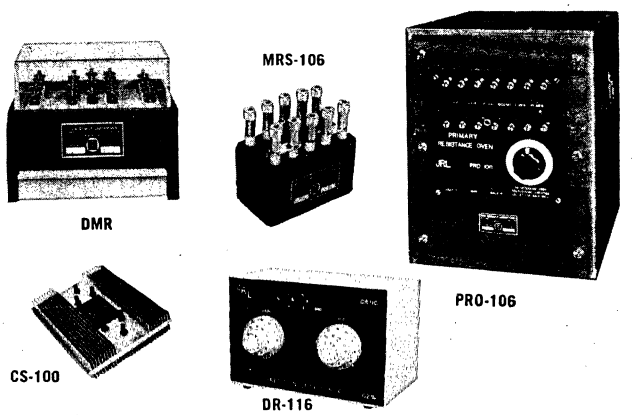
Type	Military Specs. New	Old	Commercial Wattage	Military Wattage Rating	Maximum Voltage	Max. Resist. Based on .0007	Size Length	Dia.
1616RLU	RB08	AFRT 17	.500	¼W	300V	885K	½″	½″
2020RLU	RB16	AFRT 18	.666	⅓W	300V	1 meg.	⅝″	⅝″
3220RLU	RB17	AFRT 19	1.000	½W	600V	2.5 meg.	1″	⅝″
4024RLU	RB18		1.500	¾W	600V	6.5 meg.	1¼″	¾″
6828RLU	RB19		2.000	1W	900V	12 meg.	2⅛″	⅞″

CHARLES T. GAMBLE INDUSTRIES
Precision Wire Wound Resistors
New Jersey Avenue & Fairview Street
Riverside, New Jersey 08075 Tel: (609) 461-1900

JULIE RESISTORS — RESISTANCE REFERENCES AND CURRENT SHUNTS

Julie evanohm resistors, acknowledged to be the most stable available anywhere, are offered in a wide variety of styles and sizes. The table below lists some of the more common specifications that the user must know in order to make a practical selection for his application. The Julie engineering staff is always pleased to assist in selecting the proper resistors and is able and willing to assist in designing special purpose or custom resistors. Further technical information is available upon request.





Resistor Type Description	Range: Resistors	Range: Ratios	Accuracy (%): Resistors	Accuracy (%): Ratios	Stability %/year	Temp. Coefficient PPM/°C: Resistors	Temp. Coefficient PPM/°C: Ratios	Voltage (Volts)	Current/ Power	Size	Remarks	Price** per one
NB-1 Ultra Stable oil immersed resistors	0.1 ohm - 10 meg	up to 10^4:1	.0015 1 K to 1 meg	.0005 (near 1:1)	Resistors: .0015 Ratios: .0005	5 (2.5 available)	2 (0.5 available)	200 v Between Terminals	Allow for rise of temp. of 10°C/watt	1 1/16" dia. 1 3/4"-5 5/8" long	NBS Certifiable 4-term for 3 K ohms and lower	$15 to $150
CH and CH-T4 Compact oil-filled Resistors	0.1 ohm - 5 meg	1:1 - 10^4:1	.005	.002 - .1	.002 (2T) .003 (4T)	5 (1.0 available)	2.5 (0.7 available)	300 across Terminals 500 to case	up to 2 amp	3/8"-1/2" dia. 1/2"-2" long	Style CH offers minimum and/or matched phase shift. Two or four terminals available.	$2.20 to $50.00
R, XG, RS, L, GL, & R-T4 Encapsulated Resistor	1 ohm - 10 meg	See GL	.01 100 ohm - 5 meg	.003 - .1	.003 Standard Ranges	5 (1.0 available)	2.5 (0.7 available)	125-300 Depending on size	to 300 v to 2 amps. to 2 Watts	5/8"-1" dia. 9/16"-2 1/32" long	High performance under Military environment. Equivalent to Mil Resistors RB 16, 17, 18, and 19	$1.50 to $20.00
H & HS Low Reactance Encapsulated Precision Resistors	1 ohm - 5 meg	1:1 - 10^4:1	.01 100 ohm - 5 meg	.005 (near 1:1)	.003 Standard Ranges	5 (1.0 available)	2.5 (0.7 available)	0-1000 Depending on size	to 1000 v to 2 amps. to 2 Watts	3/8"-1/2" dia. 1/2"-2" long axial leads	Features a low-reactance construction and fast time constant for AC application	$2.00 to $35.00
PC Miniature (Low Profile) Oil Filled Resistors for Printed Circuits	0.1 ohm - 2 meg	1:1 - 10^4:1	.005 1000 ohms - 1 meg	.0025 (near 1:1)	.002	5	2.5 (0.5 available	0-300 Depending on size	to 300 v to 2 Amps. 1 watt	1 9/64" long 57/64" wide 1/2" seated height	Case may be grounded or floated or guarded Low reactance type HPS also available.	$8.00 & up

Also available in encapsulated radial and axial leads and for use on PC boards and printed circuits. All Julie resistors are non-inductively wound and meet or exceed military environmental requirements. The low limit of resistors for standard accuracy is 100 ohms.

** Price ranges are based on variables of value, temperature coefficients, etc. for quantities of one. Quality discounts are available on request.

Note: Plug-in type with banana plugs (75" centers) also available. See Type R for specifications (1Ω to 2 Meg.)

RESISTANCE REFERENCE

Model	Absolute Resistance Values	Accuracy of Meas. (ppm)	Room Temp. Effect (ppm)	Approximate Size (inches)
PRO-106*	10 ohms to 1 Meg	2-5	.1(0-28°C)	10 x 14 x 15
PRO-106L*	.001 ohms to 10 ohms	5-25	.1(0-28°C)	10 x 14 x 15
MRS-106	100 ohms to 1 Meg	5-10	2.5/°C	4 x 2 x 4
MRS-105	.1 ohms to 100 ohms	5-10	2.5/°C	4 x 2 x 4
DMR Series	10 ohms to 1 Meg	5-15	2-5/°C	5 x 4 x 3
RCO-105/7E*	10 K	5-10	.05/°C	10 x 12 x 8
DTR Series	1 ohm to 100 K	5-10	2-5/°C	10 x 3 x 2
RCS-105/7	1 ohm to 10 Meg	5-10	2.5-5/°C	10 x 12 x 8
BMR Series	29,996,131,071 ohms	10-15	5/°C	5 x 4 x 3
BDR Series	100,000 ohms Max.	10-15	5/°C	5 x 4 x 3

* Ovenized. NOTE: Inquire about detailed specifications.

PRECISION DECADE RESISTOR BOXES

Accuracy: 0.02% of setting ±1 milliohm. (inquire about accuracies to .0025%)

Model	DR-113	DR-114	DR-115
Total Resis. Price	1.11 K $285.	11.1 K $250.	111 K $245.
Model	**DR-116**	**DR-117**	
Total Resis. Price	1.11 M $240.	11.1 M $265.	

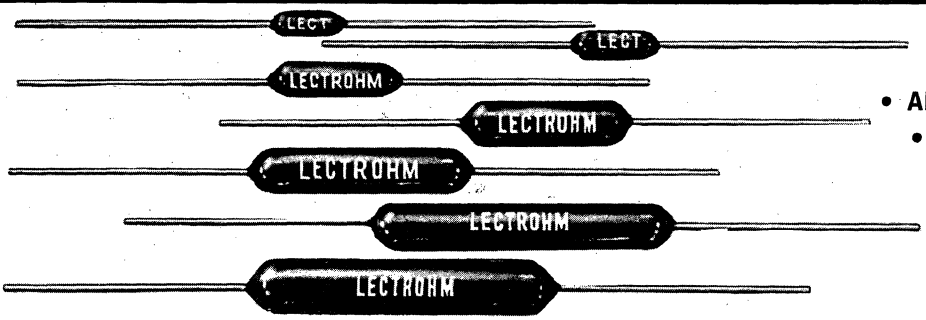
CURRENT SHUNTS

High quality shunts are high quality 4-terminal resistors especially designed to operate at relatively higher current levels without suffering appreciable resistance change. Most high ranges (50 A for example) are the finned heat-sink type. Most lower ranges are available in single and multiple-range (oil-filled) units. Accuracies up to .0025% are available although .05% or .01% are most typical. Yearly stabilities of .01% are typical and temperature coefficients a 5 ppm/°C or better. Ask for data sheet.

JULIE RESEARCH LABORATORIES, INC.
211 WEST 61st STREET, NEW YORK, NEW YORK 10023 • (212) 245-2727

Lectrohm

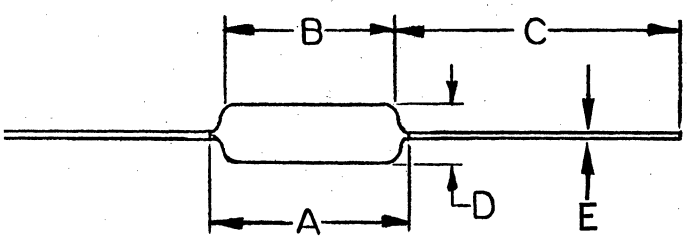
Selection Guide
AXIAL LEAD RESISTORS



- All welded construction
- Ceramic-silicone coating
- Special temperature coefficients available
- Reel packaging available

Silicone Coating	Mil R 26	Wattage for 275°C Hot Spot	Wattage for 350°C Hot Spot	LENGTH A Max.	LENGTH B Max.	LENGTH C ±1/8	D* ±1/32	E Diam.	Min. Res.	Max. Res.
XTA1		.8	1	.660	.500	1½	.093	.020	1.0	6K
XTA2		1.5	2	.630	.468	1½	.170	.025	0.1	6K
XTA3	RW69	3	3.6	.670	.515	1½	.200	.032	0.1	10K
XTA5A		4	5	.950	.781	1½	.240	.032	0.1	15K
XTA5	RW67	5	6.5	1.170	.968	1½	.300	.032	0.1	25K
XTA8		6.5	8	1.437	1.23	1½	.300	.032	0.1	35K
XTA10A		8	10	2.063	1.843	1½	.300	.032	0.1	50K
XTA10	RW68	10	12.5	2.125	1.875	1½	.375	.040	0.1	60K
XTA14	RW55	11	14	1.562	1.375	1½	.480	.040	0.5	40K
XTA20	RW56	16	20	2.312	2.125	1½	.480	.040	0.5	80K

* Diameter may be exceeded on very low value resistors.



COATING:

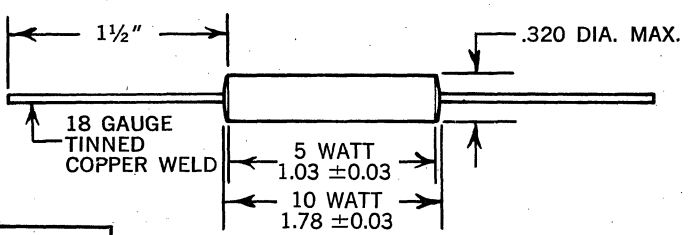
Lectrohm's ceramic silicone coating has dimensional uniformity which is required for automatic insertion.

WATTAGE:

Watt ratings have been established for hot spot temperatures of 275°C and 350°C for use in an ambient temperature of 25°C.

SAX SERIES RESISTORS

For low resistance values below 0.5 ohms in 5 and 10 watt size. All welded construction, sealed in ceramic shell.



Resistance Range: 0.01 to 0.50Ω

Tolerances: ±5%, ±3% & ±1%

HOW TO ORDER

Order Resistors by Series Number Followed by Resistance and Tolerance
Example: **XTA 3 - 150 T3**

XTA	3	150	T3
TYPE AXIAL CERAMIC-SILICONE COATING	WATTAGE RATING	RESISTANCE OHMS	TOLERANCE %

See page 1760 for Reed Relays

Lectrohm, Inc.
A subsidiary of
COOK ELECTRIC
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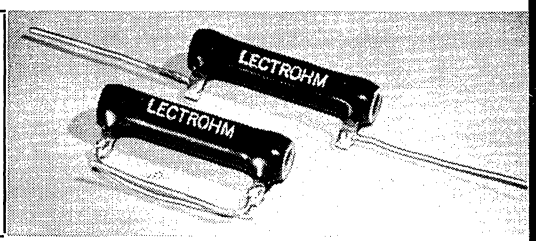
Lectrohm Selection Guide TUBULAR & OVAL RESISTORS

VITREOUS ENAMELED TUBULAR RESISTORS

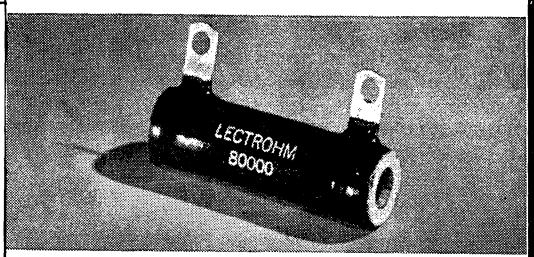
FIXED (Pig Tail Lead)

Series No.	Wattage Rating	RESISTANCE (ohms) Max.	RESISTANCE (ohms) Min.	CORE DIMENSIONS Length (±1/16)	CORE DIMENSIONS O.D. (±1/32)	CORE DIMENSIONS I.D. (±1/32)	A Max.
CA5	5	10000	0.1	1	5/16	3/16	11/32
CA10	10	50000	0.1	1¾	5/16	3/16	11/32
CA20	20	100000	0.1	2	7/16	5/16	17/32



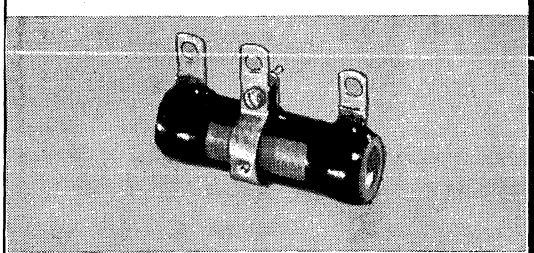
FIXED (Tab Terminal)

E25	25	100000	0.1	2	9/16	5/16	11/16
E50	50	250000	0.2	4	9/16	5/16	11/16
E75	75	390000	0.5	6	9/16	5/16	11/16
E100	100	600000	0.5	6½	¾	½	27/32
E160	160	1200000	0.8	8½	1⅛	¾	1¼
E200	200	1500000	1.0	10½	1⅛	¾	1¼



ADJUSTABLE

D10	10	10000	1.0	1¾	5/16	3/16	11/32
D25	25	25000	1.0	2	9/16	5/16	11/16
D50	50	100000	1.0	4	9/16	5/16	11/16
D75	75	100000	1.0	6	9/16	5/16	11/16
D100	100	100000	1.0	6½	¾	½	27/32
D160	160	100000	1.0	8½	1⅛	¾	1¼
D200	200	100000	1.0	10½	1⅛	¾	1¼



HOW TO ORDER

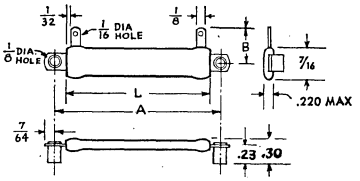
Order Resistors by Series Number Followed by Resistance and Tolerance. Example: **E 50 - 100 T5**

E	50	100	T5
TYPE FIXED LUG	WATTAGE RATING	RESISTANCE OHMS	TOLERANCE %

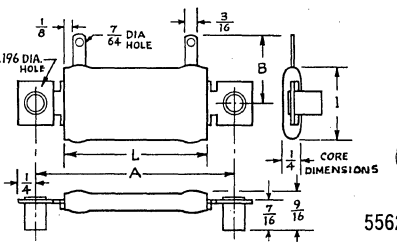
OVAL CORE RESISTORS

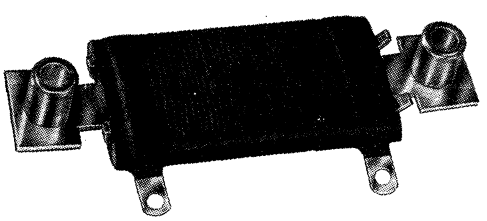
Miniature Oval Free Air Watts	XOVMS Series Resistance Min.	Resistance Max.	L	A	Core Size ⅜ x ⅛ B
10	1	15K	¾"	1"	7/16"
15	1	25K	1"	1¼"	7/16"
20	1	40K	1½"	1¾"	7/16"
25	1	50K	2"	2 5/16"	7/16"

Step bracket (push-on) is not applicable.



Standard Oval Stacking Bracket Free Air Watts	XOVS Series Resistance Min.	Resistance Max.	L	A	Core Size 1 x ¼ B
30	0.1	10K	1¼"	2"	15/16"
40	0.2	25K	2"	2¾"	15/16"
55	0.3	50K	3½"	4¼"	15/16"
65	0.4	80K	4¾"	5½"	15/16"
75	0.5	100K	6"	6¾"	15/16"





LECTROHM OVALS

Flat- or oval-core type units have an oval cross section and are mounted by flat brackets of "stud type" for stacking, or "step brackets" for normal mounting. The mounting bracket is constructed of aluminum which acts as a heat sink and makes the higher wattage rating for the size core. They are available with ceramic silicone coating.

See page 1760 for Reed Relays

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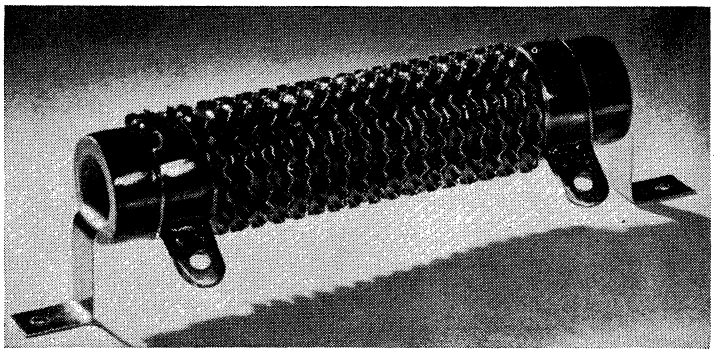
Lectrohm Selection Guide

ROE, UPRIGHTS, F P and FLEXIBLE RESISTORS

ROE SERIES

Watts	CORE SIZE O.D.	CORE SIZE I.D.	CORE SIZE Length	RESISTANCE Min. Ohms	RESISTANCE Max.* Ohms
36	9/16	5/16	2	0.02	1.8
45	9/16	5/16	3	0.03	3.0
90	9/16	5/16	4	0.04	3.8
105	9/16	5/16	5	0.05	5.2
135	9/16	5/16	6	0.06	6.5
100	3/4	1/2	3½	0.03	3.7
105	3/4	1/2	4	0.04	4.6
135	3/4	1/2	5	0.06	6.5
160	3/4	1/2	6	0.07	8.3
180	3/4	1/2	6½	0.08	9.0
125	1	5/8	4	0.06	6
150	1	5/8	5	0.08	8.5
190	1	5/8	6	0.10	11.5
215	1	5/8	7	0.12	13.5
315	1	5/8	10	0.20	21
155	1⅛	3/4	4¼	0.06	5.5
185	1⅛	3/4	5	0.09	10.5
220	1⅛	3/4	6	0.11	12.5
240	1⅛	3/4	6½	0.12	13
300	1⅛	3/4	8½	0.17	20
375	1⅛	3/4	10½	0.22	25
400	1⅛	3/4	11¼	0.24	26
420	1⅛	3/4	11¾	0.30	28



"RIB-ON-EDGE" RESISTORS

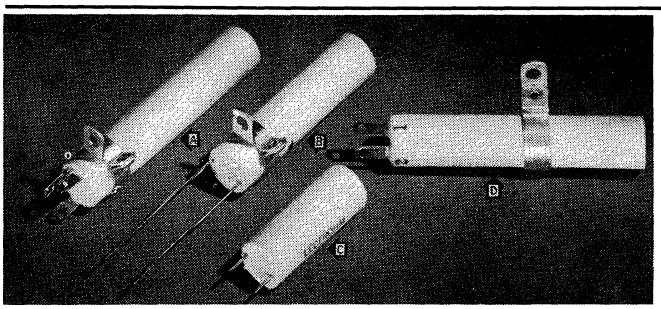
Rib-on-edge resistors are made to order for high wattage service where low resistances are required. They are also used for intermittent duty where relatively small size resistors must dissipate high wattages.

Rib-on-edge resistors are constructed of special alloy ribbon resistance wire crinkled and wound on edge around a tubular ceramic core. The resistance element is welded to a heavy terminal. The entire assembly is then secured to the ceramic tube by a special high temperature vitreous enamel. This type of resistor is classed as a "bare" resistor by NEMA and Underwriters' Standards and has a 375°C maximum operating temperature. The higher temperature rise permits the higher rating.

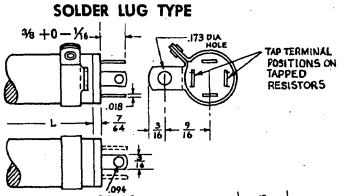
Rib-on-edge resistors can be made in fixed, adjustable, or tapped styles.

* Maximum resistances can be increased 25% with Lectrohm's unique full-crinkle winding.

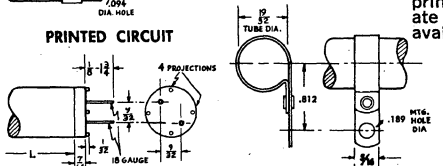
Order by series number and resistance required.
(ROE followed by watts and ohms.)
OTHER SIZES CAN BE MADE TO FIT YOUR REQUIREMENTS.



SOLDER LUG TYPE



PRINTED CIRCUIT



HORIZONTAL MOUNTING BRACKET
Catalog No. 53163

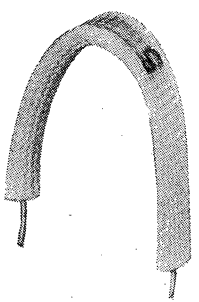
STANDARD UPRIGHT

Lectrohm's STANDARD UPRIGHT style resistor is constructed so as to present the simplest form of mounting for "above chassis." The element is in an insulated shell with a metal bracket having a single mounting hole. The terminals can be wire leads, solder lugs, or spaced wire leads for printed board use. Intermediate taps on the windings are available.

RESISTOR SPECIFICATIONS

Pigtail Type Series	Lug Type Series	Printed Circuit Series	Horizontal Mounting Series	Length L	Watts	Max. Res.
UC10	UE10	UP10	UM10	1½"	10	5,000 ohms
UC15	UE15	UP15	UM15	2"	15	7,500 ohms
UC20	UE20	UP20	UM20	2½"	20	10,000 ohms
UC25	UE25	UP25	UM25	3"	25	12,500 ohms
UC30	UE30	UP30	UM30	3½"	30	15,000 ohms

Order by series number and resistance required.



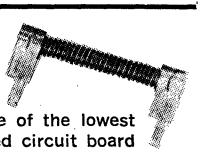
LECTROHM FLEXIBLES

FLU Series are fixed wirewound resistors that can be used in small, confined spaces. Wound on a specially treated flat fiberglas core and insulated by a fiberglas sleeve. Free air rating is 2 watts per inch with the surface temperature at the hottest spot not exceeding 340°F. Lead wires are hot tinned 18, 20 and 22 gauge, 1⅜ inches long.

Maximum resistance is 2000 ohms per inch of winding and minimum resistance is 0.2 ohms per inch.

It is also available without sleeving (bare element) in our ELE series.

TYPE FP RESISTORS



Lectrohm type FP power resistor is one of the lowest cost power resistors available for printed circuit board applications.

The resistance element is tightly wound with premium quality resistance wire on fiberglas cores. Tinned steel terminals are clinched to the resistance element by automatic machines.

Terminals are designed to be inserted in 0.070" diameter holes. Center-to-center distance of prongs on terminals are variable from 0.5" to 2.5". Power rating is 4 watts per inch and resistance range is from 0.2 ohms per inch to 1,000 ohms per inch.

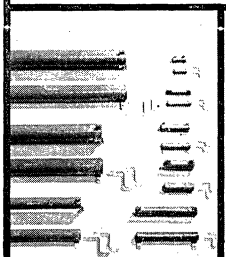
See page 1760 for Reed Relays

Lectrohm, Inc.
A subsidiary of
COOK ELECTRIC
5562 Northwest Highway • Chicago, Ill. 60630 • 312/763-1700

MEMCOR COMPONENTS

A PRODUCT OF
LTV ELECTROSYSTEMS, INC.
MEMCOR DIVISION
HUNTINGTON, INDIANA 46750

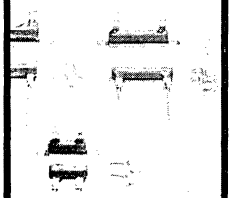
WIREWOUND RESISTORS



TYPE FR
TAB TERMINAL

POWER RATING 5-200 WATTS
STD. RES. RANGE 1-100,000 OHMS
CORE SIZE 1" x 15/16" TO 10 1/2" x 1 1/8"

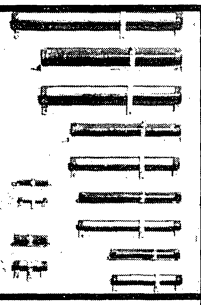
VITREOUS ENAMEL WIREWOUND
FIXED TUBULAR
WITH TABS (MILITARY EQUIVALENT AVAILABLE)



TYPE FR
RADIAL LEAD TERMINAL

POWER RATING 5-20 WATTS
STD. RES. RANGE 1-100,000 OHMS
CORE SIZE 1" x 15/16" TO 2" x 7/16"

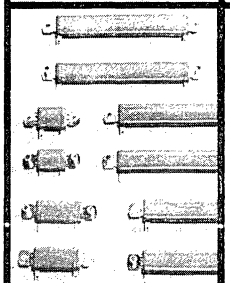
VITREOUS ENAMEL WIREWOUND
FIXED TUBULAR
WITH LEADS



TYPE AR
TAB TERMINAL

POWER RATING 10-200 WATTS
STD. RES. RANGE 1-100,000 OHMS
CORE SIZE 1 3/4" x 15/16" TO 10 1/2" x 1 1/8"

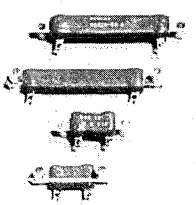
VITREOUS ENAMEL WIREWOUND
ADJUSTABLE TUBULAR
WITH TABS



TYPE ZR
TAB TERMINAL

POWER RATING 30-55 WATTS
STD. RES. RANGE 1-20,000 OHMS
CORE SIZE 1 1/4" x 1" x 5/16" TO 3 1/2" x 1" x 5/16"

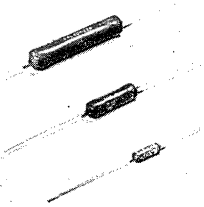
VITREOUS ENAMEL WIREWOUND
OVALS
WITH TABS (MILITARY EQUIVALENT AVAILABLE)



TYPE MZ
TAB TERMINAL

POWER RATING 10-20 WATTS
STD. RES. RANGE 1-50,000 OHMS
CORE SIZE 3/4" x 3/8" x 1 15/16" TO 2" x 3/8" x 2 5/8"

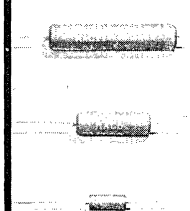
VITREOUS ENAMEL WIREWOUND
MIDGET OVALS
WITH TABS



TYPE VL
AXIAL LEAD

POWER RATING 3-10 WATTS
STD. RES. RANGE 1-51,000 OHMS
CORE SIZE 3/16" x 5/32" TO 1 11/32" x 5/16"

VITREOUS ENAMEL WIREWOUND
AXIAL LEADS
(MILITARY EQUIVALENT AVAILABLE)



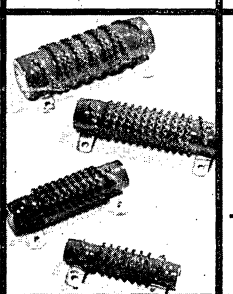
TYPE ML
AXIAL LEAD

POWER RATING 1-11 WATTS
STD. RES. RANGE 1-200,000 OHMS
UNIFORM DIMENSIONS CLOSE TOLERANCES

MOLDED SILICONE
AXIAL LEADS
(MILITARY EQUIVALENT AVAILABLE)

MEMCOR Components . . . resistors and rheostats . . . are manufactured by the MEMCOR Components facility of the MEMCOR Division of LTV Electrosystems, Inc.

MEMCOR Components represent the cumulative design skill and production knowledge of two great lines of resistance products — Tru-Ohm and Hardwick, Hindle. This "second generation" product maintains all of the proven features of both original lines plus the manufacturing refinements that can only result from industry experience.



TYPE RR
TAB TERMINAL

POWER RATING 40-1500 WATTS
STD. RES. RANGE 0.02-100 OHMS
CORE SIZE 2" x 9/16" TO 20" x 2 1/2"

VITREOUS ENAMEL WIREWOUND
EDGEWOUND
WITH TABS

MILWAUKEE RESISTOR CORPORATION
700 WEST VIRGINIA STREET, MILWAUKEE, WISCONSIN 53204 • PHONE (414) 271-9900

MILWAUKEE has become THE recognized brand for quality and service as well as ingenuity and development within the wirewound resistor industry.

Briefly described on these six pages are MILWAUKEE's standard lines, including:

AXIAL RESISTORS
POWER RESISTORS
METAL CASE RESISTORS
PRINTED CIRCUIT BOARD RESISTORS
RIBWOUND RESISTORS
GRID RESISTORS
MINIATURE OVAL RESISTORS
REGULAR OVAL RESISTORS
BATHTUB RESISTORS
FUSE & STRIP RESISTORS

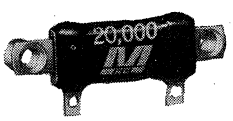
All MILWAUKEE products are carefully engineered, made of high quality materials selected specifically for each particular product. Resistance materials and termination materials are alloys selected for each wattage and ohmic value to assure the correct combination to meet customer requirements.

MILWAUKEE has the staff and facilities to help you meet your needs best, whether it be a stock or standard item or, if desired or necessary, a resistor specifically engineered and designed to meet your requirements.

MILWAUKEE IS ALSO THE SOURCE FOR **MERL** PRECISION RESISTORS, (not described herein). Write for our MERL literature describing this line of wirewound resistors offering tolerances to ±.005%.

FOR ADDITIONAL INFORMATION OR DETAILS NOT SHOWN ON THESE PAGES—WRITE FOR CATALOG

OVAL RESISTORS

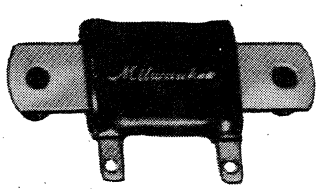


MINIATURE OVALS

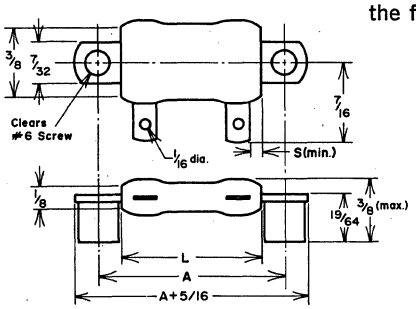
OVAL RESISTORS are for use where space saving is desired and where the use of the 'Heat Sink' function of the metal chassis, rack or panel may be employed. Resistance tolerance of ±5% is standard except on low resistance and multi-tapped units. COATINGS of vitreous enamel or silicone base are offered.

OVALS are available in regular or miniature sizes an original development of MILWAUKEE Resistor.

Additional miniature oval core sizes are available increasing the possibility of taps and isolated sections. Other intermediate sizes are also available. Only regular ovals are available as adjustable. For temperature coefficients of 20 ppm/°C or below, consult the factory.



REGULAR OVALS

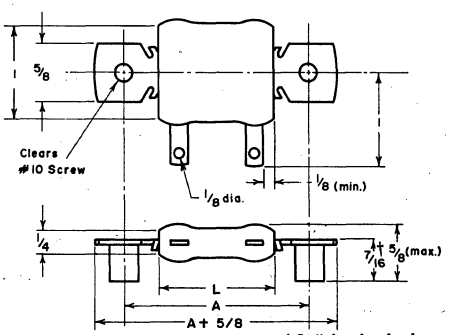


Watts*	Ohms	Dimensions A	L	S
10	.1 to 5K	1″	¾″	1/16″
15	.15 to 25K	1¼″	1″	1/16″
20	.2 to 50K	2 5/16″	2″	1/16″

* Rating based on mounting on steel panel 10″x10″x.040″.

Oval Resistors are stackable. When stacking, the resistors should be derated to avoid excessively high temperatures. The table below shows approximate rating percentages.

Number of Resistors Stacked	Percent of Single Unit Rating Vertical Stacking	Horizontal Stacking
2	80	75
3	70	60
4	65	50



† 7/16″ is standard.

Watts*	Ohms	Dimensions A	L
30	.10 to 10K	2″	1¼″
40	.13 to 25K	2¾″	2″
55	.18 to 30K	4¼″	3½″
70	.22 to 55K	5½″	4¾″
95	.25 to 75K	6¾″	6″

*Rating is based on mounting on steel pad 10″x10″x.040″.

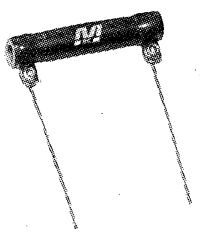
MILWAUKEE RESISTOR CORPORATION
700 WEST VIRGINIA STREET, MILWAUKEE, WISCONSIN 53204 • PHONE (414) 271-9900

MILWAUKEE FIXED AND ADJUSTABLE VITREOUS ENAMELED POWER RESISTORS

Also available with silicone or sand and cement coating

WATTAGE RATINGS:
Free air rating of 8 through 225 Watt resistors meet EIA and Military requirements for a 325°C rise in a 25°C ambient.

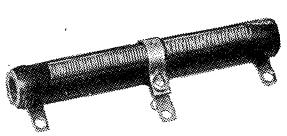
STANDARD RESISTORS:
Wattage ratings in the table to the right marked with an asterisk (*) are MILWAUKEE standard sizes and with the exception of 75 Watt size are stocked in values shown on page 2860. 1½" Tinned leads are standard on 8, 12 and 20 Watt fixed resistors. All other standard resistors have lug type terminals.



MILWAUKEE resistors are designed to meet all requirements of MIL-R-15109 (Ships) "Resistors and Rheostats, Naval Shipboard."

STANDARD TOLERANCE: ±5% is standard on MILWAUKEE Power Resistors.

OPTIONAL FEATURES — TERMINALS:
Most resistors are also available with Single Quick Connect or MILWAUKEE's patented Double Quick Connect terminals. Ferrule type and live brackets are also available. Standard lug terminals are also available with or without terminal hardware. Special terminals are available for unusual or special applications.



MOUNTING:
All sizes of resistors are available with Spring Mounting Clips, Vertical Thru Bolts and Horizontal "L" Mounting Brackets (1 to 4 resistors high). Such mounting hardware is available mounted, as loose assemblies or as individual parts (mica and centering washers, brackets only, etc.).

CUSTOM RESISTORS:
MILWAUKEE resistors are readily available customized to your requirements. NON-INDUCTIVE, TAPPED and SPECIAL TC's are readily available built to your specific requirements. Special Terminals, Mounting Features and other features can be readily fabricated with our tooling and manufacturing facilities.

AVAILABLE WATTAGE RATINGS
by core size

Watts	Core Size	Min. Res.	Max. Res.
8*	5/16 x 3/16 x 1	0.1	25K
12*	5/16 x 3/16 x 1¾	0.1	50K
11	7/16 x 5/16 x 1	0.1	30K
15	7/16 x 5/16 x 1½	0.2	65K
20*	7/16 x 5/16 x 2	0.3	100K
26	7/16 x 5/16 x 3	0.4	170K
25*	9/16 x 5/16 x 2	0.3	100K
35	9/16 x 5/16 x 3	0.4	176K
50*	9/16 x 5/16 x 4	0.5	200K
75	9/16 x 5/16 x 6	1.0	300K
24	¾ x ½ x 1½	0.2	13K
30	¾ x ½ x 2	0.3	21K
45	¾ x ½ x 3	0.5	39K
51	¾ x ½ x 3½	0.6	47K
61	¾ x ½ x 4	0.7	56K
65	¾ x ½ x 4½	0.8	65K
75	¾ x ½ x 5	0.9	73K
90	¾ x ½ x 6	1.0	91K
100*	¾ x ½ x 6½	1.0	100K
52	1 x ¾ x 3	0.3	52K
70	1 x ¾ x 4	0.4	75K
85	1 x ¾ x 5	0.5	99K
105	1 x ¾ x 6	0.6	123K
40	1⅛ x ¾ x 2	0.2	11K
80	1⅛ x ¾ x 4	0.3	32K
95	1⅛ x ¾ x 5	0.4	42K
120	1⅛ x ¾ x 6	0.5	53K
130	1⅛ x ¾ x 6½	0.6	58K
160	1⅛ x ¾ x 8	0.7	74K
175*	1⅛ x ¾ x 8½	0.8	100K
225*	1⅛ x ¾ x 10½	1.0	110K
235	1⅛ x ¾ x 11¼	1.0	120K
251	1⅛ x ¾ x 12	1.1	125K
220	1⅝ x 1⅛ x 8½	4.0	60K
275	1⅝ x 1⅛ x 10½	5.0	77K
300	1⅝ x 1⅛ x 11¾	5.5	88K
250	2½ x 1¾ x 6	3.5	3.4K
500	2½ x 1¾ x 12	8.0	8.6K
750	2½ x 1¾ x 15	10.0	11K
1000	2½ x 1¾ x 20	14.5	15K
850	3¼ x 1¾ x 15	15.0	23K
1150	3¼ x 1¾ x 20	20.0	30K

* Standard Wattages — See stock list, next page for all stock values of Standard Watts except 75 Watts.

DELIVERY:
Reasonable quantities of stock resistors are normally available for immediate delivery. Other values of standard resistors and custom resistors are available in reasonable time (4 to 6 weeks depending on general level of activity).

PREMIUM DELIVERY SERVICE — "PDS" — is also available. MILWAUKEE's new PDS service is designed to meet customers' unusual requirements. For a stated premium (averaging between $15 and $17) normal delivery is halved or better and delivery date guaranteed. In delivery trouble? — call us and inquire about PREMIUM DELIVERY SERVICE.

MILWAUKEE RESISTOR CORPORATION
700 WEST VIRGINIA STREET, MILWAUKEE, WISCONSIN 53204 • PHONE (414) 271-9900

MILWAUKEE FIXED AND ADJUSTABLE POWER RESISTOR STOCK LIST

CATALOG NUMBERS

OHMS	8 WATT FIXED	12 WATT FIXED	12 WATT ADJ.	20 WATT FIXED	25 WATT FIXED	25 WATT ADJ.	50 WATT FIXED	50 WATT ADJ.	100 WATT FIXED	100 WATT ADJ.	175 WATT FIXED	175 WATT ADJ.	225 WATT FIXED	225 WATT ADJ.	OHMS
.5	10010	10610		11210											.5
1	10020	10620	15310	11220	12010								14810		1
2	10040	10640	15320	11240											2
3				11260											3
4	10070	10660		11270											4
5	10080	10670	15350	11280	12060	15740	12640	16140	13840	17050	14360	17490	14860	17940	5
7.5	10090	10680													7.5
10	10100	10690	15370	11300	12070	15760	12660	16160	13850	17070	14370	17510	14870	17960	10
12		10694													12
15	10110	10700			12080										15
20	10120	10710													20
25	10130	10720	15400	11330	12100		12690	16190	13880	17100	14400	17540	14890	17990	25
30	10140	10730													30
40	10160	10750													40
45	10165	10755		11365											45
50	10170	10760	15420	11370	12130	15800	12710	16200	13910	17110					50
75	10180	10770		11380	12150										75
100	10190	10780	15440	11390	12160	15820	12740	16220	13930	17130	14450	17570	14940	18020	100
125	10200	10790													125
150	10210	10800		11410	12180										150
175		10805		11415											175
200	10220	10810		11420	12200										200
225															225
250	10240	10830	15470	11440	12210	15850	12770				14490		14989		250
300		10840		11450											300
400	10270	10860													400
500	10280	10870	15500	11480	12250	15880	12810	16280		17190	14530	17630	15020	18080	500
600	10290	10880													600
650				11495											650
700		10890													700
750		10895	15510	11505											750
900	10320	10910													900
1000	10330	10920	15530	11530	12300	15910	12860	16310	14060	17220	14570	17660	15060	18110	1000
1200	10340	10930		11540											1200
1500	10370	10960	15540	11570											1500
1750		10970													1750
2000	10390	10980		11590	12330										2000
2250		10990													2250
2500	10410	11000	15560	11610	12340	15940	12900	16350				17690	15090	18140	2500
2750	10415	11005		11615											2750
3000	10420	11010		11620											3000
3500		11020		11630											3500
4000	10440	11030		11640											4000
4500	10450	11040													4500
5000	10460	11050	15590	11660	12380	15970	12940	16380	14130	17280	14640	17720	15120	18160	5000
6000	10470	11060		11670											6000
7000	10480														7000
7500	10485	11075	15610												7500
8000		11080													8000
8500		11083													8500
9000															9000
10K	10500	11090	15620	11700	12420	16000	12980	16410		17310	14660	17750	15140	18190	10K
15K	10520	11110													15K
20K		11130		11740									15160	18210	20K
25K		11150		11760	12460					17340	14700		15170	18220	25K
30K		11160													30K
50K		11200		11810	12500		13060			17390	14730		15200		50K
100K				11910											100K

STOCK RESISTORS: Resistors listed above are normally available from stock in reasonable quantities. These resistors are available at a lower minimum billing price. Most values are stocked both by stocking distributors and the factory. Standard hardware units are also readily available.

OTHER OHMIC VALUES: MILWAUKEE also has large stocks of other values in both standard and non-standard sizes. Many of these items are stocked for particular customers or have been added to stock because of current demand. If you have a non-stock requirement — check with factory as to possible availability.

MILWAUKEE RESISTOR CORPORATION
700 WEST VIRGINIA STREET, MILWAUKEE, WISCONSIN 53204 • PHONE (414) 271-9900

RIBWOUND RESISTORS

APPLICATIONS

Particularly useful where high energy is to be dissipated in the lower ohmic ranges. Due to its ability to operate at higher temperatures and dissipate greater heat, the ribwound resistor is almost one-half the physical size of the equivalently rated round-wire style resistor. Ribwound wattage ratings are based on a temperature rise of 375°C. They may be mounted with spring clips (thru 1 ⅛" dia.); thrubolt mounting hardware, individual or multiple-stacked bracket assemblies or live bracket mountings.

CONSTRUCTION

Crimped ribbon resistance wire is edge-wound and then locked to the ceramic core with vitreous enamel. Resistance wire is spot-welded to the terminal connectors. Ribwound resistors can be furnished in fixed, adjustable, or tapped styles. Cement coating can be furnished.

Several 300 watt units are stocked in both fixed and adjustable styles. Listed are the more popular 300 watt ohmic values. All other wattage ratings and styles are made to order.

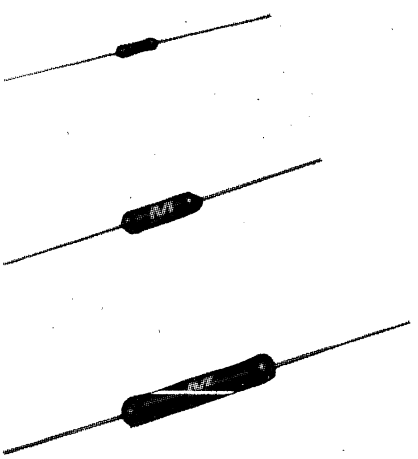
300 Watt	1⅛" x 8½"		
		Catalog No.	
Ohms	Max. Amps	Fixed	Adjustable
.07	65.5	25610	85610
.10*	54.7	25620	85620
.15*	44.7	25630	85630
.2*	38.7	25640	85640
.25*	34.6	25650	85650
.3	31.6	25660	85660
.35	29.4	25670	85670
.375*	28.3	25680	85680
.4	27.4	25690	85690
.5*	24.5	25700	85700
.6*	22.4	25710	85710
.75*	20	25720	85720
1*	17.3	25730	85730
1.25*	15.5	25740	85740
1.5*	14.1	25750	85750
1.75	13.1	25760	85760
2*	12.2	25770	85770
2.5*	10.9	25780	85780
3*	10.0	25790	85790
3.5	9.2	25800	85800
4*	8.6	25810	85810
5*	7.7	25820	85820
6*	7.0	25830	85830
6.75	6.7	25840	85840
7.5	6.3	25850	85850
8*	6.1	25860	85860
9	5.7	25870	85870
10*	5.5	25880	85870
12*	5.0	25890	85890
15*	4.5	25900	85900
17	4.2	25910	85910
20*	3.8	25920	85920
25*	3.4	25930	85930
33	3.0	25940	85940
40	2.7	25950	85950

* Stock values — 300 watt fixed only.

Watts	Core Size	Ohmic Range*
40	5/16 x 2	.01 to 5
50	¾ x 2	.007 to 4.5
60	¾ x 2½	.016 to 7
75	¾ x 3	.016 to 8
90	5/16 x 4	.018 to 9.6
100	¾ x 3½	.022 to 10
110	¾ x 4	.024 to 12.5
120	¾ x 4½	.026 to 14
135	¾ x 5	.03 to 16
150	1⅛ x 4	.03 to 15.5
160	¾ x 6	.035 to 20
161	1⅛ x 4¼	.035 to 17
175	1⅛ x 4½	.039 to 18.2
180	¾ x 6½	.04 to 22
220	1⅛ x 6	.05 to 26.5
225	1⅛ x 6⅛	.05 to 27.0
240	1⅛ x 6½	.05 to 29
300	1⅛ x 8½	.07 to 40
375	1⅛ x 10½	.08 to 51
400	1⅛ x 11¼	.08 to 55
401	1⅝ x 8½	.05 to 58
420	1⅛ x 11¾	.1 to 57.5
500	1⅝ x 10½	.12 to 74
550	1⅝ x 11¾	.13 to 85
750	2½ x 12	.27 to 110
1000	2½ x 15	.375 to 143
1500	2½ x 20	.55 to 198
2000	3¼ x 20	2. to 245

* May be different for adjustable.

AXIAL RESISTORS



Available in a variety of sizes from 1 watt through 11 watts on request.

APPLICATIONS

- Electronic Circuitry
- Printed Circuits
- Radio, Television and Sound Reproduction
- Miniature Controls

FEATURES

- Rugged yet small.
- Highly stable.
- Matched expansion in core caps and coating for temperature stability.
- Standard 5% tolerance over 1 ohm, available in closer tolerances on request.
- Wattage ratings based on 325°C rise at 25°C ambient.
- Standard Stock — 3, 6.5 and 11 watt sizes.
- Leads Hot Tin Dipped.

CONSTRUCTION

- Wire Wound on Ceramic Core
- All Welded
- Vitreous or Silicone Base Coating

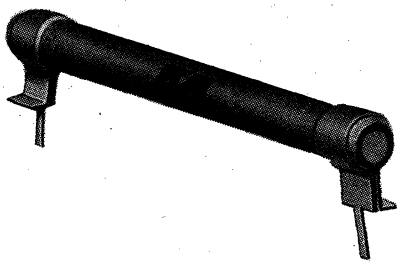
Number	Watts	Size	Ohms
2-7-ΩL	3	9/64 Dia x 5/16	1 to 10,000
4-14-ΩL	6.5	11/32 x 1	1 to 20,000
5-28-ΩL	11	13/32 Dia x 1⅞	1 to 50,000

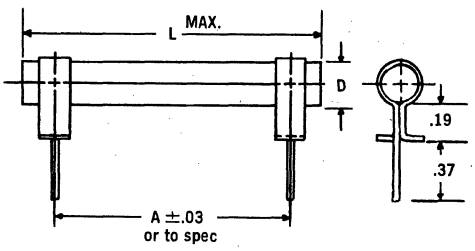
Ohmic values below 1 ohm or higher than shown, available on request.

When ordering use number, dash, resistance value; i.e. 3 watt, 500 ohm, 2-7-500L.

MILWAUKEE RESISTOR CORPORATION
700 WEST VIRGINIA STREET, MILWAUKEE, WISCONSIN 53204 • PHONE (414) 271-9900

PRINTED CIRCUIT BOARD POWER RESISTORS





FIXED

Watts	L	A	D	Max. Ohms
3	1 5/16	0.6	13/64	14K
5	1 1/4	0.9	13/64	25K
7	1 5/8	1.3	13/64	40K
10	2	1.7	13/64	60K
15	2	1.7	5/16	90K
20	2 1/2	2.2	5/16	110K

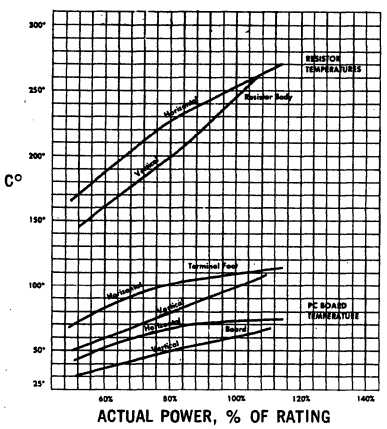
ADJUSTABLE

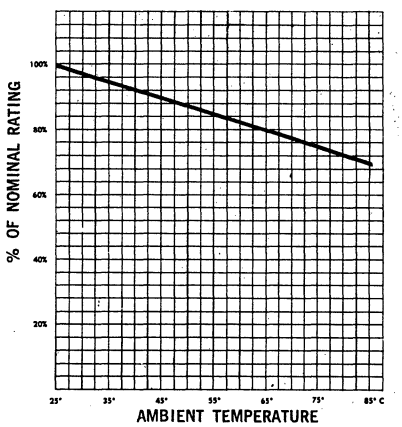
Watts	L	A	D	Max. Ohms
15	2	1.7	5/16	2K*
20	2 1/2	2,2	5/16	3K*

* For higher ohms, consult factory

FEATURES

- Built-in standoff keeps board cool.
- Mounting feet prevent rocking.
- Power ratings 3 to 20 watts.
- Complete OHM range.
- One-piece, welded terminals
- Rectangular leads .020 x .040 in.
- Silicon base coating. Vitreous enamel coating available.
- Standard tolerance ±5%.
- 20 PPM upon request.
- Patent 3,462,651.





BATHTUB RESISTORS

"MILWAUKEE" Bathtub Resistors are wound on a high quality fiberglass cord. Terminals with axial leads are securely clamped to the windings and encapsulated in a square ceramic case with a high temperature, inorganic, humidity proof, silicone compound. The rectangular shape of the ceramic case lends itself to compactness for easy installation and rapid heat dissipation. Good dielectric qualities with voltage breakdowns up to 1500 volts are achieved through encapsulation. Standard tolerance is ±10%. Closer tolerances are available.

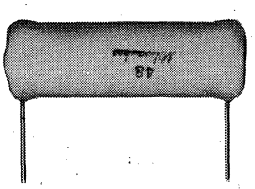
SPECIAL LOW OHMIC VALUES for auto radio 5 watt size are in stock.

CONTACT FACTORY FOR 5 & 10 WATT STOCK LIST

M.R.C. Part No.	Watts	Dim. "L" ±1/32	Dim. "W"	Dim. "H"	Max. Ohms	Min. Ohms
2BT6-14-Ω	5	7/8	.375	.344	6K	.1
2BT6-18-Ω	6	1 1/8	.375	.344	11K	.1
2BT6-22-Ω	7	1 3/8	.375	.344	15K	.1
2BT6-30-Ω	10	1 7/8	.375	.344	25K	.1
2BT8-30-Ω	15	1 7/8	.50	.50	25K	.1
2BT8-40-Ω	20	2 1/2	.50	.50	30K	.2

5 Watt to 10 Watt — 20 Ga. Std. Leads
15 Watt & 20 Watt — 18 Ga. Std. Leads
All above RESISTORS also available with 18 or 20 Ga leads upon request.

STRIP AND FUSE RESISTORS



STRIP Resistors are designed for special applications and provide excellent performance characteristics at very economical prices. Sturdy asbestos cores support the high quality resistance wire which terminates with 1½" tinned copper leads. Completely protected with high temperature cement and sand.

Special wattages, length, width, or thickness are custom engineered for your specific requirement.

The core width and length are in 1/16th inch increments. The core thickness for the listed units is 1/8th inch. Other thicknesses are available, as are tapped units. Standard tolerance is ±10% and other tolerances are available.

FUSE Resistors are available in the same rating as any strip resistor. Dimensions are the same. Fuse specifications of trip current and trip time should be specified.

CONTACT FACTORY FOR 5 WATT STOCK FUSE LIST

Watts	Size	Ohmic Range	Nominal Overall Length	Nominal Overall Width	Leads
5	6-19	1.5 - 3K	1 5/16	1/2	1
8	6-23	1.5 - 4K	1 5/16	1/2	1 1/4
10	8-23	1.5 - 4.8K	1 5/16	5/8	1 1/4
12	8-31	3 - 7.5K	2 1/16	5/8	1 3/4
15	10-31	5 - 7.5K	2 1/16	3/4	1 3/4
20	10-39	7 - 9K	2 5/16	3/4	2 1/4
25	10-47	10 - 10K	3 1/16	3/4	2 3/4
25	12-39	10 - 10K	2 5/16	7/8	2 1/4
30	12-47	12 - 12K	3 1/16	7/8	2 3/4

MILWAUKEE RESISTOR CORPORATION
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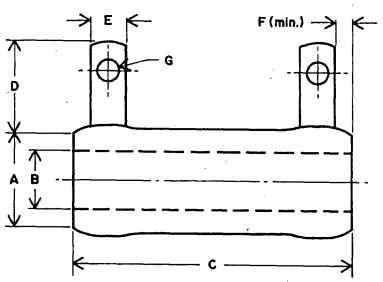
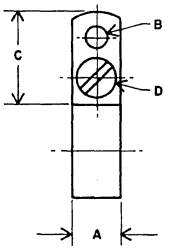
RESISTOR DIMENSIONS





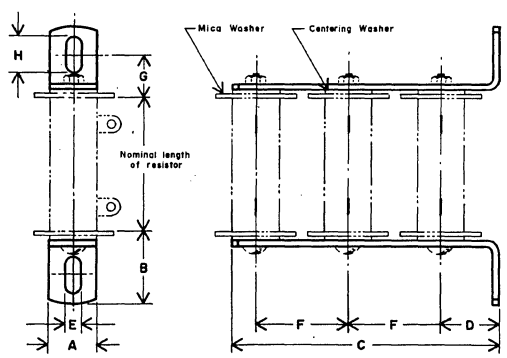
Watt	Core A	Core B	Core C	Terminal D	Terminal E	Terminal F	Terminal G	Lead
8	5/16	3/16	1	5/16	3/16	1/16		18 GA 1½"
12	5/16	3/16	1¾	5/16	3/16	1/16		18 GA 1½"
20	7/16	5/16	2	5/16	3/16	1/16		18 GA 1½"
25	5/16	5/16	2	½	¼	⅛	.172	
50	5/16	5/16	4	½	¼	⅛	.172	
75	5/16	5/16	6	½	¼	⅛	.172	
100	¾	½	6½	½	¼	⅛	.172	
175	1⅛	¾	8½	9/16	⅜	¼	.203	
225	1⅛	¾	10½	9/16	⅜	¼	.203	

Watts	A	B	C	Catalog Number	D
12	3/16	.130	33/64	12-251	4-40
25/50/75	¼	.141	23/32	12-271	6-32
100	¼	.170	27/32	12-291	8-32
175/225	5/16	.170	51/64	12-321	8-32

OTHER TERMINALS AND SLIDERS ARE AVAILABLE — CONSULT FACTORY

MOUNTINGS

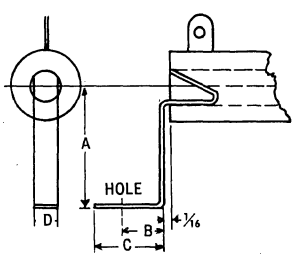
L-BRACKETS



Watts	A	B	D	E	G	H	No. Res.	C	F	Catalog No.
8/12/20 25/50/75	½	¾	1¼	7/32	7/16	7/16	1	1⅜	—	12-401
							2	2⅜	1	12-402
100	¾	¾	1	7/32	7/16	7/16	1	1⅝	—	12-634
							2	3¼	1⅝	12-635
							3	4⅞	1⅝	12-636
							4	6½	1⅝	12-637
175 225	1¼	⅞	1½	9/32	7/16	9/16	1	2 1/16	—	12-907
							2	4 1/16	2	12-908
							3	6 1/16	2	12-909
							4	8 1/16	2	12-910

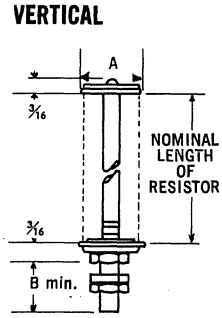
OTHER BRACKETS ARE AVAILABLE — CONSULT FACTORY

SPRING CLIPS



Watts	Core O.D.	Core I.D.	Dimensions A	B	C	D	Hole	Cat. No.
8/12	5/16	3/16	5/16	5/32	5/16	¼	.15	12-007
20	7/16	5/16	23/32	⅜	9/16	¼	.17	12-012
25/50/75	9/16	5/16	23/32	⅜	9/16	¼	.17	12-012
100	¾	½	1 9/32	⅜	9/16	⅜	.19	12-018
175/225	1⅛	¾	1 15/32	⅜	⅝	½	.22	12-022

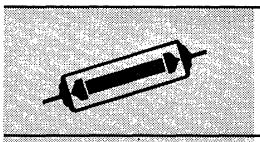
VERTICAL



Watts	A	B	Thru Bolt	Cat. No.
8	½	⅜	8-32 - 1¾	11-200
12	½	⅜	8-32 - 2½	11-201
20	¾	⅜	8-32 - 2¾	11-202
25	¾	⅜	10-32 - 2¾	11-203
50	¾	⅝	10-32 - 5	11-204
75	¾	⅝	10-32 - 7	11-205
100	1	⅜	10-32 - 7¼	11-206
175	1½	⅝	¼-20 - 9½	11-207
225	1½	⅝	¼-20 - 11½	11-208

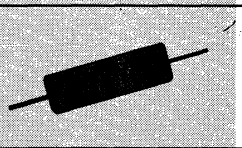
MEPCO PRODUCT CHECK LIST

MEPCO



FH HERMETIC SEAL METAL FILM RESISTORS

• MAN RATED-SPACE PROVEN DESIGN • TRUE HERMETIC SEAL • ULTIMATE MOISTURE PROTECTION • EXCEEDS ALL MIL-R-55182 ENVIRONMENTAL REQUIREMENTS • BETTER THAN "S" FAILURE RATE • EXCELLENT STABILITY • ESTABLISHED RELIABILITY



FE SERIES - MOLDED METAL FILM RESISTORS

• ESTABLISHED RELIABILITY — PER MIL-R-55182 • MEETS OTHER STANDARD MIL REQUIREMENTS • PRECISION NETWORKS AND MATCHED SETS • ABSOLUTE TOLERANCE AS LOW AS .1% • RATIO TOLERANCE AS LOW AS .05% • TC's TO 15PPM • AVAILABLE FROM FACTORY STOCK FOR IMMEDIATE DELIVERY

MR SERIES - METAL FILM RESISTORS

• HI REL DEVICES AT LOW REL PRICES • 100% SCREENING • IMMEDIATE DELIVERY FROM FACTORY INVENTORY

MR 25 and 30 - COMMERCIAL LEVEL • CONFORMAL COATED • COLOR CODING • MEETS ENVIRONMENTAL REQUIREMENTS OF MIL-R-22684 and 10509* • TC ±100PPM • TOLERANCES TO 1%

MR 24 and 34 - MILITARY INDUSTRIAL LEVEL • CONFORMAL COATED • MIL-R-10509 CHARACTERISTIC D • TC's ±100PPM • TOLERANCES TO 1%

MR 31 and 39 - MILITARY RELIABILITY LEVEL • MOLDED ENCLOSURE • MIL-R-10509 CHARACTERISTIC C • TX RELIABILITY LEVEL • ±50PPM • TOLERANCE TO 1%

*EXCEPT POLARIZED MOISTURE TEST

HERMETICALLY SEALED CARBON FILM RESISTORS

• TRUE HERMETIC SEAL — PROVIDES ABSOLUTE ENVIRONMENTAL PROTECTION • PERFORMANCE PROVEN RELIABILITY • TOLERANCES AS LOW AS ±1% • TC's ±200 TO-500PPM • MIL-R-10509 — CHARACTERISTIC G • RESISTANCE RANGES 50Ω THRU 20 MEG

GE SERIES - THICK FILM DISCRETE RESISTORS

• RESISTANCE RANGE TO 50 MEG OHMS • MIL CONFIGURATIONS 1/20W. TO 1/4W • TC's ±150PPM • TOLERANCE TO 1% • MOLDED ENCLOSURE

"TINYCHIP" THICK FILM RESISTOR CHIPS

• MINIATURE SIZE — .050" x .050" TYPICAL • TOLERANCES TO 1% AVAILABLE • CUSTOM DESIGN AVAILABLE • SUPERIOR STABILITY • BONDABLE TERMINATIONS

PRECISION WIREWOUND RESISTORS

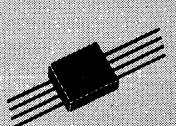
• TOLERANCES AS LOW AS .005% • TEMPERATURE COEFFICIENTS TO ±3PPM • HIGH STABILITY • CHOICE OF CONFIGURATIONS (AXIAL LEAD, RADIAL LEAD, PC, CERAMIC, BOBBIN)

WIREWOUND POWER RESISTORS

• HIGH POWER HANDLING CAPABILITIES IN SMALL SIZE • EXCELLENT PROTECTION AGAINST MOISTURE AND ENVIRONMENTAL HAZARDS • TOLERANCES TO ±.05%, TC's AS LOW AS 5PPM • BROAD RANGE OF STYLES • LOW THERMAL EMF

MINIATURE CERAMIC CAPACITORS

• THIN PLATE DESIGN (SMALLER THAN DISC CAPACITORS) • PRICED LOWER THAN OTHER THIN PLATE OR MONOLITHIC CAPACITORS • NON-MIGRATORY ELECTRODE SYSTEM FOR HIGH RELIABILITY • MEETS OR EXCEEDS MIL-C-11015 (CK 41, 42 and 43) • 100% FINAL TEST • HIGH TEMPERATURE SOLDER — ELIMINATES REFLOW PROBLEMS • FAST DELIVERY—LARGE INVENTORY MAINTAINED • HIGH VOLUME PRODUCTION CAPABILITY



HYBRID MICROCIRCUITS

• THICK FILM SUBSTRATES — PASSIVE AND ACTIVE CIRCUITS • HIGH STABILITY • LOW TC • PRECISION CIRCUIT CALIBRATION • CHIP AND WIRE ATTACHMENT OF ACTIVE DEVICES • LOWEST COST PROVEN TECHNOLOGY • DIGITAL AND LINEAR DEVICES • CUSTOM AND STANDARD CIRCUITS — 6 STANDARD DEVICES AVAILABLE FOR "OFF THE SHELF" DELIVERY — DESIGN, PROTOTYPING AND PRODUCTION OF CUSTOM CIRCUITS TO MEET INDIVIDUAL CUSTOMER REQUIREMENTS • EXPERIENCED, FLEXIBLE, COMPETITIVE — OVER 6 YEARS OF CONTINUOUS MANUFACTURING OF BOTH MILITARY (PER MIL-STD 883) AND INDUSTRIAL AND COMMERCIAL PRODUCTS

PRINTED CIRCUIT EDGE CONNECTORS

• EDGE CONNECTORS, INTERCONNECTORS, HIGH DENSITY CONNECTORS • COMBINATION CONNECTORS • COMPETITIVE PRICING • STATE OF THE ART TECHNOLOGY — HIGH DENSITY — BIFURCATED SPRINGS — STANDARD CONTACT SPACINGS — 4 TERMINATION STYLES • CUSTOM CAPABILITIES — COMPLETE DESIGN AND PRODUCTION CAPABILITIES TO PRODUCE CONFIGURATIONS TO MEET CUSTOMER REQUIREMENTS • ON TIME DELIVERY — FROM FACTORY STOCK • INTERCHANGEABLE WITH COMPETITIVE CONNECTORS

MEPCO, INC. 71 E. Columbia Road, Morristown, N. J. 07960

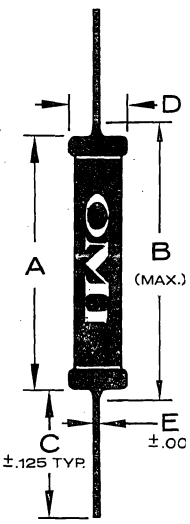
A NORTH AMERICAN PHILIPS COMPANY

OMI RESISTORS

T SERIES

OMTRONICS MANUFACTURING, INC. • 2406 LEAVENWORTH STREET, OMAHA, NEBRASKA 68105 • (402) 348-9500

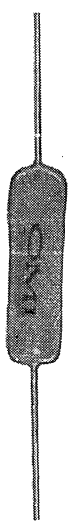
PRECISION POWER RESISTORS, AXIAL LEADS



Highly reliable, silicone coated, precision resistors manufactured to meet MIL-R-26 specifications. There are 17 basic sizes with power ratings from ½ to 10 watts and resistance ranges from .05 ohms to 275K ohms. Resistance tolerances from .05% to 5% (1%, standard). Temperature coefficient of resistance 2PPM up (20PPM, standard).

OMI TYPE	MIL TYPE	OMI WATTAGE RATING		RESISTANCE RANGE		MAX. WORKING VOLTAGE*		Max. Weight Grams	PHYSICAL DIMENSIONS				
		U	V	Min.	Max.	U	V		A	B	C	D	E
T-½A	—	.4	—	.5	3.4K	18	—	.21	.210 ±.015	.265	1.500	.078 ±.015	.020
T-½	—	.75	—	.5	7.5K	31	—	.30	.330 ±.015	.390	1.500	.078 ±.015	.020
T-1A-20	RW-70 U	1.0	1.25	.1	10K	50	55	.36	.406 ±.031	.437	1.500	.093 ±.031	.020
T-1A	—	1.0	1.25	.1	10K	50	55	.36	.406 ±.031	.437	1.500	.093 ±.031	.020
T-1B	—	1.1	1.30	.1	12K	62	67	.40	.530 ±.015	.590	1.500	.093 ±.031	.020
T-1C	—	1.0	—	.1	5K	28	33	.33	.265 ±.015	.335	1.500	.093 ±.031	.020
T-2	—	1.5	—	.1	10K	72	79	.95	.343 ±.015	.410	1.500	.187 ±.031	.032
T-2A	—	3.0	3.75	.1	22K	135	148	.70	.560 ±.062	.622	1.500	.187 ±.031	.032
T-2A-20	RW-79 U	3.0	3.75	.1	22K	135	148	.70	.560 ±.062	.622	1.500	.187 ±.031	.032
T-2B	—	3.0	—	.1	40K	170	200	.92	.812 ±.062	.890	1.500	.188 ±.031	.032
T-2C	—	2.5	3.00	.05	32K	138	157	1.5	.500 ±.062	.593	2.000	.218 ±.032	.040
T-2C-20	RW-69 V	2.5	3.00	.05	32K	138	157	1.5	.500 ±.062	.593	2.000	.218 ±.032	.040
T-3	—	4.0	5.50	.05	40K	210	250	2.3	625 ±.062	.765	2.000	.250 ±.032	.040
T-5	—	5.0	6.00	.05	90K	300	365	4.3	.875 ±.062	.937	2.000	.312 ±.031	.040
T-5-20	RW-74 U	5.0	6.00	.05	90K	300	365	4.3	.875 ±.062	.937	2.000	.312 ±.031	.040
T-6	—	6.0	6.50	.05	95K	330	376	4.8	1.000 ±.094	1.094	2.000	.312 ±.031	.040
T-6-20	RW-67 V	6.0	6.5	.05	95K	330	376	4.8	1.000 ±.094	1.094	2.000	.312 ±.031	.040
T-7	—	7.0	8.00	.05	100K	350	390	5.2	1.185 ±.062	1.247	2.000	.312 ±.031	.040
T-7A	—	7.0	9.00	.05	150K	504	576	7.0	1.375 ±.094	1.469	2.000	.469 ±.094	.040
T-7A-20	RW-55 V	7.0	9.00	.05	150K	504	576	7.0	1.375 ±.094	1.469	2.000	.469 ±.094	.040
T-10	—	10.0	11.00	.05	250K	788	898	9.0	1.780 ±.062	1.842	2.000	.375 ±.031	.040
T-10-20	RW-78 U	10.0	11.00	.05	250K	788	898	9.0	1.780 ±.062	1.842	2.000	.375 ±.031	.040
T-10B-20	RW-68 V	10.0	11.00	.05	250K	788	898	9.0	1.875 $^{+.063}_{-.125}$	1.875	2.000	.344 ±.094	.040
T-10A	—	10.5	14.00	.05	275K	799	911	10.0	1.925 ±.062	2.094	2.000	.375 ±.062	.040
T-10A-20	RW-56 V	10.5	14.00	.05	275K	799	911	10.0	2.000 ±.094	2.094	2.000	.469 ±.094	.040

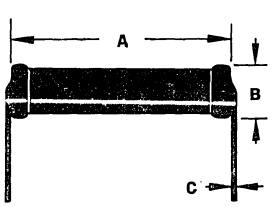
* Max. working voltage determined at .0008 wire.



SPECIAL FEATURES • Close tolerances (to .01% available). • Extremely high stability. • Low TC of resistance (to 2PPM). • Welded construction terminal to terminal. • Wide temperature range; from −65° to 275°C. • A specially formulated silicone coating makes OMI T-series resistors impervious to moisture, salt spray, abrasion and expanded temperatures.

PRECISION POWER RESISTORS, RADIAL LEADS

TR SERIES



SPECIFICATIONS

TR electrical, mechanical, material, power rating and derating specifications are identical to models of equivalent wattage and size in the OMI T Series. Also available, non-inductively wound, and identified as the "NR" Series.

Type	Dim. A	Dim. B	Dim. C
TR-1A	.406 ±.031	.093 ±.031	.020
TR-1B	.531 ±.031	.093 ±.031	.020
TR-2A	.562 ±.062	.187 ±.031	.020
TR-2C	.500 ±.062	.218 ±.031	.032
TR-2B	.812 ±.062	.187 ±.031	.020
TR-3	.625 ±.062	.250 ±.031	.032
TR-5	.875 ±.062	.312 ±.031	.032
TR-7	1.218 ±.062	.312 ±.031	.032
TR-10	1.780 ±.062	.375 ±.031	.032

OMI RESISTORS HT HF

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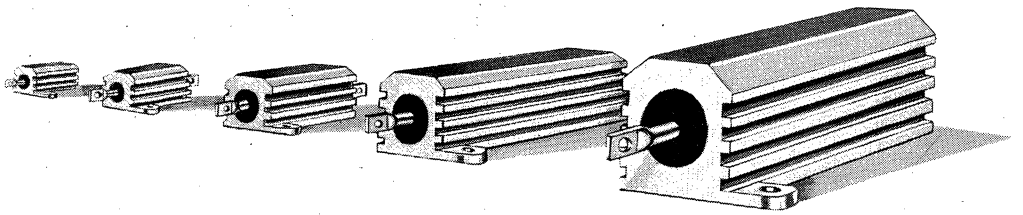


HT Models are anodized, aluminum-housed, precision wirewound resistors, designed to chassis mount for maximum heat dissipation. They are manufactured to meet or exceed MIL-R-18546 specifications. Four sizes: 5 to 50 watts (mounted), resistance ranges from .1 ohm to 250K, depending on size. Tolerances —1% standard — .05% to 5% available. Temperature coefficient from 2PPM up. (20PPM, standard.)

HF Models are identical in dimensions, resistance ranges, tolerance and temperature coefficients with those of the HT Series, but offer a great increase in their power ratings as similar size through the use of beryllium oxide cores for increased heat dissipation. These are manufactured to exceed MIL-R-18546 power ratings.

STANDARD ELECTRICAL SPECIFICATIONS

OMI Type		MIL Type	Power Rating (Watts)*			Resistance Range		Max. Working Voltage		Max. Weight Grams
			HF (OMI)	HT	MIL	MIN.	MAX.	HF	HT	
HF-5	HT-5	RE-60	15	5	5	.1	22K	220	160	3
HF-10	HT-10	RE-65	20	10	10	.1	47K	340	265	7
HF-25	HT-25	RE-70	35	25	20	.1	90K	650	550	14
HF-50	HT-50	RE-75	50	50	30	.1	250K	1400	1250	29
	HT-75			75		.1	75K		1500	120

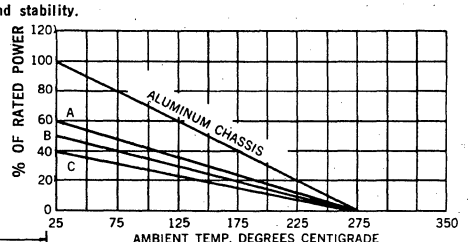
*Rating is based on chassis mounting area and stability.

Chassis Dimensions:

HT-5, HF-5, HT-10 and HF-10 — 6x4x2x .04", Aluminum Chassis.

HT-25, HF-25, HT-50 and HF-50 — 7x5x 2x.04". Aluminum Chassis.

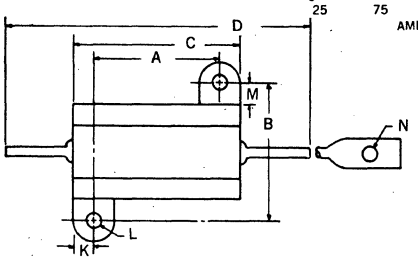
HT-75 — 12"x12"x.062, Aluminum Panel.

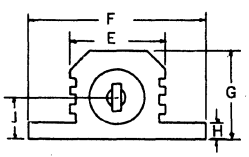


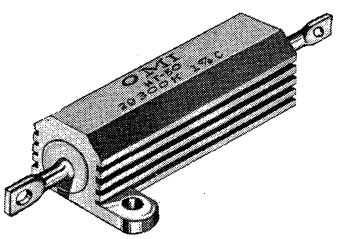
DERATING

OMI, HT and HF resistors have an operating temperature range of —55°C to +275°C. Derating is required for reduced chassis mounting area and for high ambient temperatures. The graph curves shown apply to operation of unmounted resistors. Free air rating.

A = HT5, HT-10
B = HT-25
C = HT-50, all HF Series and HT-75







DIMENSIONAL SPECIFICATIONS — HOUSED TYPE

TYPE		A	B	C	D	E	F	G	H	J	K	L	M	N
HF-5	HT-5	.444 ±.005	.490 ±.005	.600 ±.031	1.125 ±.062	.334 ±.015	.646 ±.015	.320 ±.015	.065 ±.010	.140 ±.010	.078 ±.010	.093 ±.005	.078 ±.015	.050 ±.005
HF-10	HT-10	.562 ±.005	.625 ±.005	.750 ±.031	1.375 ±.062	.430 ±.015	.800 ±.015	.400 ±.015	.075 ±.010	.190 ±.010	.093 ±.010	.093 ±.005	.102 ±.015	.086 ±.005
HF-25	HT-25	.719 ±.005	.781 ±.005	1.062 ±.031	1.938 ±.062	.530 ±.015	1.080 ±.015	.560 ±.015	.085 ±.010	.260 ±.010	.172 ±.010	.125 ±.005	.115 ±.015	.086 ±.005
HF-50	HT-50	1.563 ±.005	.844 ±.005	1.968 ±.031	2.781 ±.062	.615 ±.015	1.140 ±.015	.615 ±.015	.085 ±.010	.300 ±.010	.196 ±.010	.125 ±.005	.107 ±.015	.086 ±.005
	HT-75	2.125 ±.005	1.500 ±.005	2.500 ±.031	3.375 ±.093	1.125 ±.031	1.875 ±.031	1.125 ±.031	.125 ±.015	.625 ±.015	.187 ±.015	.172 ±.005	.187 ±.015	.095 ±.005

HN HFN — ALUMINUM HOUSED, NON-INDUCTIVE

HN and HFN Models with equivalent electrical and physical specifications to the HT and HF Series are also available with non-inductive windings. To order HT, non-inductively wound, specify "HN". To order HF, non-inductively wound, specify "HFN" instead of the basic HT and HF models. **NOTE:** The following conditions apply to non-inductive types as compared to HT or HF:

1. Maximum resistance values must be divided by 2.
2. Maximum working voltage must be multiplied by .707.
3. Maximum weights may slightly exceed those shown above.

OMI RESISTORS HT

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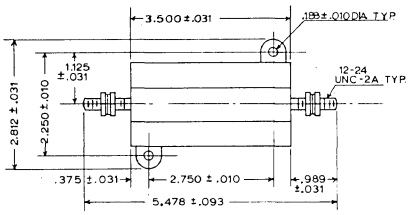
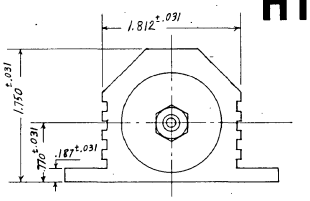
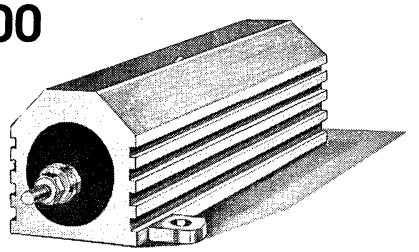
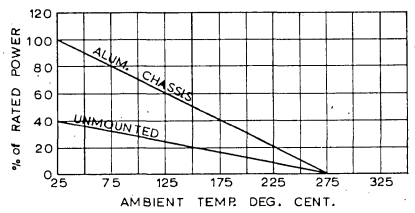
HT-100







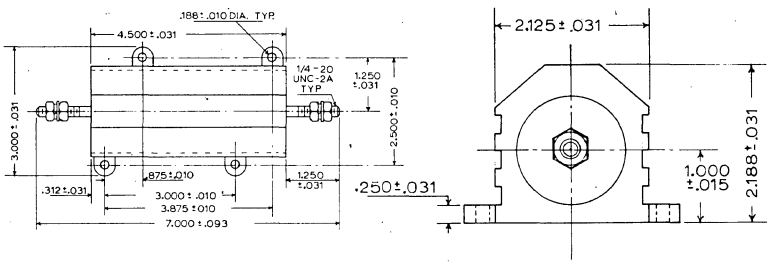


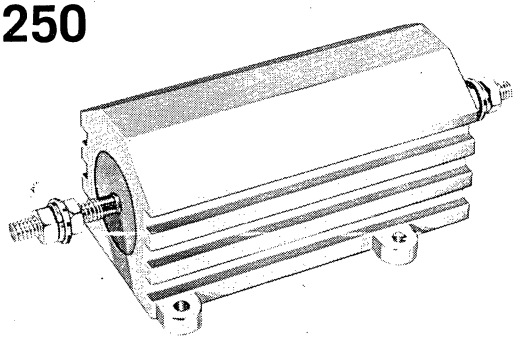
STANDARD ELECTRICAL SPECIFICATIONS

OMI Type	MIL Type	Power Rating (Watts)*		Resistance Range		Max Working Voltage	Max. Weight Grams
		(OMI) HT	MIL	MIN.	MAX.	HT	
HT-100	RE-77	100	75	.1	50K	1900	400
HT-250	RE-80	250	120	.1	75K	2500	800

Chassis Dimensions: 12"x12"x.125 Aluminum Panel

HT-250



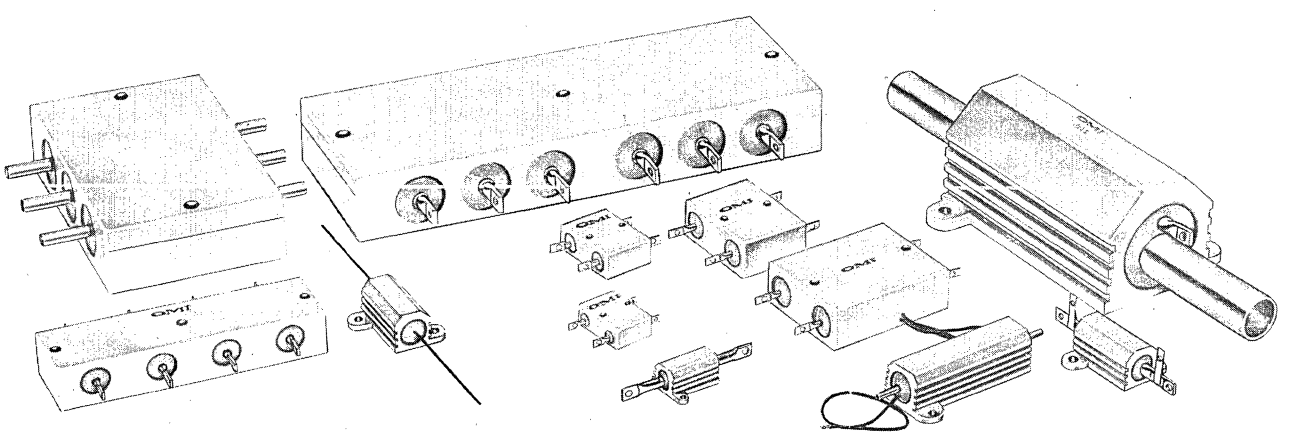


HEAT SINK CAPABILITIES

OMI's factory tooling and engineering experience put at your disposal facilities of design and production to manufacture heat sink resistors for your specific requirements.

Manufactured to your specific parameters, these resistors include the following outstanding characteristics: (A) High power capabilities, (B) 4-Wire low value resistors as well as the standard 2-wire units, (C) Combined characteristics such as .05 ohms ±5 PPM and 4-wire termination and (D) high temperature, high pressure integral molding into housing constructions.

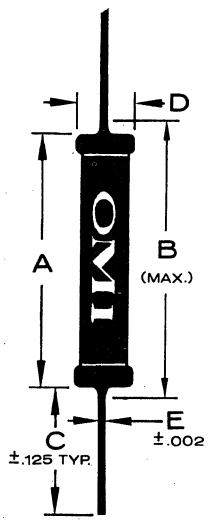
This advanced state of the art allows us to confidently solicit your inquiries for special design modes.



OMI RESISTORS F SERIES

OMTRONICS MANUFACTURING, INC. • 2406 LEAVENWORTH STREET, OMAHA, NEBRASKA 68105 • (402) 348-9500

SILICONE COATED RESISTORS, AXIAL LEADS
BERYLLIUM OXIDE CORE

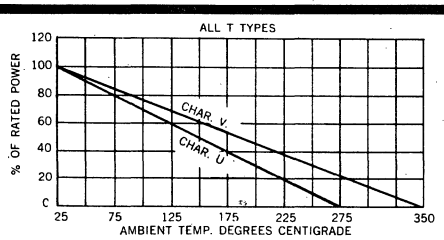


The OMI F Series resistors — at ratings from 1 to 15 watts—offer greatly increased power ratings over conventional resistors of equivalent size. All resistors in the F Series are manufactured in accordance with MIL. Specs. and are available in ten basic physical sizes with resistance ranges from 0.1 ohm to 250K ohms. Resistance tolerances from 0.05% to 5% (1%, standard) and temperature coefficient of resistance from 2PPM up (20PPM, standard).

OMI TYPE	MIL TYPE	OMI WATTAGE RATING		RESISTANCE RANGE		MAX. WORKING VOLTAGE*		Max. Weight Grams	PHYSICAL DIMENSIONS				
		U	V	Min.	Max.	Min.	Max.		A	B	C	D	E
F-1	RW-81U	1.0 W	1.5 W	1	3.4K	29	35	.21	.250 ±.031	.265	1.500	.078 ±.015	.020
F-2	—	1.5 W	2.0 W	1	7.5K	42	48	.21	.312 ±.015	.327	1.500	.078 ±.015	.020
F-3	RW-80U	2.25W	2.75W	.1	10K	74	81	.36	.406 ±.031	.437	1.500	.093 ±.032	.020
F-5	—	4.0 W	5 W	.1	22K	153	170	.80	.562 ±.062	.640	1.500	.188 ±.032	.032
F-5A	—	4.5 W	6.5 W	.1	40K	214	257	.96	.812 ±.062	.890	1.500	.188 ±.032	.032
F-5C	—	5 W	7 W	.1	32K	194	230	1.5	.500 ±.062	.593	2.000	.218 ±.032	.040
F-6	—	6 W	8 W	.1	40K	258	298	2.3	.625 ±.062	.765	2.000	.250 ±.032	.040
F-10	—	7 W	10 W	.1	90K	390	467	4.3	.875 ±.062	1.000	2.000	.312 ±.032	.040
F-12	—	10 W	12 W	.1	100K	607	665	5.2	1.218 ±.062	1.281	2.000	.312 ±.032	.040
F-15	—	15 W	18 W	.1	250K	979	1072	9.0	1.780 ±.062	1.875	2.000	.375 ±.032	.040

* Maximum working voltage determined at .0008 dia. wire.

SPECIAL FEATURES All features of the conventional precision power resistors, plus the beryllium oxide core for optimum heat dissipation, allow reduction of physical size of resistor while maintaining equivalent power ratings of conventional types.



DERATING
Applicable to both F and T Series

Both OMI, T and F Series resistors have an operating temperature range of −55°C to 275°C (characteristic U) or to 350°C (characteristic V). Derating is required for high ambient temperatures in accordance with the curve shown at left.

N FN NON-INDUCTIVE TYPES
Available with both Axial and Radial Leads

OMI Models of equivalent physical and electrical specifications are available with non-inductive windings. They are identified by the letter "N"; to order non-inductively wound T Series, specify "N"; to order non-inductively wound F Series, specify "FN".

NOTE: The following conditions apply to specifications applicable to the non-inductively wound types, as compared to the basic T or F types.

1. Maximum resistance must be diveded by 2.
2. Maximum working voltage must be multiplied by .707.
3. Maximum weights may slightly exceed those shown for the basic T or F types.

MINIATURE POWER RESISTORS FR SERIES
Radial Leads

As in the OMI, TR Series, models of equivalent electrical, mechanical, power rating and derating specifications are available in FR3, FR5, FR5A, FR5C, FR6, FR10, FR12, and FR15 dimensions. These models are also available non-inductively wound and identified as the FNR Series.

TEMPERATURE COEFFICIENT

Although all OMI, T, F, HT and HF resistors are manufactured with a temperature coefficient of ±20PPM/°C over the full temperature range and resistance range as standard production, closer temperature coefficients are available.

Special Close T.C. Availability: All styles can be supplied with temperature coefficients of ±10PPM, ±5PPM, and ±2PPM. Non-inductively wound styles can be supplied with ±10PPM.

Temperature Range: −65°C to +275°C.

Tolerance Range: 0.05% to 5%.

Resistance Range: 0 to 2 watts, 25 ohms to maximum for each size.
Over 2 watts, 50 ohms to maximum for each size.

Code to Designate Special T.C: 10PPM C-10
5PPM C-5
2PPM C-2

To Order Resistors with Special T.C., Specify: (example)

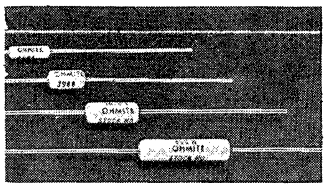
Resistor Type	Resistance Value	Tolerance	T.C. Code
T-5	4700 ohms	0.5%	C-5

SERIES 99 MOLDED AXIAL LEAD VITREOUS ENAMELED RESISTORS

- **FIRST MOLDED, WIREWOUND, VITREOUS ENAMEL RESISTOR**
- **INSULATED! Meets 1000 VAC Test**
- **WITHSTANDS 1500°F Temperature without Distortion**
- **RESISTS Chipping, Breaking**
- **VITRIFIED MARKINGS, Resist Abrasion and Active Solvents**
- **UNIFORM SIZE Permits Clip-Mounting with Significant Heat Sink Benefits**
- **HIGH OVERLOAD CAPABILITY**

An exclusive technique (U.S. Patent No. 3,229,237) permits application of the vitreous enamel coating by **molding** instead of the conventional "dip" process. The dimensionally consistent and thicker coating that results, guarantees a 1000 VAC insulation rating plus unparalleled capability for withstanding very high temperatures, high humidity and immersion in salt solution.

These resistors are normally mounted by their axial leads. However, their consistent form also permits mounting in clips with heat sink benefits up to 100%. Resistor markings are also vitreous and will not burn off even under extreme overloads. Resistance tolerance is ±5%. Series 99 resistors meet the requirements of MIL-R-26 for "insulated" resistors.



TYPE 994, COMMERCIAL, HIGH STABILITY

Standard Tolerance 3% • Tolerances to 0.25% Available

Type 994 units feature long term stability and the Series 99 low temperature coefficient of resistance (T.C.).

Stability: Type 994 resistors, on a 2000 hour, cyclic, load-life test (1½ hour on, ½ hour off) have less than ±2% △R.

Standard Tolerance for Type 994 resistors is ±3%. Tolerances to ±0.25% are available for resistance values 1Ω and above.

Ohmite Style	Rated Watts @ 25°C	Dimensions (inches) Lgth. ±.015	Dia. +.031 −.000	Leads 1½" AWG	Typ. Wt. (g's)	Resistance Range (Ohms)	Max. Wkg. Volts RMS
994-1A	1.5	.422*	.125*	24	0.4	0.1-6650	
994-2A	2.25	.375	.188	20	0.8	0.1-6490	85
994-3A	3.25	.547	.203	20	1.3	0.1-22,100	200
994-5A	6.5	.922	.312	20	3.6	0.1-80,600	460
994-5B	5	.938	.203	20	2.0	0.1-53,600	500
994-7A	9	1.218	.312	20	4.5	0.1-118,000	670
994-10A	11	1.218	.312	20	6.9	0.1-187,000	1100
994-15A	15	2.00	.394	20	13.0	0.1-243,000	1100

TYPE 995, COMMERCIAL POWER APPLICATIONS

Standard tolerance for Type 995 units is ±5% for values 1 ohm and above; ±10% for values below 1 ohm. For tolerances to ±0.25%, consult factory.
Low temperature coefficient.

5% TOLERANCE; CLOSER TOLERANCES AVAILABLE

Ohmite Style	Rated Watts @ 25°C	Dimensions (inches) Lgth. ±.015	Dia. +.031 −.000	Leads 1½" AWG‡	Typ. Wt. (g's)	Resistance Range† (Ohms)	Max. Wkg. Volts RMS
995-1A	1.5	.422*	.125*	24	0.4	0.1-6650	
995-2A	2.25	.375	.188	20	0.8	0.1-6490	85
995-3A	3.25	.547	.203	20	1.3	0.1-22,100	190
995-5A	6.5	.922	.312	20	3.6	0.1-80,600	460
995-5B	5	.938	.203	20	2.0	0.1-53,600	500
995-7A	9	1.218	.312	20	4.5	0.1-118,000	670
995-10A	11	1.781	.312	20	6.9	0.1-187,000	1100
995-15A	15	2.00	.394	20	13	0.1-243,000	1100

* Tolerance +.015, −.005. † For tolerances closer than 1%, minimum value is 1 ohm. ‡ AWG 20 = .032"; AWG 24 = .020".

TYPE 991 FOR MILITARY APPLICATIONS

Meets the requirements of MIL-R-26E, 350°C max. hot spot. Surpasses the stability requirements of ±3% ΔR on the 2000 hour cyclic load-life test. The low TC of Series 99 units far surpasses the requirements of MIL-R-26E. Standard resistance tolerance is ±5% for values 1 ohm and above; ±10% below 1 ohm; other tolerances can be supplied.

RESISTORS FOR MIL-R-26E

Ohmite Style	"V" Char. MIL Style	Rated Watts @25°C	Ohm Range*	Dimensions Lgth. ±.015	Dia. +.001 −.000	Leads 1½ AWG	Typ. Wt. (g's)
991- 3A	RW69V	3	0.1-2K	.547	.203	20	1.3
991- 5A	RW67V	6.5	0.1-8.2K	.922	.312	20	3.6
991-10A	RW68V	11	0.1-20K	1.781	.312	20	6.9
991-15A	RW56V	14	0.1-9.1K	2.00	.394	20	13.0

* Max. values with .001 wire — except .00175 for RW56V only.

SERIES 88 MOLDED PRECISION POWER RESISTORS

FOR T.C. LESS THAN 0 ±10PPM/°C AND NONINDUCTIVE VERSIONS, CONSULT FACTORY.

TYPE 882 FOR COMMERCIAL POWER APPLICATIONS

This type intended for commercial power applications. These units derate to zero watts at 350°C ambient; T.C. = 0 ±10ppm/°C ; insulation tested at 1000 VAC except 500 volts for 1 watt size.

STANDARD TOLERANCE ±3%; CLOSER AVAILABLE

Ohmite Style	Nom. Rated Watts 25°C	Dimensions Lgth. +.020 −.010	Dia. ±.020	Leads 1½" AWG	Typ. Wt. Grams	Ohms Range Std. 3% Tol.	Max. Wkg. Volts RMS
882-1A	1.5	0.417	0.105	24	0.3	0.10-10,700	—
882-1B	1.5	0.542	0.105	24	0.3	0.10-17,400	—
882-2	2.25	0.375	0.188	20	0.6	0.10-10,500	85
882-3	3.25	0.542	0.230	20	1.3	0.10-34,800	200
882-5	6.5	0.917	0.323	18	3.3	0.10-127,000	460
882-7	9	1.22	0.323	18	4.3	0.10-187,000	670
882-10	11	1.82	0.343	18	6.3	0.10-316,000	1100

* Ohmite's standard power tolerance is 3% supplied at no extra charge over 5% for values 1 ohm and higher; 10% for values below 1 ohm. Closer tolerances are available.

TYPE 884 HIGH STABILITY, PRECISION-POWER TYPE

Type 884 resistors (Riteohm 88) are classified as high stability, precision-power types. They are aged and conservatively rated for maximum long term stability and exhibit superior characteristics despite relatively high operating temperature at rated wattage.

Type 884 units are available in † tolerances of 0.05% and derate to zero watts at 275°C ambient; T.C. = 0 ±10 ppm/°C; insulation tested at 1000 VAC except 500 volts for 1 watt size.
† For applications where maximum stability is of primary importance as may be the case with close tolerance resistors, a derating of 50% is recommended.

STANDARD TOLERANCES TO .05% AVAILABLE FOR VALUES 1 OHM AND ABOVE

Ohmite Style	Nom. Rated Watts 25°C	Dimensions Lgth. +.020 −.100	Dia. ±.020	Leads 1½" Long AWG	Typ. Wt. (g's)	Resistance Ranges[2] Closer Than 0.5% Tol. (Min. Ohms)	0.5% Tol. & Greater (Min. Ohms)	Max. Ohms All Tols.	Max. Wkg. Volts RMS
884-1A[1]	1	0.417	0.105	24	0.3	0.499	0.10	10,700	
884-1B	1	0.542	0.105	24	0.3	0.499	0.10	17,400	
884-2	2	0.375	0.188	20	0.6	0.499	0.10	10,500	85
884-3[2]	3	0.542	0.230	20	1.3	0.499	0.10	34,800	200
884-5[3]	5	0.917	0.323	18	3.3	0.499	0.10	127,000	460
884-7	7	1.22	0.323	18	4.3	0.499	0.10	187,000	670
884-10[4]	10	1.82	0.343	18	6.3	0.499	0.10	316,000	1100

[1] Commercial equivalent of RW70.
[2] Commercial equivalent of RW79 except for size.
[3] Commercial equivalent of RW74
[4] Commercial equivalent of RW78 except for size.

TUBULAR VITREOUS ENAMELED RESISTORS

TYPE 200, BROWN DEVIL®

"BROWN DEVIL" (Type 200) vitreous enameled, wirewound resistors, have been an industry byword for small rugged power resistors. Compact, with surprising overload capability. Five sizes are stocked in a broad selection of values.

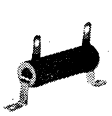
Ohmite Code	Rated Watts	Dimensions Lgth.	Dia.	Leads 1½" AWG	Resistance Range (Ohms)
200-3AA-48	3	7/16	.210	20	0.11 -10K
200-5¼CA-48	5¼	5/8	¼	20	0.15 -20K
200-8D-48	8	1	5/16	18	0.034-25K
200-12D-48	12	1¾	5/16	18	0.083-57K
200-20H-48	20	2	7/16	18	0.14 -113K

TYPE 270, FIXED, RADIAL LUG

Lug type resistors are wire-wound on high quality ceramic cores, protected and insulated by Ohmite vitreous enamel.

Wire of finest alloy and largest practical size is used for each resistance. Original uniform close spacing of the turns maintained by anchoring effect of the vitreous enamel. Wire securely welded to the terminal lugs. Resistance tolerance: ±5% for values 1 ohm or higher; ±10% below 1 ohm.

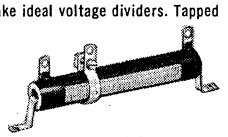
Wattage ratings are for use in free air. When mounted in closed spaces or where circulation of air is restricted, they should not be used at more than one-half wattage rating.



Ohmite Code	Rated Watts	Core Dimensions Lgth.	Dia.	Resistance Range (Ohms)
270-12D-57	12	1¾	5/16	0.075-51.6K
270-25K-40	25	2	7/16	0.15-100K
270-50K-40	50	4	5/16	0.38-260K
270-100M-40	100	6½	¾	0.23-101K
270-175P-46	175	8½	1⅛	0.13-101K
270-225P-46	225	10½	1⅛	0.17-129K

TYPE 210, "DIVIDOHM®" ADJUSTABLE

"Dividohm" resistors make ideal voltage dividers. Tapped "bleeders" are made by using one or more adjustable lugs, as required. Also useful for obtaining odd resistance values.



"Dividohm" resistors are vitreous enameled resistors on which a narrow strip has been left uncovered to expose a portion of each turn. Contact is made by an embossed contact on the adjustable lug.

Ohmite Code	Rated Watts	Core Dimensions Lgth.	Dia.	Resistance Range (Ohms)
210-12D-57	12	1¾	5/16	0.95- 30K
210-25K-40	25	2	7/16	0.24- 67K
210-50K-40	50	4	5/16	0.62-176K
210-75K-40	75	6	5/16	1.0 -284K
210-100M-40	100	6½	¾	1.0 -104K
210-175P-46	175	8½	1⅛	0.67-101K
210-225P-46	225	10½	1⅛	0.86-129K

TYPE 250, "THIN" RESISTORS — FIXED

Ohmite Code	Rated Watts	Core Dimensions Lgth.	W.	Thk.	Resistance Range (Ohms)
250-10TA-51S	10	¾	⅜	⅛	0.15 to 12.9K
250-15TA-51S	15	1	⅜	⅛	0.25 to 21.6K
250-20TA-51S	20	2	⅜	⅛	0.64 to 56.1K
250-25TD-51S	25	1½	13/16	¼	0.14 to 16.0K
250-30TE-57S	30	1¼	1	¼	0.093 to 10.8K
250-40TE-57S	40	2	1	¼	0.22 to 25.0K
250-55TE-57S	55	3½	1	¼	0.92 to 36.5K

Ohmite "Thin" Resistors are used where space is at a premium. Wirewound on flat, oval shaped ceramic cores. Coated with Ohmite's exclusive vitreous enamel.

Integral thru-core mounting brackets equalize heat distribution and conduct heat directly to metal mounting surface. Reduce wattage rating 15% if mounted on non-metallic surface.

Total height from bottom of bracket to top of resistor: 5/16" for 10 thru 20 watts; 11/32" for 25 thru 55 watt size.

Stack-mounted "Thin" resistors

TYPE 260, "THIN" DIVIDOHM® — ADJUSTABLE

Ohmite Code	Rated Watts	Core Dimensions Lgth.	Wdth.	Thk.	Resistance Range (Ohms)
260-15TA(T)-51S	15	1	⅜	⅛	2.8 to 21.6K
260-20TA(T)-51S	20	2	⅜	⅛	7.2 to 56.1K
260-30TE(B)-57S	30	1¼	1	¼	1.0 to 10.8K
260-30TE(B)-57U					
260-40TE(B)-57S	40	2	1	¼	2.4 to 25.0K
260-40TE(B)-57U					
260-55TE(B)-57S	55	3½	1	¼	10.0 to 36.5K
260-55TE(B)-57U					

WRITE FOR COMPLETE INFORMATION AND SPECIFICATIONS ON OHMITE RESISTORS

OHMITE MFG. CO., a NORTH AMERICAN PHILIPS company • 3635 HOWARD STREET, SKOKIE, ILLINOIS 60076 • PHONE (312) 675-2600 • TWX 910-223-0805

RCL **ELECTRONICS, INC.**
General Sales Office:
700 South 21st Street, Irvington, N. J. (Area Code 201) 374-3311 • TWX 710-999-5511

special temperature coefficient wire wound resistors

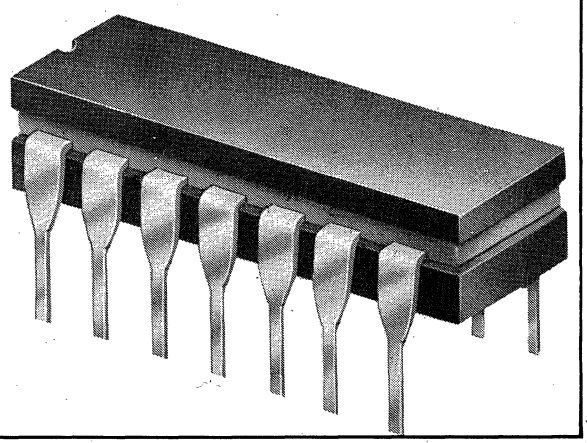
- Applications include transistor circuits, zener diode temperature compensation, temperature measuring devices.
- Available in a range of temperature coefficients from −50 ppm/°C. to +6,000 ppm/°C.
- Values range from 10 ohms to 5 megohms.
- All available with axial or printed circuit leads.
- All meet applicable paragraphs of Mil-R-93D

DIP NETWORKS

Available as ladder or summing networks, or any configuration required.

Depending upon application RCL utilizes wirewound resistors, thin film resistors, thick film resistors, chip resistors, or any combinations of the foregoing.

Contact our Engineering Dept. for complete specifications.

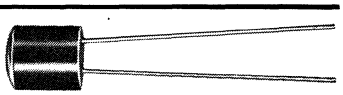


Special Temperature Coefficients available (see table below)

COLD RANGE −55°C to +25°C	HEAT RANGE +25°C to +105°C	R FACTOR Multiply Max. R by
−50 ±20	**−50 ±20**	1.00
−30 ±10	**−30 ±10**	1.00
±3	**±3**	1.00
±5	**±5**	1.00
±10	**±10**	1.00
±20	**±20**	1.00
+95 ±20	**+85 ±20**	.80
+110 ±10	**+100 ±10**	.80
+120 ±10	**+110 ±10**	.75
+150 ±30	**+150 ±30**	.85
+180 ±20	**+180 ±20**	.80
+280 ±30	**+280 ±30**	.25
+380 ±40	**+400 ±40**	.70
+700 ±200	**+650 ±200**	.60
+850 ±80	**+850 ±80**	.60
+1100 ±100	**+1050 ±100**	.50
+1250 ±100	**+1150 ±100**	.50
+1500 ±200	**+1450 ±200**	.55
+2600 ±200	**+2550 ±200**	.50
+3400 ±300	**+3600 ±300**	.36
+4000 ±400	**+4500 ±400**	.10
+5000 ±300	**+6000 ±300**	.05

Above T.C.'s refer to .001 minimum wire diameter. Some alloys available in sizes as low as .0007.

RCL printed circuit resistors



non-inductive winding

△ All welded construction.

△ All resistor wire terminations are made at the top of the resistor rather than at the bottom.

This does the following:

a. protects the joints from damage when submerged in a solder bath.

b. by placing these joints as far away as possible from the solder bath, the body acts as a heat sink and thus these terminations are given additional protection.

c. this design generally applies to values of 2K and above.

△ Custom designs on special order.

△ Different lead spacing can be furnished on request.

RCL Type	MIL-R-93D Type	Dia. (±.025)	Length (±.032)	Max. R. Using .001	Max. R. Using .0006	Wattage	Standard Lead Spacing (±/010)	Lead Diam. (AWG)
4060	RB-71	¼	5/16	100K	500K	.250	.200	#22
4061	—	¼	⅜	160K	800K	.250	.200	#22
4062	—	¼	7/16	160K	800K	.250	.200	#22
4063	—	⅜	⅜	185K	1 Meg.	.333	.200	#20
4064	—	⅜	7/16	250K	1.3 Meg.	.333	.200	#20
4065	RB-70	⅜	½	301K	1.5 Meg.	.333	.200	#20
4066	—	7/16	⅜	450K	2 Meg.	.400	.300	#20
4067	—	7/16	7/16	600K	3 Meg.	.400	.300	#20
4068	—	7/16	½	700K	3.5 Meg.	.400	.300	#20

Lead length 1¼" Minimum. Tinned, weldable leads.

RCL ELECTRONICS, INC.
General Sales Office:
700 South 21st Street, Irvington, N. J.. (Area Code 201) 374-3311 • TWX 710-999-5511

SERIES T

silicone coated axial power wire-wound resistors

General Specifications Available:

- ☐ **Standard temperature coefficient:** ±10 PPM/°C, (slightly higher for lower values) Additional TC's available from −50 PPM/°C to +6000 PPM/°C.
- ☐ **Tolerance:** ±1.0% is standard. Available to ±.01%.
- ☐ **Wattage Range:** ½ watts to 14 watts.
- ☐ **Resistance Values:** from .01 ohms to 275K. Higher values available.
- ☐ **Coating:** Silicone coating withstands moisture, salt, water immersion, and cleansing solutions.
- ☐ **Leads:** Tinned copperweld is standard. Leads are weldable and solderable.
- ☐ **Dielectric Strength:** 1000 VAC "V" block test.
- ☐ **Insulation Resistance:** 5000 Megohms minimum at 100 volts D.C.
- ☐ **Wide Temperature Range:** From −65°C to +275°C (Characteristic U) or +350° (Characteristic V)

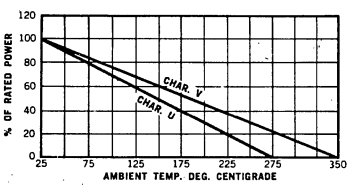
POWER RATINGS:

The RCL "T" Series has two power ratings, depending on operating temperature and stability requirements:

CHARACTERISTIC U: 275°C maximum hot-spot temperature.

CHARACTERISTIC V: 350°C maximum hot-spot temperature.

DERATING:
RCL Series "T" resistors have an operating temperature range of −65°C to +275°C (Characteristic U), or to +350°C (Characteristic V).



Ultra-fast delivery for prototpyes and initial production needs.

RCL TYPE	MIL-R 26 E TYPE	WATTAGE RATING U	WATTAGE RATING V	DIMENSIONS DIA. ±.031*	DIMENSIONS LEN. ±.062*	MAX. RESISTANCE RCL MAX.	MAX. RESISTANCE MIL-R 26 E MAX.	LEAD DIAM.
T-½A		.4		.078	.220	2.5K		#24
T-½		.75		.078	.330	7.5K		#24
T-1A		1.0	1.25	.093	.406	10K		#24
T-1A-70	RW-70	1.0		.094	.406 ±.031	10K	3.16K	#24
T-1B		1.1	1.30	.093	.530	12K		#24
T-1C		1.0		.093	.280	5K		#24
T-2		1.5		.156	.343	10K		#20
T-2A		3.0	3.75	.187	.500	22K		#20
T-2A-69	RW-69		3.00	.188 ±.063	.500 ±.063	22K	.91K	#20
T-2B		3.0	3.75	.188	.812	40K		#20
T-2B-79	RW-79	3.0		.187	.560	22K	10.5K	#20
T-2C		3.0	3.25	.250	.500	40K		#18
T-3		4.0	5.5	.250	.625	45K		#18
T-5		5.0	6.5	.312	.875	91K		#18
T-5-74	RW-74	5.0		.312	.875	95K	38.3K	#18
T-6		6.0	7.5	.312	1.000	95K		#18
T-6-67	RW-67		6.5	.313 ±.063	1.000 ±.094	95K	3.6K	#20
T-7		7.0	9.00	.312	1.185	100K		#18
T-7A		7.0	9.00	.375	1.375	150K		#18
T-7A-55	RW-55*		7.00	.469 ±.094	1.375 ±.094	150K	9.1K	#20
T-10		10.0	13.00	.375	1.812	250K		#18
T-10-78	RW-78	10.0		.375	1.780	260K	90.9K	#18
T-10-68	RW-68		11.00	.344 ±.094	1.875 $\pm\frac{.063}{.125}$	265K	8.2K	#20
T-10A		10.5	14.00	.375	1.925	275K		#18
T-10-A-56	RW-56		14.00	.469 ±.094	2.000 ±.094	275K	16K	#20

Lead Length: 1¼" minimum. * Tolerance applies to all types unless otherwise indicated.

BERYLLIUM OXIDE CORE WIRE-WOUND RESISTORS

For maximum heat dissipation . . . in smaller sizes. (All specifications same as above . . . Series T.)

RCL Type	MIL-R-26E	Rated Wattage U	Rated Wattage V	Dimensions Diameter ±.032	Dimensions Diameter ±.08 mm	Dimensions Length ±.062	Dimensions Length ±1.6 mm	Lead Diameter AWG	Lead Diameter mm	Max. Resistance MIL	Max. Resistance RCL
B-1	RW-81	1	—	.085 ±.020	2.2 ±0.5	.250 ±.032	6.4 ±0.8	#24	0.5	.649K	3.4K
B-2	—	1.5	2	.078	2	.312	7.9	#24	0.5	—	7.5K
B-3	RW-80	2	—	.094	2.4	.406 ±.032	10.3 ±0.8	#24	0.5	3.16K	10.0K
B-5	—	4	5	.188	4.8	.562	14.3	#20	0.8	—	25K
B-5A	—	4.5	6.5	.188	4.8	.812	20.6	#20	0.8	—	42K
B-5C	—	5	7	.218	5.5	.500	12.7	#18	1	—	32K
B-6	—	6	8	.250	6.4	.625	15.9	#18	1	—	50K
B-10	—	7	10	.312	7.9	.875	22.2	#18	1	—	95K
B-12	—	10	12	.312	7.9	1.218	31	#18	1	—	154K
B-15	—	15	18	.375	9.5	1.780	45.2	#18	1	—	273K

Lead length 1¼" (32mm) Minimum.

NON-INDUCTIVE WINDING AVAILABLE FOR SERIES "T" OR "B"

☐ For non-inductive winding add prefix "N".
1. Divide maximum resistance values by two.
2. Multiply maximum working voltage by .707.

RCL ELECTRONICS, INC.

General Sales Office:
700 South 21st Street, Irvington, N. J. (Area Code 201) 374-3311 • TWX 710-999-5511

subminiature axial lead resistors

These extremely small, encapsulated resistors meet and exceed the specifications of MIL-R-93D. Special RCL techniques also allow the production of custom sizes at minimal cost to the customer.

Tolerances available: from ±1.0% to ±0.001%.

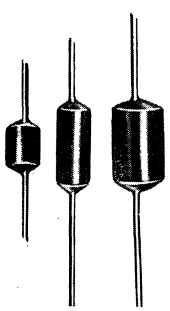
Temperature coefficient: Standard is ±10 PPM/°C.

Temperature coefficients available as low as ±2 PPM/°C.

RCL Type	Dia. Inches (±1/64)	Length Inches (±1/32)	Max. Watts	Max. Volts	Max. Res. .001 Wire	Max. Res. .0005 Wire	Non-inductive	Lead Diam. (Length 2" ±1/8")
7001	.100	.200	0.05	75	10K	100K	No	#26AWG
7003	.100	.260	0.05	100	10K	150K	No	#24AWG
7004	.100	.300	0.05	100	10K	250K	Yes	#24AWG
7005	1/8	1/4	0.1	100	10K	300K	Yes	#22AWG
7006	1/8	5/16	0.1	100	16K	350K	Yes	#22AWG
7007	3/16	3/8	0.125	200	60K	700K	Yes	#22AWG
7008	1/4	1/4	0.150	100	100K	1 Meg.	Yes	#20AWG
7009	1/4	11/32	0.25	200	127K	1.4 Meg.	Yes	#22AWG
7010	1/4	1/2	0.33	400	226K	3 Meg.	Yes	#20AWG

Maximum wattage rating is at 25° C through 125° C

commercial/industrial applications

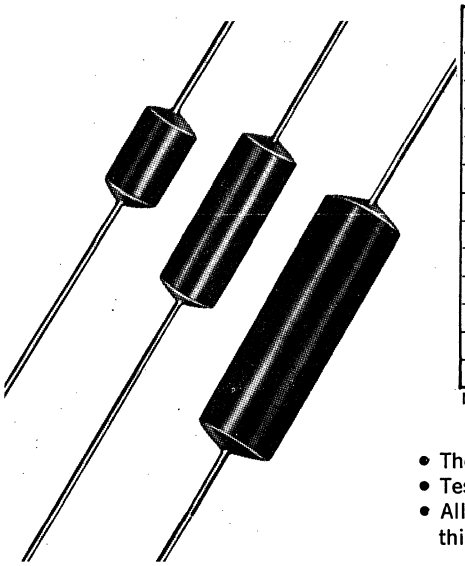


RCL Economy line — low cost, precision wire wound resistors for test equipment, instruments, industrial controls, communications equipment. All the benefits of wire wounds — low T.C., high stability, close tolerance.

- Price competitive with comparable metal film resistors
- Standard T.C. = ±10 PPM/°C
- Special T.C.'s available on request (see page)
- High temperature epoxy coating provides moisture protection
- Lead Length: 1⅜" minimum
- Wattage rating at 60°C ambient; derated to zero at 105°C
- Low noise
- Molded-in leads for structural strength
- Tolerance Available: ±1.%, 0.5%, 0.25%, 0.1%
- Non-inductive winding available on special order

Style Number	Wattage* Rating	Min. Res.	Max. Res. .5% 1%	Max. Res. .25% .1%	Bobbin Diameter ±1/32	Bobbin Length ±1/16	Lead Diam. AWG
E-10	.1	0.1 ohm	10K	6K	3/16	3/8	#22
E-20	.25	0.1 ohm	20K	13K	3/16	5/8	#20
E-30	.5	0.1 ohm	40K	25K	1/4	3/4	#20

axial lead encapsulated resistors



lead length: 2" ±1/8" #20 AWG, **non-inductive winding**

Type	MIL-R-93D Type	Dia. In. (±1/64)	Lgth In. (±1/32)	Maximum Watts	MIL Wattage	Maximum Volts	Max. Res. .001 Wire
7009	RB-56	1/4	11/32	0.25	0.125	200	127K
7010	RB-55	1/4	1/2	0.33	0.15	400	226K
7020	RB-54	1/4	3/4	0.50	0.25	400	511K
7030	RB-53	3/8	3/4	0.60	0.33	400	750K
7040	RB-52	3/8	1	1.00	0.50	800	1.5 Meg.
7044	—	1/2	1/2	0.50	—	400	1 Meg.
7045	—	1/2	5/8	0.60	—	400	1 Meg.
7045A	—	7/16	5/8	0.60	—	400	650K
7050	RB-57	1/2	1	1.25	0.75	800	2 Meg.
7050A	—	7/16	1	1.25	—	800	1.5 Meg.
7060	RB-58	1/2	1-1/2	1.50	1.0	900	3 Meg.
7070	RB-59	1/2	2	2.00	1.25	1,200	5 Meg.

Maximum wattage rating is from −55° C to +125° C.

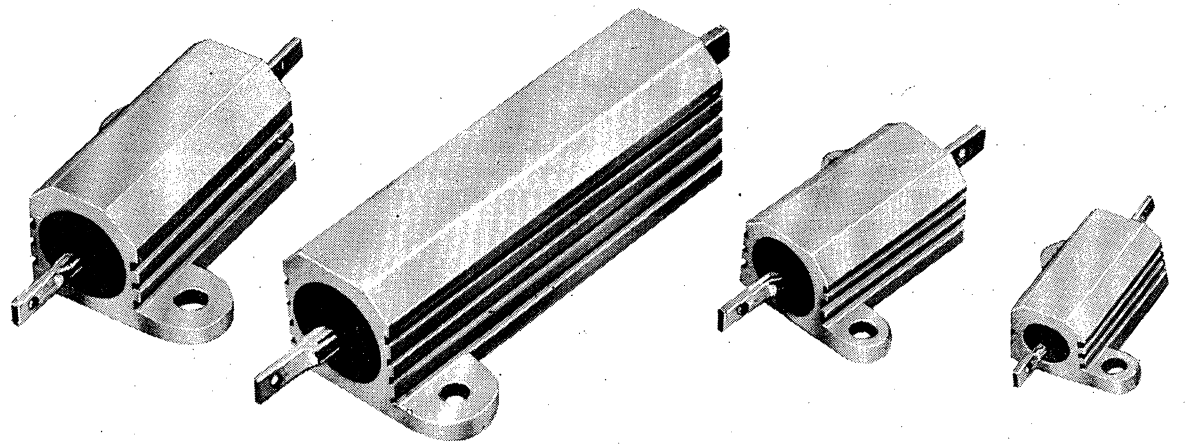
MILITARY SPECIFICATIONS

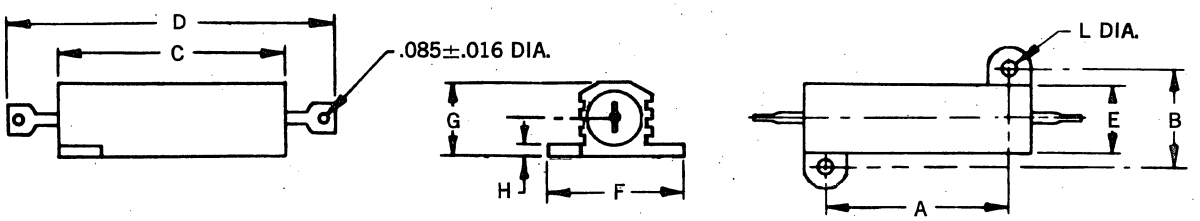
- These standard sizes meet the physical dimensions of MIL-R-93D.
- Test data and approval information available.
- All RCL types meet and exceed the electrical and environmental characteristics of this specification.

INDUSTRY'S BEST DELIVERY

RCL ELECTRONICS, INC.
General Sales Office:
700 South 21st Street, Irvington, N. J. (Area Code 201) 374-3311 • TWX 710-999-5511

aluminum housed precision power resistors





TYPE	A	B	C	D	E	F	G	H	L	MIL-Type
Tol.	±.005	±.005	±.032	±.062	±.015	±.015	±.015	±.010	±.005	—
AL-5	.445	.490	.600	1.125	.335	.645	.321	.065	.094	RE-60
AL-10	.562	.625	.750	1.375	.420	.795	.400	.074	.094	RE-65
AL-25	.750	.780	1.060	1.940	.530	1.075	.560	.087	.125	RE-70
AL-50	1.562	.845	1.970	2.780	.615	1.135	.615	.087	.125	RE-75

FEATURES

- Tolerance: Available from ±3% to ±.01%.
- Standard T.C.: ±10 PPM/°C. Lower T.C.'s are available.
- All popular types, 5 watts through 50 watts
- Molded and welded construction
- Screw mounts on chassis
- Exceptionally high stability at all conventional power ratings
- Utilizes heat-sink effect of chassis
- Clearly marked on top surface of housing for ease of identification after mounting
- Exceeds MIL-R-18546D
- Complete protection against environment

NON INDUCTIVE STYLES: (Series "AL" and "ALB")
The same physical and electrical specifications are available with non-inductive winding. They are identified by adding the letter N after the AL identification.

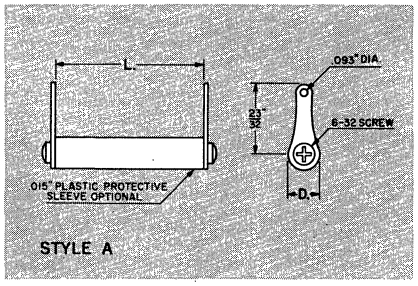
RCL TYPE	MIL-R-18546D TYPE	POWER RATING* (WATTS) RCL	POWER RATING* (WATTS) MIL	RESISTANCE RANGES (OHMS)	MAX. WORKING VOLTAGE	MAX. WT. GRAMS
AL-5	RE-60G	7.5	5	.01 to 24.5K	160	3
AL-10	RE-65G	12.5	10	.01 to 47.1K	265	6
AL-25	RE-70G	25	20	.01 to 95.2K	550	14
AL-50	RE-75G	50	30	.01 to 273K	1250	29

* Rating based on chassis mounting.

BERYLLIUM OXIDE CORES FOR GREATER HEAT DISSIPATION

RCL TYPE	MIL-R-18546D TYPE	POWER RATING* (WATTS) RCL	POWER RATING* (WATTS) MIL	RESISTANCE RANGES (OHMS)	MAX. WORKING VOLTAGE	MAX. WT. GRAMS
ALB-5	RE-60	15	5	.01 to 24.5K	220	3
ALB-10	RE-65	20	10	.01 to 47.1K	340	6
ALB-25	RE-70	35	20	.01 to 95.2K	650	14
ALB-50	RE-75	50	30	.01 to 273K	1400	29

* Rating based on chassis mounting.



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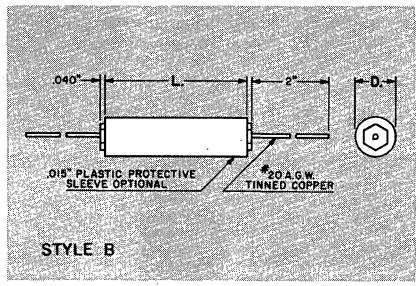

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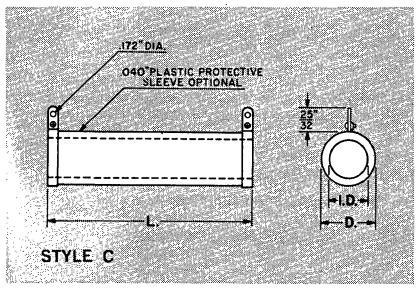

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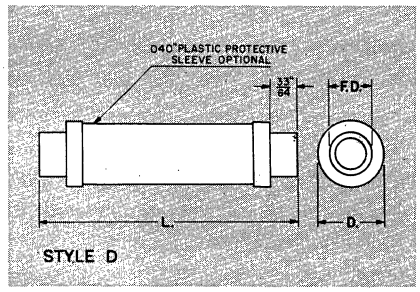

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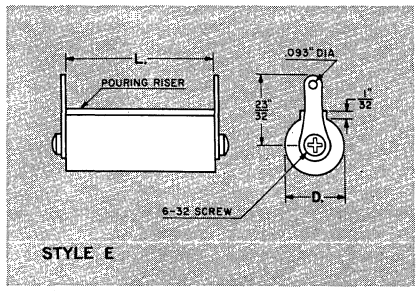

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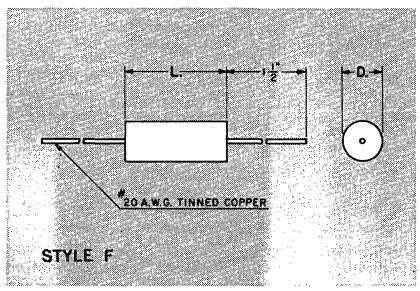

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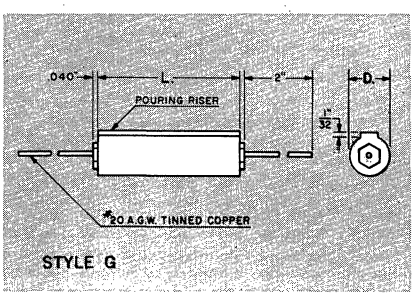

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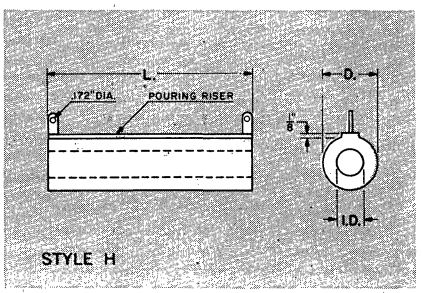


STYLE H

Resistance Products Co.

914 SOUTH 13TH STREET
HARRISBURG, PA 17104
PHONE 717-236-5081
TWX = 510 650-4920

CARBON & METAL OXIDE FILM RESISTORS

The following charts list the specifications for more than 150 standard and precision carbon film resistors. For special values or configurations, consult the factory.

HIGH VOLTAGE RESISTORS

TERMINAL	TYPE	WATTS MAX.	VOLTS MAX.	OHMS MIN.	OHMS MAX.	DIMENSIONS INCHES L	D	ID	FD	DWG. STYLE
Radial Lugs	BBF	1	3500	10 K	10 G	1	5/16 °			
	BBM	2	7500	10 K	25 G	1 3/4	5/16 °			
	BBR	3	15000	20 K	25 G	3	5/16 °			
	BBV	5	30000	40 K	25 G	5 1/2	5/16 °	NA	NA	A
	BFQ	4	15000	20 K	25 G	2 1/2	5/16 °			
	BFT	6	25000	40 K	25 G	4	5/16 °			
	BFW	10	40000	70 K	25 G	6 1/2	5/16 °			
Axial Wire Leads	BAEW	.5	2500	10 K	1 G	3/4	1/4 °			
	BAKW	1	5000	20 K	2 G	1 1/2	1/4 °			
	BBFW	1	3500	10 K	10 G	1	5/16 °	NA	NA	B
	BBMW	2	7500	10 K	25 G	1 3/4	5/16 °			
	BBRW	3	15000	20 K	25 G	3	5/16 °			
Radial Bands	DJU	10	25 KV	50 K	100 G	4 1/2	3/4 °°	1/2		
	DPW	20	35 KV	100 K	100 G	6 1/2	1 1/8 °°	3/4		
	DPX	30	65 KV	200 K	100 G	10 1/2	1 1/8 °°	3/4	NA	C
	DVY	60	90 KV	400 K	100 G	14 1/2	1 1/2 °°	1 1/8		
	DZW	35	40 KV	300 K	100 G	6 1/2	2 °°	1 5/16		
	DZZ	100	125 KV	700 K	100 G	18 1/2	2**	1 5/16		
Ferrule Ends	DPW-1	20	35 KV	100 K	100 G	7 11/16	1 1/8 **		1 3/16	
	DPX-1	30	65 KV	200 K	100 G	11 11/16	1 1/8 **		1 3/16	
	DVY-1	60	90 KV	400 K	100 G	15 11/16	1 1/2 **	NA	1 3/64	D
	DZW-1	35	40 KV	300 K	100 G	7 11/16	2 **		1 3/64	
	DZZ-1	100	125 KV	700 K	100 G	19 11/16	2**		1 3/64	
Radial Lugs	EBF	1	3500	10 K	1 G	1	7/16			
	EBM	2	7500	10 K	1 G	1 3/4	7/16			
	EBR	3	15000	20 K	1 G	3	7/16			
	EBV	4	30000	40 K	1 G	5 1/2	7/16	NA	NA	E
	EFQ	4	15000	20 K	1 G	2 1/2	3/4			
	EFT	5	25000	40 K	1 G	4	3/4			
	EFW	8	40000	70 K	1 G	6 1/2	3/4			
Axial Wire Leads	EAEW	.5	2500	10 K	1 G	1	5/16	NA	NA	F
	EAKW	1	5000	20 K	1 G	1 3/4	5/16			
Axial Wire Leads	EBFW	1	3500	10 K	1 G	1	7/16			
	EBMW	2	7500	10 K	1 G	1 3/4	7/16	NA	NA	G
	EBRW	3	15000	20 K	1 G	3	7/16			
Radial Bands	EJU	8	25 KV	50 K	1 G	4 1/2	1	1/2		
	EPW	16	35 KV	100 K	1 G	6 1/2	1 3/8	3/4		
	EPX	24	65 KV	200 K	1 G	10 1/2	1 3/8	3/4	NA	H
	EVY	48	90 KV	400 K	1 G	14 1/2	1 3/4	1 1/8		
	EZW	28	40 KV	300 K	1 G	6 1/2	2 5/16	1 5/16		
	EZZ	80	125 KV	700 K	1 G	18 1/2	2 5/16	1 5/16		
Ferrule Ends	EPW-1	16	35 KV	100 K	1 G	7 11/16	1 3/8		1 3/16	
	EPX-1	24	65 KV	200 K	1 G	11 11/16	1 3/8		1 3/16	
	EVY-1	48	90 KV	400 K	1 G	15 11/16	1 3/4	NA	1 3/64	I
	EZW-1	28	40 KV	300 K	1 G	7 11/16	2 5/16		1 3/64	
	EZZ-1	80	125 KV	700 K	1 G	19 11/16	2 5/16		1 3/64	

All dimensional tolerances ±1/64" or 1% whichever is greater.

° Unless otherwise specified all type B resistors are normally supplied sleeved with a .015 wall clear vinyl sleeving which increases the diameter shown by .03.
Order resistors without sleeving if units are to be operated near maximum limits, at elevated ambient, or in all coolant.

** Sleeving available on request. Increase dia. shown by .08.

Resistance Products Co.

914 SOUTH 13TH STREET • HARRISBURG, PENNSYLVANIA 17104
PHONE 717-236-5081 • TWX = 510 650-4920

MILITARY OR COMMERCIAL RESISTORS

TERMINAL	TYPE	WATTS MAX.	VOLTS MAX.	OHMS MIN.	OHMS MAX.	DIMENSIONS INCHES L	DIMENSIONS INCHES D	MIL SPEC	DWG. STYLE
Axial Wire Leads	HSD[1]	.5	2500	1 M	1 T	7/8	0.345	MIL-R-14293 Style RM30S	K
	HSK[1]	1	5000	1 M	5 T	1 5/8	0.345	MIL-R-14293 Style RM50U	
	FAC[2]	.25	250	20	10 M	9/16	0.10	MIL-R-10683	J

[1] Hermetic
[2] Non-Hermetic

PRECISION TOLERANCE RESISTORS

TERMINAL	TYPE	MAX. WATTS	VOLTS MAX.	RESISTANCE VALVE (MAX.) ±2%	RESISTANCE VALVE (MAX.) ±1%	DIMENSIONS INCHES L	DIMENSIONS INCHES D	DWG. STYLE
Radial Lugs	BP-2	2	10 KV	20 G	5 G	2	3/16	A
	BP-4	4	15 KV	50 G	10 G	3 1/2	5/16	
	BP-6	6	30 KV	50 G	10 G	6	3/16	
	BP-8	8	30 KV	50 G	10 G	5	5/16	
	BP-10	10	60 KV	50 G	10 G	11	3/16	
	BP-12	12	50 KV	50 G	10 G	8	5/16	
	BP-20	20	80 KV	50 G	10 G	13	3/16	
Axial Wire Leads	BP-1W	1	5 KV	2 G	1 G	1 1/2	1/4	B
	BP-2W	2	10 KV	20 G	5 G	2	3/16	
	BP-4W	4	15 KV	50 G	10 G	3 1/2	5/16	
	BP-6W	6	30 KV	50 G	10 G	6	3/16	
Radial Lugs	EBP-2	2	10 KV	2 G	500 M	2	7/16	E
	EBP-4	4	15 KV	2 G	500 M	3 1/2	7/16	
	EBP-6	6	30 KV	2 G	500 M	6	7/16	
	EBP-8	8	30 KV	2 G	500 M	5	3/4	
	EBP-9	9	60 KV	2 G	500 M	11	7/16	
	EBP-10	10	50 KV	2 G	500 M	8	3/4	
	EBP-16	16	80 KV	2 G	500 M	13	3/4	
Axial Wire Leads	EBP-1W	1	5 KV	1 G	100 M	1 1/2	5/16	G
	EBP-2W	2	10 KV	2 G	500 M	2	7/16	
	EBP-4W	4	15 KV	2 G	500 M	3 1/2	7/16	
	EBP-6W	6	30 KV	2 G	500 M	6	7/16	
Radial Lugs	HP-2	2	10 KV	100 G	25 G	2	5/16	A
	HP-4	4	15 KV	100 G	25 G	3 1/2	5/16	
	HP-6	6	30 KV	100 G	25 G	6	5/16	
	HP-8	8	30 KV	100 G	25 G	5	5/16	
	HP-10	10	60 KV	100 G	25 G	11	5/16	
	HP-12	12	50 KV	100 G	25 G	8	5/16	
	HP-20	20	80 KV	100 G	25 G	13	5/16	
Axial Wire Leads	HP-1W	1	5 KV	100 G	25 G	1 1/2	1/4	B
	HP-2W	2	10 KV	100 G	25 G	2	5/16	
	HP-4W	4	15 KV	100 G	25 G	3 1/2	5/16	
	HP-6W	6	30 KV	100 G	25 G	6	5/16	

HIGH FREQUENCY RESISTORS

TERMINAL	TYPE	WATTS MAX.	VOLTS MAX.	OHMS MIN.	OHMS MAX.	DIMENSIONS INCHES L	DIMENSIONS INCHES D	DIMENSIONS INCHES ID	DIMENSIONS INCHES FD	DWG. STYLE
Radial Lugs	FBF	1	500	20	25 M	1	3/16			A
	FBM	2	1000	25	50 M	1 3/4	5/16			
	FBR	3	2000	35	100 M	3	5/16			
	FBV	5	3700	60	100 M	5 1/2	5/16	NA	NA	
	FFQ	4	1500	20	50 M	2 1/2	9/16			
	FFT	6	2800	25	75 M	4	5/16			
	FFW	10	4500	40	100 M	6 1/2	9/16			
Axial Wire Leads	FAEW	.5	400	20	20 M	3/4	1/4			B
	FAKW	1	800	25	40 M	1 1/2	1/4			
	FBFW	1	500	20	25 M	1	5/16	NA	NA	
	FBMW	2	1000	25	50 M	1 3/4	5/16			
	FBRW	3	2000	35	100 M	3	5/16			
Radial Bands	GJU	10	3000	20	50 M	4 1/2	3/4	1/2	NA	C
	GPW	20	4000	20	50 M	6 1/2	1 1/8	3/4		
	GZW	35	4500	20	35 M	6 1/2	2	1 5/16		
	GPX	30	7000	30	100 M	10 1/2	1 1/8	3/4		
	GVY	60	10000	35	100 M	14 1/2	1 1/2	1 1/8		
	GZZ	100	12500	30	100 M	18 1/2	2	1 5/16		
Ferrule Ends	GPW-1	20	4000	20	50 M	7 11/16	1 1/8		1 3/16	D
	GZW-1	35	4500	20	35 M	7 11/16	2		1 5/64	
	GPX-1	30	7000	30	100 M	11 11/16	1 1/8	NA	1 3/16	
	GVY-1	60	10000	35	100 M	15 11/16	1 1/2		1 5/64	
	GZZ-1	100	12500	30	100 M	19 11/16	2		1 5/64	

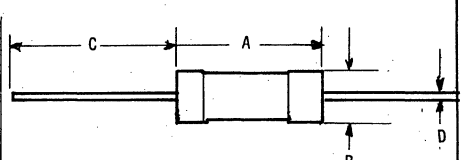
HIGH MEGOHM RESISTORS

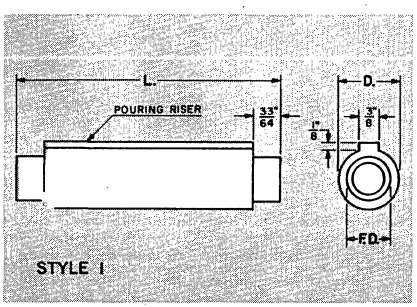
TERMINAL	TYPE	WATTS MAX.	VOLTS MAX.	OHMS MIN.	OHMS MAX.	DIMENSIONS INCHES L	DIMENSIONS INCHES D	DIMENSIONS INCHES ID	DIMENSIONS INCHES FD	DWG. STYLE
Radial Lugs	HBF	1	3500	1 M	25 T	1	5/16 ***			A
	HBM	2	7500	1 M	50 T	1 3/4	5/16 ***			
	HBR	3	15000	1 M	100 T	3	5/16 ***			
	HBV	5	30000	1 M	100 T	5 1/2	5/16 ***	NA	NA	
	HFQ	4	15000	1 M	100 T	2 1/2	5/16 ***			
	HFT	6	25000	1 M	100 T	4	5/16 ***			
	HFW	10	40000	1 M	100 T	6 1/2	5/16 ***			
	HACW	.25	1000	10 M	10 G	9/16	0.10	NA	NA	J
	HADW	.5	5000	10 M	10 G	1	0.10			
Axial Wire Leads	HAEW	.5	2500	1 M	1 T	3/4	1/4	NA	NA	B
	HAKW	1	5000	1 M	5 T	1 1/2	1/4			
	HBFW	1	3500	1 M	25 T	1	5/16			
	HBMW	2	7500	1 M	50 T	1 3/4	5/16			
	HBRW	3	15000	1 M	100 T	3	5/16			

*** Values up to 10 Gigaohms are provided with .015 plastic sleeves, increasing overall diameter by .03 inch. Resistors of greater than 10 G, and Types HACW, HADW, are provided with special coating to minimize effects of handling and humidity, no change in diameter.

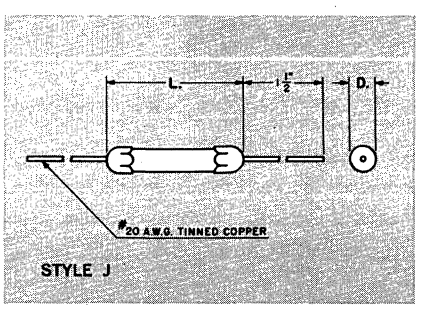
METAL OXIDE FILM RESISTORS

TYPE	MAXIMUM WATTAGE	MAXIMUM VOLTAGE	RESISTANCE RANGE (Ω)	DIMENSIONS A±.05"	DIMENSIONS B±.02"	DIMENSIONS C±.12"	DIMENSIONS D±.005"
ROX-1	2.5	10 KV	100 to 4.5 G	1.05"	.27"	1.5"	.040"
ROX-1 1/2	3.8	15 KV	150 to 7.5 G	1.55			
ROX-2	5.0	20 KV	200 to 10 G	2.05	B, C, and D dimensions are identical within the tolerances for all units, ROX-1 through ROX-4		
ROX-2 1/2	6.3	25 KV	250 to 12.5 G	2.55			
ROX-3	7.5	30 KV	300 to 15 G	3.05			
ROX-3 1/2	8.8	35 KV	350 to 17.5 G	3.55			
ROX-4	10.0	40 KV	400 to 20 G	4.05			





STYLE I



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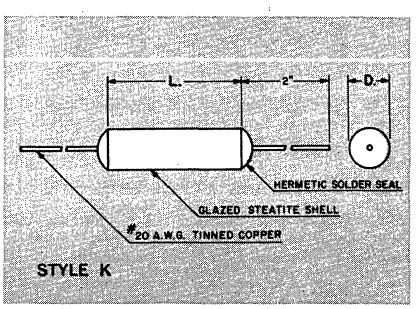


STYLE K

Over 25 Years' *Versatile* OHMIC CAPABILITY Meet Your Wirewound Resistor Requirements

AXIAL LEAD

No.	Watts	Resistance Min. Max.	Dimensions O.D. x Lgth.
3 AX	3	0.1- 10,000	¼ max. x 9/16
5 AX	5	0.1- 30,000	11/32 max. x 1 1/16
10 AX	10	0.1- 50,000	13/32 max. x 1 5/16

MIL-R-26 AXIAL LEAD

RW67V	6.5	0.10- 3,600	11/32 x 1 1/16
RW68V	11	0.10- 8,200	13/32 x 1 5/16
RW69V	3	0.10- 910	¼ x 9/16

Silicone-base coated, moisture-resistant.
TC = 0 ± 20 ppm/°C, 10 ohms and above.
Commercial equivalents available.

FIXED LUG

No.	Wattage	Resistance Min.-Max.	Max. Dimensions O.D. x Lgth.
1 M	5	0.1- 11,000	5/16 x 1
1¾ M	10	0.1- 50,000	5/16 x 1¾
2 E	20	0.25-100,000	7/16 x 2
2 B	25	0.25-100,000	9/16 x 2
4 B	50	0.5-175,000	9/16 x 4
6½ C	100	1.0-300,000	¾ x 6½
8½ R	160	1.0-300,000	1⅛ x 8½
10½ R	200	1.0-400,000	1⅛ x 10½

MIL-R-26 FIXED LUG

RW29V	11	0.10- 5,600	7/16 x 1¾
RW30V	11	0.10- 2,700	9/16 x 1
RW31V	14	0.10- 6,800	9/16 x 1½
RW32V	17	0.10-10,000	9/16 x 2
RW33V	26	0.10-18,000	9/16 x 3
RW35V	55	0.10-43,000	29/32 x 4

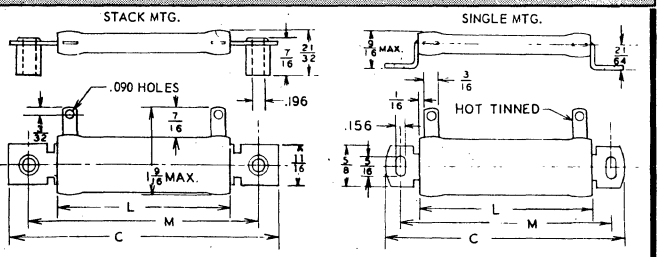
ADJUSTABLE

No.	Wattage	Resistance Min.-Max.	Max. Dimensions O.D. x Lgth.
1¾ MA	10	1.0- 10,000	5/16 x 1¾
2 BA	25	1.0- 25,000	9/16 x 2
4 BA	50	1.0-100,000	9/16 x 4
6 BA	75	1.0-100,000	9/16 x 6
6½ CA	100	1.0-100,000	¾ x 6½
8½ RA	160	1.0-100,000	1⅛ x 8½
10½ RA	200	1.0-100,000	1⅛ x 10½

MIL-R-19365 ADJUSTABLE

RX29V	11	1- 470	7/16 x 1¾
RX32V	17	1- 910	9/16 x 2
RX33V	26	1-1,500	9/16 x 3
RX35V	55	1-3,600	29/32 x 4

FLAT OVAL



Watts* Free Air	Core—L	Min. Ohms	Max. Ohms	Mounting	C	M
30	1¼	0.1	10K	Single Stack	2⅛ 2½	1¾ 2
40	2	0.2	30K	Single Stack	2⅞ 3¼	2½ 2¾
55	3½	0.3	60K	Single Stack	4⅜ 4¾	4 4¼
65	4¾	0.4	85K	Single Stack	5⅝ 6	5¼ 5½
75	6	0.5	100K	Single Stack	6⅞ 7¼	6½ 6¾

MINIATURE, FLAT OVAL

Construction similar to above large size resistors.

WATTS* Free Air	Min. Ohms	Max. Ohms
10	1.0	15 K
15	1.0	25 K
20	1.0	50 K

Write for Bulletin RMF 5.0/1068

*Ratings of large and miniature, flat oval resistors based on mounting on steel panel 10" x 10" x .040". When mounted on non-metallic surface, reduce wattage approximately 15%.

RIBBON-WOUND RESISTORS

Watts	Core Size D	Core Size L	Ohms Min. Res.	Ohms Max. Res.	Watts	Core Size D	Core Size L	Ohms Min. Res.	Ohms Max. Res.
400	1⅛	11¼	0.24	18.00	135	¾	5	0.06	4.25
375	1⅛	10½	0.22	16.50	105	¾	4	0.04	3.00
300	1⅛	8½	0.17	13.00	100	¾	3½	0.03	2.40
240	1⅛	6½	0.11	8.20	135	9/16	6	0.06	5.50
185	1⅛	5	0.09	6.40	105	9/16	5	0.05	3.65
180	¾	6½	0.08	6.00	90	9/16	4	0.04	2.75

Available with adjustable tap bands or with tapped windings.

NON-INDUCTIVE RESISTORS: for high frequency power circuits. Available in all fixed-lug types, 10 watts and larger. Standard tolerances: ±10%.

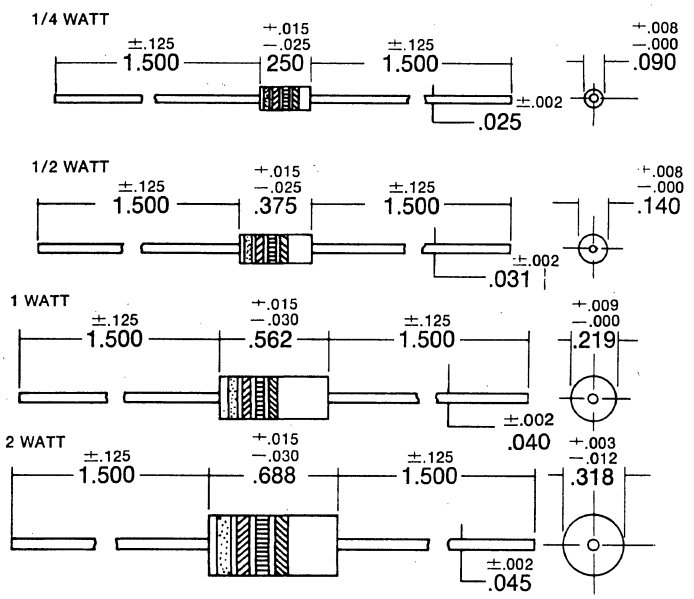
RESISTANCE TOLERANCES: Standard: ±5%, 1.0 ohm and over. Special: down to ±1%.

Write For Complete Catalog

resistors, inc.
CUSTOM DESIGNING, ENGINEERING, MANUFACTURING
5226 West 26th Street, Chicago, Illinois 60650
Area Code: 312 OLympic 2-7555

STACKPOLE

FIXED COMPOSITION RESISTORS



Stackpole Resistors offer superior performance in terms of load life, moisture resistance, shelf life, and other important characteristics. Available in ¼, ½, 1 and 2 watt insulated types in resistance values with 5%, 10% and 20% tolerances as shown below.

EASIEST SOLDERING

Soldering is assured thanks to an exclusive extra solder coating applied after the usual tin dipping. Leads of Stackpole Resistors solder readily by any method — dip or iron — stay tarnish-free even after months in storage. And, their baked-on color codes resist solvent scrubbing operations . . . maintain uniform, attractive appearance.

MILITARY APPROVED

Resistors approved to MIL-R-39008 have failure rates expressed as percentages per 1000 hours based on load life data generated at 50 percent full load operation and an ambient temperature of 70°C. The failure rates are established at a 60 percent confidence level on the basis of the life test. All Stackpole Resistors are qualified to the R level of MIL-R-39008 which corresponds to a failure rate of 0.01 percent per 1000 hours.

STANDARD VALUES FOR MODERN CIRCUITRY

±20%	±10%	±5%
10	10	10
		11
	12	12
		13
15	15	15
		16
	18	18
		20
22	22	22
		24
	27	27
		30
33	33	33
		36
	39	39
		43
47	47	47
		51
	56	56
		62
68	68	68
		75
	82	82
		91

Table gives basic numbers for standard values. All values are decade multiples of these numbers. Example: 82 x 1000 = 82000 Ohms.

STACKPOLE RESISTORS

MILITARY

SPECIFICATION	IDENTIFICATION	MAX. POWER RATING	RESISTANCE RANGE*	MAX. OPERATING VOLTAGE
MIL-R-39008	RCR 07	¼ w	10 ohms to 1 megohm	250 v
MIL-R-39008	RCR 20	½ w	10 ohms to 22 megohms	350 v
MIL-R-39008	RCR 32	1 w	10 ohms to 22 megohms	500 v
MIL-R-39008	RC 42	2 w	10 ohms to 22 megohms	500 v

COMMERCIAL

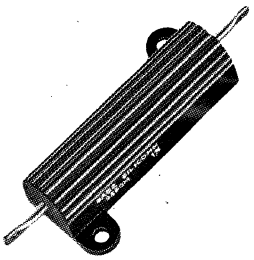
RS-172A	RC 20	½ w	2.7 ohms to 22 megohms	350 v

* Resistance values above or below those indicated are available upon request.

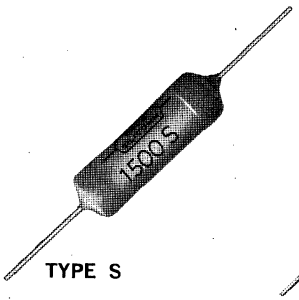
STACKPOLE
CARBON COMPANY
ELECTRONIC COMPONENTS DIV., KANE, PA. 16735
PHONE (814) 837-7000 • TWX (510) 695-8404

RESISTORS AVAILABLE THROUGH LEADING INDUSTRIAL ELECTRONIC PARTS DISTRIBUTORS

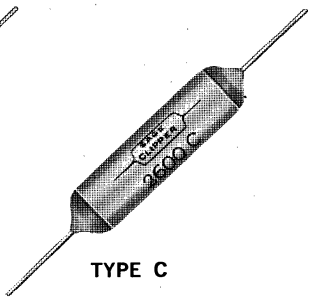
SAGE ELECTRONICS CORPORATION



TYPE M



TYPE S



TYPE C

TYPE C CLIPPER METAL SHEATHED RESISTORS

Similar in all respects to Type S, fully insulated plus addition of metal sleeve for heat sink mounting in spring clip holders.

STYLE	Rating Watts
	Full heat sink rating
2200C	6
2250C	6
2400C	7
2550C	11
2600C	14
2650C	16
2750C	20

TYPE S, NS SILICONE COATED POWER RESISTORS

Meet or exceed MIL-R-26D requirements. N designates non-inductive.

STYLE	Rating Watts	Nominal Size		Lead Dia.	Standard Range, Ω	
		Length	Dia.		Regular Winding	Non-Inductive*
100S	1	.400	.094	.020	8400	3000
200S	2	.400	.125	.020	11000	3900
300S	3	.400	.187	.020	15000	5300
250S	.5	.250	.078	.020	3800	1350
500S	.8	.312	.078	.020	5000	1750
750S	1	.531	.094	.020	12000	4200
1000S	1	.406	.094	.020	8400	3000
1100S	2	.500	.125	.032	15000	5500
1150S	2	.687	.125	.032	25500	9000
1200S	3	.500	.187	.032	20000	7000
1230S	3	.500	.219	.040	20000	7000
1240S	3	.562	.187	.032	24000	8400
1250S	3	.812	.187	.032	40000	14000
1300S	3	.625	.250	.040	30000	10500
1400S	4	.750	.250	.040	42000	15000
1500S	5	.875	.312	.040	71000	25000
1550S	5	1.000	.312	.040	88000	31000
1600S	7	1.219	.312	.040	114000	40000
1650S	8	1.375	.375	.040	170000	60000
1700S	10	1.781	.375	.040	230000	80000
1750S	10	1.937	.375	.040	257000	90000
1900S	10	1.375	.431	.040	210000	73000
1950S	11	1.937	.431	.040	314000	110000

*S styles only

SAGE SILICOHM® fixed wirewound units are not ordinary power resistors. They provide remarkable miniaturization vs required wattage performance. Sage has pioneered the area of power handling capacity combined with precision and stability features ordinarily associated with MIL-R-93 and like resistors.

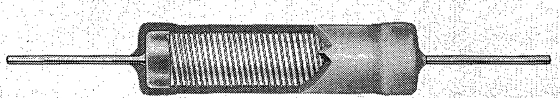
TYPE SB & NSB HIGH WATTAGE COMMERCIAL BERYLLIA CORE RESISTORS

STANDARD SOLDERABLE LEADS	STANDARD WELDABLE LEADS	RATED WATTS		Approx. Grams WEIGHT
		G	V	
250SB	257SB	1	1.5	.18
500SB	507SB	1.5	2	.28
1000SB	1007SB	2.25	2.75	.32
1200SB	1207SB	3.5	4.5	1.0
1230SB		5	6.5	1.1
1240SB	1247SB	4	5	1.1
1250SB	1257SB	4.5	6	1.2
1300SB	1307SB	6	8	1.8
1500SB	1507SB	7	9	3.6
1600SB	1607SB	9	12	4.2
1700SB	1707SB	14	18	7.3

One watt 250SB actual size.

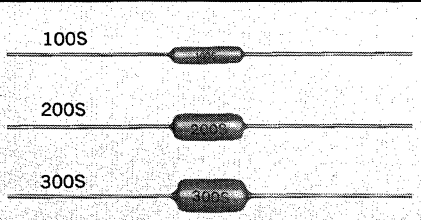
TYPE S CONSTRUCTION

Showing ceramic core, spaced single layer winding welded to monel cap, and multiple layer Impervohm® coating.



MINIATURE TYPE S "CORDWOOD" SERIES

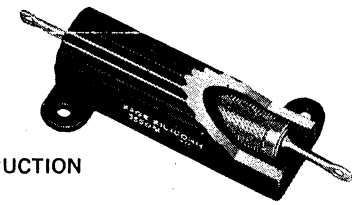
1, 2, 3 watt .4 inch body length



SAGE *For complete specifications request Catalog R-66*

INDUSTRY'S FINEST RESISTORS...Commercial, Military, High Reliability

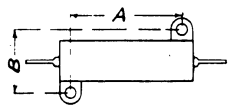
TYPE M METAL CLAD CHASSIS MOUNT RESISTORS



TYPE M CONSTRUCTION

Aluminum housed resistors for heat sink mounting. Meet or exceed requirements of MIL-R-18546D. Dielectric strength to 2500 volts rms.

All dimensions are inches nominal. Complete specifications available on request.



STYLE	Rating Watts	A	B	Max. Resistance Ω	
				Regular Winding	Non-Induct.
3105M	8	.444	.490	24,000	8,400
3010M	14	.562	.625	30,000	10,500
3225M	25	.719	.781	71,000	25,000
3550M	50	1.562	.844	230,000	80,000

TYPE MB HIGH WATTAGE
BERYLLIUM OXIDE CORES

STYLE	RATED WATTS 25°C ambient	
	chassis mounted	free air
3105 MB / NMB	15	6
3010 MB / NMB	20	8
3225 MB / NMB	35	14
3550 MB / NMB	50	20

MB suffix designates regular single layer wind, NMB non-inductive wind.

MIL-R-26D TYPE DESIGNATIONS

EXAMPLE: RW69 V 471

- RW69 — Body Style
- V — Characteristic, V only (350°C max.)
- 471 — Nominal resistance, Ω. Two significant digits plus third indicating number of zeros. Below 10ΩR = decimal and last digit is significant.

TOLERANCE: ±5% for values 1Ω and up; ±10% below 1Ω.
TC: ±260 ppm/°C 20Ω and up; 400 ppm/°C below 20Ω.

MIL STYLE	SAGE STYLE	MIL WATTS	DEFINED OHMIC RANGE (Single layer wound .00175 min. wire dia.)
RW55V	1900S	7	.1—5100
RW56V	1950S	14	.1—9100
RW67V	1550S	6.5	.1—3600
RW68V	1700S	11	.1—8200
RW69V	1200S	3	.1—910

EXAMPLE: RW70 U 49R9 F

- RW70 — Body Style
- U — Characteristic, U only (275°C max.)
- 49R9 — Nominal resistance, Ω. Three significant digits plus fourth indicating number of zeros. Below 10ΩR decimal and following digits are significant.
- F — Tolerance ± % B = .1% D = .5% F = 1.0%

TC: ±30 ppm/°C 10Ω and above
±50 ppm/°C 1Ω to 10Ω
±90 ppm/°C below 1Ω

MIL STYLE	SAGE STYLE	MIL WATTS	VOLTAGE Max.	DEFINED OHMIC RANGE		
				Min.	Max. for .001" wire (Navy)	Max. for .0008" wire (all other)
RW70U	1000S	1	——	.1	1210	3160
RW74U	1500S	5	300	.1	12100	38300
RW78U	1700S	10	720	.1	40200	90900
RW79U	1240S	3	135	.1	3570	10500
RW80U	1000SB	2	——	.1	1240	3160
RW81U	250SB	1	25	.1	649	——

MIL-R-18546D TYPE DESIGNATIONS

Example: RE65 G 1001

- RE65 — Style
- G — Characteristic, 275°C Max. G for regular inductive winding N for non-inductive winding
- 1001 — Nominal resistance, Ω. ±1% only. Three significant digits plus fourth indicating number of zeros. Below 100Ω R = decimal and following digits are significant.

T.C. ±30 ppm/°C 2000Ω and above
±50 ppm/°C under 2000Ω

MIL STYLE	SAGE STYLE	MIL WATTS	DEFINED OHMIC RANGE	
			Min.	Max. (.001 wire)
RE60G	3105M	5	.1	3320
RE60N	3105NM	5	1.0	1650
RE65G	3010M	10	.1	5620
RE65N	3010NM	10	1.0	2800
RE70G	3225M	20	.1	12100
RE70N	3225NM	20	1.0	6040
RE75G	3550M	30	.1	39200
RE75N	3550NM	30	1.0	19600

CONSIDER THESE DETAILS:

- Wattage Rating, ½ to 50 watts
- Tolerance and stability as close as .05%
- T.C. 20 ppm/°C or 10 ppm/°C
- 1000 volt rms body insulation
- Low values not available in other resistors (specials to .01Ω)
- Characteristic U or V wattage rating: to 275°C or 350°C
- Power load life stability <.5%/1000 hours
- Weldable leads when specified
- Non-inductive winding when specified

SAGE ELECTRONICS CORPORATION

Box 3926 • Rochester, N.Y. 14610 / Phone: Rochester—Area 716-586-8010

shallcross
A CUTLER-HAMMER COMPANY
SELMA, NORTH CAROLINA 27576 / TELEPHONE: (910) 965-2341 / TWX: 510-920-0740

PRECISION RESISTORS

HR SERIES (RBR STYLES WHICH MEET OR EXCEED MIL-R-39005)

HR Style	HR Style MIL-R-39005	Dimensions A ±.032	B ±.015	C Min.	D Awg.	Watts MIL 125°C	Watts Commercial 85°C[1]	Maximum Voltage DC	Approx. Weight Grams	Maximum Resistance
1[2]		.250	.250	1.0	22	.100	.200	150	.3	150 K
3[2]		.359	.265	1.0	22	.125	.250	150	1.0	250 K
4[2]		.375	.375	1.0	20	.250	.500	300	2.5	500 K
• 5[2]		.500	.250	1.0	22	.250	.500	300	1.0	500 K
6[2]		.375	.250	1.0	22	.125	.250	300	1.0	300 K
7[2]		.500	.375	1.0	20	.330	.660	300	3.0	600 K
• 8[2]	RBR71[4,7]	.312	.250	1.0	22	.125	.250	300	.3	150 K
9[2]		.750	.375	1.0	20	.500	1.0	600	4.5	1.0 Meg.
•10	RBR56[3,7]	.343	.250	1.5	20	.125	.250	200	1.0	350 K
11	RBR75	.295	.250	1.5	22	.125	.250	150	.3	250 K
•12	RBR55[3,7]	.500	.250	1.5	20	.150	.300	300	1.0	525 K
13		.625	.250	1.5	20	.200	.400	500	1.5	800 K
•14	RBR54[3,7]	.750	.250	1.5	20	.250	.500	300	2.0	850 K
16		1.0	.250	1.5	20	.500	1.0	750	3.0	1.25 Meg.
19	RBR76	.812	.312	1.5	20	.500	1.0	300	3.5	5.0 Meg.
•20		.250	.187	1.5	22	.100	.200	150	.3	125 K
•21		.375	.187	1.5	22	.125	.250	300	.3	200 K
•22	RBR74	.500	.187	1.5	22	.150	.300	300	.3	300 K
23		.625	.187	1.5	22	.175	.350	600	1.0	400 K
26		1.0	.187	1.5	22	.250	.500	1000	1.5	500 K
30		.343	.375	1.5	20	.125	.250	300	2.0	1.0 Meg.
•32		.500	.375	1.5	20	.250	.500	300	3.5	1.5 Meg.
•34	RBR53[3,7]	.750	.375	1.5	20	.330	.660	500	4.5	2.0 Meg.
•36	RBR52[3,7]	1.0	.375	1.5	20	.500	1.0	750	6.0	2.5 Meg.
38		1.50	.375	1.5	20	.750	1.5	1000	7.5	3.5 Meg.
39		2.00	.375	1.5	20	1.250	2.5	1200	10.0	4.0 Meg.
40		.500	.160	1.5	22	.100	.200	300	.3	500 K
•41		.250	.125	1.5	22	.050	.100	100	.2	125 K
•42		.375	.125	1.5	22	.065	.125	200	.2	200 K
43		.500	.125	1.5	22	.075	.150	200	.3	300 K
47		.187	.100	1.5	24	.025	.050	75	.1	50 K
•48		.312	.100	1.5	24	.030	.060	100	.1	100 K
49		.437	.100	1.5	24	.040	.075	100	.2	150 K
52		.500	.500	1.5	20	.330	.660	300	5.5	2.0 Meg.
54		.750	.500	1.5	20	.500	1.0	500	7.0	3.0 Meg.
•56	RBR57	1.0	.500	1.5	20	.750	1.5	750	8.5	4.0 Meg.
58		1.5	.500	1.5	20	1.0	2.0	1000	11.5	5.0 Meg.
59		2.0	.500	1.5	20	1.250	2.5	1200	12.5	10.0 Meg.
•68		.250	.085	1.5	24	.020	.040	100	.1	50 K
69		.375	.085	1.5	24	.025	.050	100	.1	100 K

• **Standard Style**

[1] Commercial ratings may be applied at 125°C provided 175°C max. operating temperature is permissible.

[2] Printed Circuit Style
Standard grid spacing .200".

[3] Available in failure rate levels M, P and R both tightened and standard ΔR's.

[4] Available in failure rate levels M and P, both tightened and standard ΔR's.

[7] MIL-R-39005 approved.

VA & SP SERIES (RB STYLES WHICH MEET OR EXCEED MIL-R-93)

VA Style[2,3]	VA Style MIL-R-93	Dimensions A ±.032	B ±.015	C Min.	D Awg.	Watts MIL 125°C	Watts Commercial 85°C[1]	Maximum Voltage DC	Approx. Weight Grams	Maximum Resistance
•10[4]	RB56	.343	.250	1.5	20	.125	.250	200	1.0	350 K
•11		.295	.250	1.5	22	.125	.250	150	.3	250 K
•12[4]	RB55	.500	.250	1.5	20	.150	.300	300	1.0	525 K
13		.625	.250	1.5	20	.200	.400	500	1.5	800 K
•14[4]	RB54	.750	.250	1.5	20	.250	.500	300	2.0	850 K
16		1.0	.250	1.5	20	.500	1.0	750	3.0	1.25 Meg.
19		.812	.312	1.5	20	.500	1.0	300	3.5	5.0 Meg.
30		.343	.375	1.5	20	.125	.250	300	2.0	1.0 Meg.
•32		.500	.375	1.5	20	.250	.500	300	3.5	1.5 Meg.
•34[4]	RB53	.750	.375	1.5	20	.330	.660	500	4.5	2.0 Meg.
•36[4]	RB52	1.0	.375	1.5	20	.500	1.0	750	6.0	2.5 Meg.
38		1.5	.375	1.5	20	.750	1.500	1000	7.5	3.5 Meg.
39		2.0	.375	1.5	20	1.250	2.500	1200	10.0	4.0 Meg.
52		.500	.500	1.5	20	.330	.660	300	5.0	2.0 Meg.
•54		.750	.500	1.5	20	.500	1.0	500	7.0	3.0 Meg.
•56[4]	RB57	1.0	.500	1.5	20	.750	1.5	750	8.5	4.0 Meg.
•58[4]	RB58	1.5	.500	1.5	20	1.0	2.0	1000	11.5	5.0 Meg.
•59[4]	RB59	2.0	.500	1.5	20	1.250	2.5	1200	12.5	10.0 Meg.
SP Style							**Subminiatures**			
•20		.250	.187	1.5	22	.100	.200	150	.3	125 K
•21		.375	.187	1.5	22	.125	.250	300	.3	200 K
•22		.500	.187	1.5	22	.150	.300	300	.3	300 K
23		.625	.187	1.5	22	.175	.350	600	1.0	400 K
26		1.0	.187	1.5	22	.250	.500	1000	1.5	500 K
40		.500	.160	1.5	22	.100	.200	300	.3	500 K
•41		.250	.125	1.5	22	.050	.100	100	.2	125 K
•42		.375	.125	1.5	22	.065	.125	200	.2	200 K
•43		.500	.125	1.5	22	.075	.150	200	.3	300 K
47		.187	.100	1.5	24	.025	.050	75	.1	50 K
•48		.312	.100	1.5	24	.030	.060	100	.1	100 K
49		.437	.100	1.5	24	.040	.075	100	.2	150 K
•68		.250	.085	1.5	24	.020	.040	100	.1	50 K
69		.375	.085	1.5	24	.025	.050	100	.1	100 K

• **Standard Style**

[1] Commercial ratings may be applied at 125°C provided 175°C max. operating temperature is permissible.

[4] MIL-R-93 approved.

Request Catalogue LA196-711 for part # construction - Min. TCR & Tol. vs. value.

shallcross
A CUTLER-HAMMER COMPANY
SELMA, NORTH CAROLINA 27576 / TELEPHONE: (910) 965-2341 / TWX: 510-920-0740

PR SERIES (RWR STYLES WHICH MEET OR EXCEED MIL-R-39007)

Shallcross Style	MIL-R-39007 Style	Power Rating (Watts) 275°C	Resistance Value: Minimum Tolerance 0.5%	Resistance Value: Value Tolerance 1.0%	Resistance Value: Maximum All Tolerance	Core Material	Maximum Weight (Grams)	Maximum Working Voltage	Dimensions: A	Dimensions: B	Dimensions: C ±⅛"	Dimensions: D
PR13		6	1.0	0.1	10 K	Beryllia	2.25	185	.625 ±.062	.250 ±.032	1.500	.040
PR17		5	1.0	0.1	7 K	Beryllia	1.5	142	.500 ±.062	.218 ±.032	1.500	.040
PR33		15	1.0	0.1	80 K	Beryllia	8.5	760	1.780 ±.062	.375 ±.032	1.500	.040
PR433	RWR78[1]	10	1.0	0.1	80 K	Alumina	8.5	626	1.780 ±.062	.375 ±.032	1.500	.040
PR46	RWR84[1]	7	1.0	0.1	25 K	Beryllia	4.0	295	.875 ±.062	.312 ±.032	1.500	.040
PR446	RWR74[1]	5	1.0	0.1	25 K	Alumina	4.0	246	.875 ±.062	.312 ±.032	1.500	.040
PR49	RWR80[1&2]	2.25	10	1.0	2.67 K	Beryllia	.35	52	.406 ±.032	.094 ±.032	1.500	.020
PR449		1	10	1.0	2.67 K	Alumina	.35	52	.406 ±.032	.094 ±.032	1.500	.020
PR60		10	1.0	0.1	45 K	Beryllia	4.7	448	1.218 ±.062	.312 ±.032	1.500	.040
PR61	RWR89[1]	4	1.0	0.1	4.12 K	Beryllia	1.0	112	.560 ±.062	.187 ±.032	1.500	.032
PR461		3	1.0	0.1	4.12 K	Alumina	1.0	112	.560 ±.062	.181 ±.032	1.500	.032
PR62		4.5	1.0	0.1	14 K	Beryllia	1.25	150	.812 ±.062	.187 ±.032	1.500	.032
PR462	RWR71[1]	3.25	1.0	0.1	16.2 K	Alumina	1.25	110	.812 ±.062	.187 ±.032	1.500	.032
PR66	RWR82[1]	1.5	10	1.0	1.6 K	Beryllia	.30	35	.312 ±.032	.085 ±.015	1.500	.020
PR68	RWR81[1&2]	1	10	1.0	1 K	Beryllia	.25	25	.250 ±.032	.085 ±.015	1.500	.020

[1] MIL-R-39007 approved. To Life Failure Rate M, P, and R.
[2] **"Stockistors" — Shallcross maintains in stock every mil bell value for style RWR80S & RWR81S Tol. F, Life Failure Rate R - 1 wk. del. max.**

LA SERIES (RW STYLES WHICH MEET OR EXCEED MIL-R-26)

Shallcross Style	MIL-R-26 Style	Power Rating (Watts) 275°C	Power Rating (Watts) 350°C	Resistance Value: Minimum Tolerance 0.5%	Resistance Value: Value Tolerance 1.0%	Resistance Value: Maximum All Tolerance	Core Material	Maximum Weight (Grams)	Maximum Working Voltage	Dimensions: A	Dimensions: B	Dimensions: C ±⅛"	Dimensions: D
LA13		6	8	1.0	0.1	16K	Baryllia	2.25	185	.625 ±.062	.250 ±.032	1.5	.040
LA17		5	7	1.0	0.1	11K	Beryllia	1.5	142	.500 ±.062	.218 ±.032	1.5	.040
LA33		15	18	1.0	0.1	130K	Beryllia	8.5	720	1.780 ±.062	.375 ±.032	1.5	.040
LA433	RW78[2] RW68[2]	10	13	1.0	0.1	130K	[1]	8.5	720	1.780 ±.062	.375 ±.032	1.5	.040
LA46		7	10	1.0	0.1	40 K	Beryllia	4.0	300	.875 ±.062	.312 ±.032	1.5	.040
LA446	RW74[2]	5	6.5	1.0	0.1	40 K	[1]	4.0	300	.875 ±.062	.312 ±.032	1.5	.040
LA49	RW80[2]	2.25	2.75	10	1.0	4.1 K	Beryllia	.35	52	.406 ±.032	.094 ±.032	1.5	.020
LA449	RW70[2]	1	1.25	10	1.0	4.1 K	[1]	.35	52	.406 ±.032	.094 ±.032	1.5	.020
LA60		10	12	1.0	0.1	63 K	Beryllia	4.7	448	1.218 ±.062	.312 ±.032	1.5	.040
LA61		4	5	1.0	0.1	10.5 K	Beryllia	1.0	112	.560 ±.062	.187 ±.032	1.5	.032
LA461	RW79[2]	3	3.75	1.0	0.1	10.5 K	[1]	1.0	135	.560 ±.062	.187 ±.032	1.5	.032
LA62		4.5	6.5	1.0	0.1	22 K	Beryllia	1.25	150	.812 ±.062	.187 ±.032	1.5	.032
LA462		3.25	4.75	1.0	0.1	22 K	[1]	1.25	110	.812 ±.062	.187 ±.032	1.5	.032
LA66		1.5	2	10	1.0	2.5 K	Beryllia	.30	35	.312 ±.032	.085 ±.015	1.5	.020
LA68	RW81[2]	1	1.5	10	1.0	1.7 K	Beryllia	.25	25	.250 ±.032	.085 ±.015	1.5	.020
LA468		.40	.52	10	1.0	1.7 K	[1]	.25	25	.250 ±.032	.085 ±.015	1.5	.020
LA466		.75	1.0	10	1.0	2.5 K	[1]	.30	35	.312 ±.032	.085 ±.015	1.5	.020
LA472		1.1	1.3	10	1.0	7.6 K	[1]	.40	67	.575 ±.032	.094 ±.015	1.5	.020
LA413		4.0	5.5	1.0	0.1	16 K	[1]	2.25	185	.625 ±.062	.250 ±.032	1.5	.040
LA417		2.5	3.25	1.0	0.1	11 K	[1]	1.5	142	.500 ±.062	.218 ±.032	1.5	.040
LA460		7.0	9.0	1.0	0.1	63 K	[1]	4.7	448	1.218 ±.062	.312 ±.032	1.5	.040
LA419	RW67[2]	5.0	6.5	1.0	0.1	48 K	[1]	3.3	350	1.000 ±.062	.312 ±.032	1.5	.040

[1] Ceramic: Steatite or alumina, depending on physical size.
[2] MIL-26 approved.

PC SERIES (RB STYLES WHICH MEET OR EXCEED MIL-R-93)

Shallcross PC Style[2,3] (Round)	MIL-R-93 Style	Fig.	Dimensions: A	Dimensions: B	Dimensions: C	Dimensions: D	Dimensions: E	Watts MIL 125°C	Watts Commercial 85°C[1]	Maximum Voltage DC	Approx. Weight Grams	Maximum Resistance
			±.032	±.015	1" Min.	Awg.	±.010					
1		I	.250	.250	1.0	22	.200	.100	.200	150	.3	150 K
3		I	.359	.265	1.0	22	.200	.125	.250	150	1.0	250 K
4		I	.375	.375	1.0	20	.200	.250	.500	300	2.5	500 K
5		I	.500	.250	1.0	22	.200	.250	.500	300	1.0	500 K
6		I	.375	.250	1.0	22	.200	.125	.250	300	1.0	300 K
7	RB70	I	.500	.375	1.0	20	.200	.330	.660	300	3.0	600 K
8	RB71[4]	I	.312	.250	1.0	22	.200	.125	.250	300	.3	150 K
9		I	.750	.375	1.0	20	.200	.500	1.0	600	4.5	1.0 Meg.
(Flat)			±.020	±.020	1" Min.	Awg.	±.010	125°C	85°C[1]			
301		II	.300	.250	1.0	20	.125	.125	.250	150	0.5	1.0 Meg.
303		II	.300	.500	1.0	20	.250	.250	.500	150	1.0	2.0 Meg.
(Radial)			±.032	±.015	1" Min.	Awg.	±.010	125°C	85°C[1]			
312		III	.500	.250	1.0	20	.406	.150	.300	300	1.0	525 K
314		III	.750	.250	1.0	20	.600	.250	.500	300	2.0	850 K
316		III	1.00	.250	1.0	20	.906	.500	1.00	750	3.0	1.25 Meg.
332		III	.500	.375	1.0	20	.406	.250	.500	300	3.5	1.5 Meg.
334		III	.750	.375	1.0	20	.656	.330	.660	500	4.5	2.0 Meg.
336		III	1.00	.375	1.0	20	.906	.500	1.00	750	6.0	2.5 Meg.
340		III	.500	.160	1.0	22	.406	.100	.200	300	.3	500 K
352		III	.500	.500	1.0	20	.406	.330	.660	300	5.5	2.0 Meg.
356		III	1.00	.500	1.0	20	.906	.750	1.50	750	8.5	4.0 Meg.

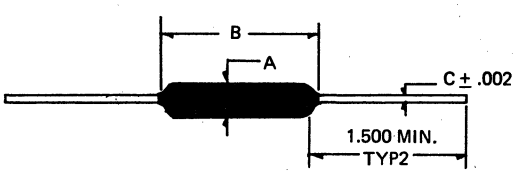
[1] Commercial ratings may be applied at 125°C provided 175°C max. operating temperature is permissible.
[3] All styles are also available at (HR) High Reliability styles with complete documentation.
[4] MIL-R-93 approved.
[5] Standard style.

POWER EL LABS

1050 SECOND ST. MANCHESTER, N.H. 03102
TWX 710-220-1844 Tel. (603) 625-8994

TYPE EL SILICONE POWER

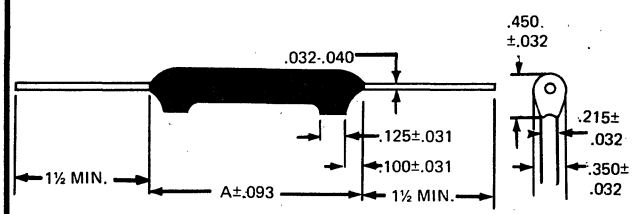
MEETS OR EXCEEDS MIL-R-26



Tel Labs Style	Mil Desig. (RW)	Diameter (A)	Length (B)	Lead Size (C)	Wattage 275°C	Wattage 350°C	Radial Leads (special)	Radial Leads Size
EL¼		.090±.031	.215±.031	.020	0.5W	1.0W	Yes	—
EL½		.090±.031	.280±.031	.020	0.5W	1.0W	Yes	.020
EL1A	RW70	.090±.031	.395±.031	.020	1.0W	1.25W	Yes	.020
EL1B		.090±.031	.530±.031	.020	1.0W	1.25W	Yes	.020
EL1C		.135±.031	.335±.031	.025	1.0W	2.0W	No	—
EL2		.250±.031	.625±.062	.032-.040	3.0W	4.0W	Yes	.032
EL2A		.187±.031	.825±.062	.032	3.25W	4.5W	Yes	.032
EL2B		.187±.031	.625±.062	.032	3.0W	3.5W	Yes	.032
EL2C	RW59, 69	.250±.031	.562±.062	.032-.040	3.0W	4.0W	Yes	.032
EL2D		.250±.031	.500±.062	.032-.040	3.0W	4.0W	Yes	.032
EL2E		.195±.031	.500±.062	.025	2.5W	3.5W	No	—
EL2F		.187±.031	.500±.062	.032	2.5W	3.0W	Yes	.032
EL2G		.187±.031	.430±.062	.032	2.5W	3.0W	Yes	.032
EL2H		.187±.031	.385±.062	.032	2.5W	3.0W	Yes	.032
EL21	RW79	.195±.031	.560±.062	.032	3.0W	3.5W	Yes	.032
EL3		.295±.031	.500±.062	.032-.040	3.0W	4.0W	Yes	.032
EL5	RW74	.290±.062	.925±.093	.032-.040	5.0W	6.0W	Yes	.032
EL5A	RW57, 67	.350±.062	1.000±.093	.032-.040	5.0W	6.5W	Yes	.032
EL7		.290±.062	1.200±.093	.032-.040	5.0W	6.5W	Yes	.032
EL7A		.350±.062	1.360±.093	.032-.040	5.0W	7.0W	Yes	.032
EL10A	RW58, 68	.350±.062	1.815±.093	.040	10.0W	12.0W	Yes	.032

TYPE ELM POWER RESISTORS

FOR PRINTED CIRCUIT BOARDS



TEL LABS STYLE	LENGTH "A"	WATTAGE "U"	WATTAGE "V"	RESISTANCE .05%—0.5%	1%—5%	RADIAL LEADS
ELM5A	1.000	5W	6W	.5Ω-35k	.1Ω- 90k	YES
ELM7A	1.360	6W	7W	.5Ω-45k	.1Ω-100k	YES
ELM10A	1.815	10W	12W	.5Ω-75k	.1Ω-275k	YES

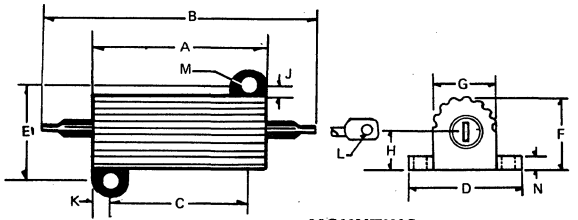
DATA CHART 2

TEL LABS STYLE	TEMPERATURE COEFFICIENT ±50 PPM	±30 PPM	±20 PPM
ELM5A	BELOW 1Ω	1Ω to 9.9Ω	10Ω to 90k
ELM7A	BELOW 1Ω	1Ω to 9.9Ω	10Ω to 100k
ELM10A	BELOW 1Ω	1Ω to 9.9Ω	10Ω to 275k

1. Less than 100°C temp., rise when derated to 30% of wattage under characteristic "V."
2. Silicone Coated
3. Non-Inductively wound version available. One-half the resistance value shown in data chart 1.
4. Reduces the possibility of burned printed circuit boards.
5. Insures resistor identification.
6. Shock and vibration problems reduced when properly installed.

TYPE EH CHASSIS MOUNT

ALUMINUM HOUSED

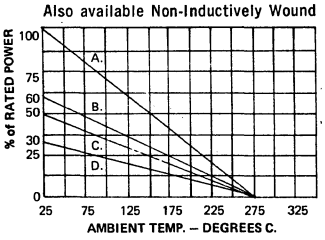


TEL LABS STYLE	A ±.031	C ±.005	E ±.005
EH5	.600	.444	.490
EH10	.750	.562	.625
EH25	1.062	.718	.781
EH50	1.937	1.562	.843

MOUNTING

EH25, 50 5x7x2 Aluminum Chassis
EH5, 10 4x6x2 Aluminum Chassis

Also available Non-Inductively Wound



EH5 3.0 GRAMS
EH10 5.6 GRAMS
EH25 11.7 GRAMS
EH50 25.0 GRAMS

A. EH5, 10, 25, 50 Mounted
B. EH10 Unmounted
C. EH5, 25 Unmounted
D. EH50 Unmounted

TEL LABS STYLE (Anodyzed)	WATTAGE Mounted	WATTAGE Unmounted	RESISTANCE RANGE 1% - 5%	TEMP. COEFFICIENT ±50 PPM	TEMP. COEFFICIENT ±20 PPM
EH5	8W	4W	0.1Ω to 22K	0.1Ω to 30Ω	OVER 30Ω
EH10	10W	6W	0.1Ω to 40K	0.1Ω to 50Ω	OVER 50Ω
EH25	25W	10W	0.1Ω to 70K	0.1Ω to 100Ω	OVER 100Ω
EH50	50W	12W	0.1Ω to 250K	0.1Ω to 300Ω	OVER 300Ω

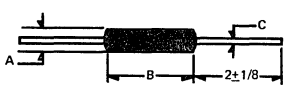
Meets or exceeds MIL R-18546D.

PRECISION TEL LABS

1050 SECOND ST. MANCHESTER, N.H. 03102
TWX 710-220-1844 Tel. (603) 625-8994

TYPE SA EPOXY

ENCAPSULATED AXIAL
DESIGNED TO MEET OR EXCEED MILR93D.
All units represented may be modified for minimum inductance and capacitive effects at frequencies above the audio range. Rise and decay time characteristics are measured from 10% to 90% of peak pulse amplitude with a 100 kilocycle pulse input.
Temperature coefficients are available to 0 ± 4PPM/°C and T.C. matches are available to 2PPM/°C.
Stabilities of 0.005% per year are available on a production basis.



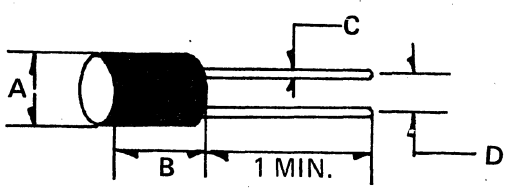
Tel Labs Style	Mil R93D Desig.	Diam. A ± .015	Length B ± .031	Lead Diam. C.	MAX. VALUE Mil.	MAX. VALUE Comm.	WATTAGE Mil.	WATTAGE Comm.	MAX. VOLTAGE Mil.	MAX. VOLTAGE Comm.
SA1	RB55	.250	.500	.032	226 K	1.1 Meg	.15W	.3W	400	400
SA2	RB54	.250	.750	.032	448 K	2 Meg	.25W	.4W	300	400
SA3	RB53	.375	.875	.032	750 K	8 Meg	.333W	.5W	300	400
SA4	RB52	.375	1.000	.032	1.5 Meg	10 Meg	.5W	.75W	600	800
SA5	RB57	.500	1.062	.032	2 Meg	16 Meg	.75W	1.0W	800	1000
SA6	RB58	.500	1.531	.032	3 Meg	24 Meg	1.0W	1.5W	900	1200
SA7	RB59	.500	2.031	.032	5.11 Meg	24 Meg	1.25W	2.0W	1200	1800
SA11		.250	.625	.032		400 K		.33W		800
SA13		.312	.937	.032		1.2 Meg		.5W		800
SA16	RB56	.250	.375	.032	127 K	205 K	.125W	.25W	200	200
SA19		.250	.250	.032		500 K		.2W		200

SUBMINIATURES

Tel Labs Style	Diameter A ±.015	Length B ±.031	Lead Diam. C.	Maximum Value	Maximum Wattage	Maximum Voltage
SA9	.135	.312	.025	400 K	.08W	100
SA10	.185	.560	.025	500 K	.2W	100
SA17	.109	.270	.020	200 K	.05W	100
SA20	.165	.500	.025	400 K	.150W	100, 200
SA21	.187	.375	.025	500 K	.125W	100, 200
SA22	.150	.437	.025	375 K	.07W	100
SA24	.125	.250	.020	75 K	.05W	100
SA25	.110	.300	.020	85 K	.05W	100
SA26	.125	.375	.025	140 K	.05W	100
SA29	.100	.300	.025	80 K	.05W	100
SA30	.200	.405	.025	175 K	.05W	100
SA31	.100	.220	.020	70 K	.04W	100

TYPE PW SERIES

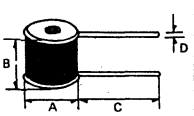
Conformal and Shell Encapsulated. Designed Specifically for Printed Circuit Applications. Temperature coefficients from 0±20 PPM to 0±5 PPM Matching to 2 PPM. Inductive or Noninductive Winding. Stabilities available on a production basis to 0.005%/year.



Mil R 93D Desig.	Tel Labs Style	A ± .015	B ± .032	C	D ± .015	MAX. VALUE Mil.	MAX. VALUE Comm.	WATTAGE Mil.	WATTAGE Comm.	MAX. V. Mil.	MAX. V. Comm.
RB71	PW1	.250	.312	.025	.200	100K	125K	.125W	.15W		300
	PW2	.250	.406	.025	.200		175K		.2W		600
RB70	PW20	.375	.500	.032	.200, .250	301K	375K	.250W	.33W	150	600
	PW40	.468	.625	.032	.250, .300		500K		.3W		600
	PW31	.500	.625	.032	.250, .300		1.75 Meg		.6W		600
	PW10	.406	1.250	.032	.250, .300		1.0 Meg		1.0W		1200
	PW50	.531	1.000	.032	.250, .300		3.0 Meg		1.0W		1200

TYPE CR/CA/CL SERIES

CERAMIC CORE RESISTORS
"CR" Ceramic Radial Leads
"CA" Ceramic Axial Leads
"CL" Ceramic Lugs
Ceramic spool type unit. Windings sealed in varnish. Hole provided for screw mounting. Operate from -65°C to 105°C. Inherently good stability.
Excellent for use under laboratory conditions and most commercial applications.



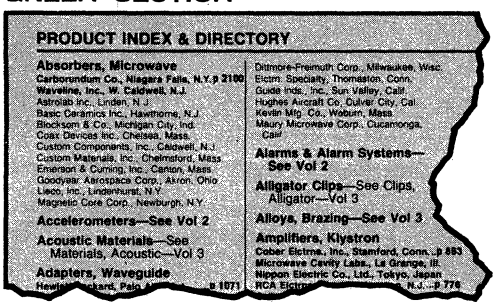
Style	Diameter A ±.015	Length B ±.031	Lead Diam. D	Max Value (.0005 Wire)	Wattage	Max. V	Hole (clearance) Screw #
CR16	.250	.250	0.20	100K	0.1W	200	0
CR1	.250	.406	.020-0.25	400K	0.15W	400	2
CR23	.281	.343	.020-.025	250K	0.15W	200	2
CR18	.343	.312	.020-.025	400K	0.2W	200	6
CR2	.250	.687	.020-.025	1.25 Meg.	0.25W	400	0
CR20	.375	.437	.020-.032	1.0 Meg.	0.25W	200	4
CR25	.500	.437	.025-.032	1.5 Meg.	0.33W	400	6
CR27	.375	.656	.025-.032	1.5 Meg.	0.5W	400	4
CR31	.500	.625	.025-.032	3.0 Meg.	0.5W	400	6
CR35	.500	.562	.025-.032	3.25 Meg.	0.5W	400	6
CR53	.500	1.000	.025-.032	6.0 Meg.	1.0W	800	6
CR60	.750	1.250	.025-.032	6.0 Meg.	1.5W	800	6
CR71	.812	2.093	.025-.032	20.0 Meg.	2.5W	1600	6

1. All units above may be supplied with Axial Leads, specify "CA".
2. Lugs may be supplied on the following; CL25, CL31, CL35, CL53, CL60, CL71

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y. p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

Accelerometers—See Vol 2

Acoustic Materials—See Materials, Acoustic—Vol 3

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Hewlett-Packard, Palo Alto ... p 1071
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Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Electns., Inc., Stamford, Conn. p 893
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electron ... N.J. ... p 776

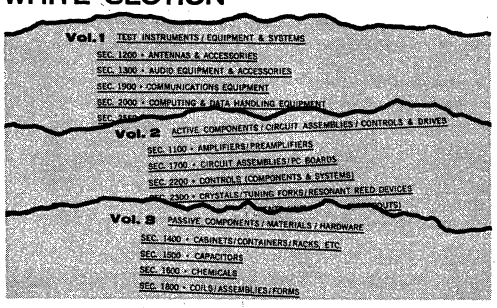
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

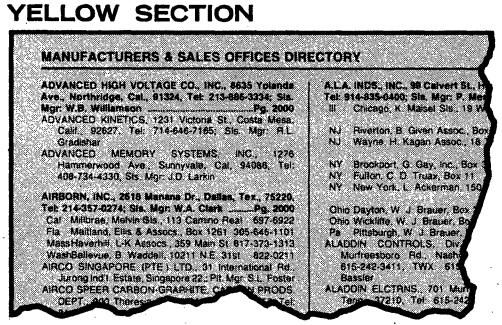
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3234; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1278 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

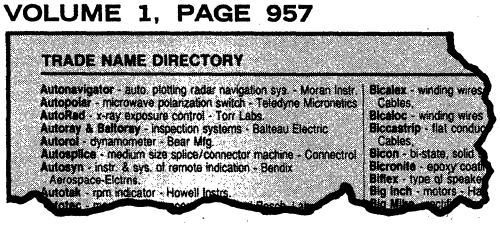
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-6274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal Milibrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St 617-373-1313
Wash Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22; Pit. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, ... PRODS DEPT., ... Tel:

A.L.A. INDS., INC., 98 Calvert St., ... Tel: 914-835-0400; Sls. Mgr: P. Mas...
Ill Chicago, K. Masel Sls., 19 W...
NJ Riverton, B. Green Assoc., Box ...
NJ Wayne, H. Kagan Assoc., 18 ...
NY Brockport, G. Gay, Inc., Box ...
NY Fulton, C. D. Truax, Box 11...
NY New York, L. Ackerman, 150 ...
Ohio Dayton, W. J. Brauer, Box ...
Ohio Wickliffe, W. J. Brauer, Box ...
Pa Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bessler ...
ALADDIN ELCTRNS., 701 Murf... Tenn. 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autoptica - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Electns.
Autotak - rpm indicator - Howell Instrs.
Bicalez - winding wires, Cables,
Bicaloc - winding wires
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

If you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

MIL-R-10509 PRECISION RESISTORS

TRW®
ELECTRONIC COMPONENTS

HIGH STABILITY PRECISION EVAPORATED METAL FILM RESISTORS

IRC Type	MIL Type	MIL Char.	IRC T.C. Code	MIL Resistance Range (Ohms)	Std. Resistance Range (Ohms)	MIL Power Rating (Watts) 70°C	MIL Power Rating (Watts) 125°C	MIL Voltage Rating (Volts)	Body Length (L)	Body Diam. (D)	Max. Clean Lead Length (CL)	Lead Gage (A)	Body Style
UC	—	—	T0, T2	—	50-10K	1/8	1/20	200	.125 ± .020	.047 ± .010	.160	#30* .010	C
MMC	RN50	—	T0	—	10-100K	1/8	1/20	200	.152 ± .020	.065 ± .010	.200	#26**.016	C
		C, E	T2, T9	10-100K	49.9-100K								
CEA	RN55	D	T0	10-301K	10-1 Meg	1/8	1/10	200	.250 ± .031	.090 ± .010	.325	#22 .0253	C
		C, E	T2, T9	49.9-100K	30.1-1 Meg								
CCM	RN55	D	T0	10-301K	20-301K	1/8	1/10	200	.250 ± .031	.088 ± .010	.325	#22 .0253	C
		C, E	T2, T9	49.9-100K	30.1-301K								
MCM	—	—	T0	—	20-301K	1/8	1/10	200	.250 ± .031	.093 ± .005	.310	#22 .0253	M
		—	T2, T9	—	30.1-301K								
CCA	RN60	D	T0	10-1 Meg	10-3 Meg	1/4	1/8	250	.400 ± .031	.140 ± .020	.540	#22 .0253	C
		C, E	T2, T9	49.9-499K	49.9-3 Meg								
MEA	RN60	D	T0	10-1 Meg	10-1.5 Meg	1/4	1/8	250	.406 ± .015	.130 ± .010	.545	#22 .0253	M
		C, E	T2, T9	49.9-499K	30.1-1.5 Meg								
MEB	RN65	D	T0	10-2 Meg	10-3 Meg	1/2	1/4	300	.594 ± .015	.203 ± .015	.733	#22 .0253	M
		C, E	T2, T9	49.9-1 Meg	49.9-3 Meg								
CCB	RN65	D	T0	10-2 Meg	10-1.5 Meg	1/2	1/4	300	.594 ± .031	.180 ± .020	.734	#22 .0253	C
		C, E	T2, T9	49.9-1 Meg	49.9-1.5 Meg								
MEC	RN70	D	T0	10-2.49 Meg	10-5 Meg	3/4	1/2	350	.719 ± .020	.261 ± .020	.863	#20 .032	M
		C, E	T2, T9	24.9-1 Meg	24.9-5 Meg								
CEC	—	—	T0	—	10-5 Meg	1	1/2	350	.594 ± .031	.180 ± .020	.734	#20 .032	C
		—	T2, T9	—	49.9-5 Meg								
MEF	RN75	B	T0	10-5.11 Meg	49.9-18 Meg	—	1	500	1.105 ± .020	.395 ± .020	1.253	#20 .032	M
		C, E	T2, T9	49.9-2 Meg	49.9-18 Meg								
MEH	RN80	B	T0	30.1-10 Meg	100-45 Meg	—	2	750	2.254 ± .020	.395 ± .020	2.378	#20 .032	M
		—	T2, T9	—	100-45 Meg								

* Gold plated Dumet leads, 1.00" ± .062". ** Lead length, 1.00" ± .062".

TOLERANCES

Metal film resistors are supplied in standard tolerances of ±1.0%, ±0.5%, ±0.25% and ±0.1%. For tighter tolerances, SEE "AR" SERIES.

IRC T.C. CODE

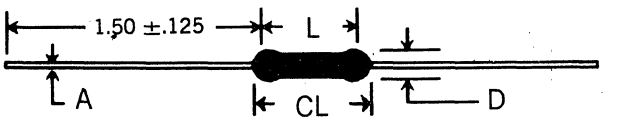
T0 — 0 ±100 PPM/°C
T2 — 0 ± 50 PPM/°C
T9 — 0 ± 25 PPM/°C

(±1%) PRECISION DEPOSITED CARBON FILM RESISTORS

IRC Type	MIL Type	MIL Char.	MIL Resistance Range (Ohms)	Std. Resistance Range* (Ohms)	Power Rating (Watts) 40°C	Power Rating (Watts) 70°C	Voltage Rating (Volts)	DIMENSIONS IN INCHES Body Length (L)	Body Diameter (D)	Max. Clean Lead Length (CL)	Lead Gage (A)	Body Style
DCC	RN20	X	10-2 Meg	10-25 Meg	1/2	1/2	350	.594 ± .031	.180 ± .020	.750	#20 .032	C
DCF	RN25	X	10-2.49 Meg	10-50 Meg	1	—	500	.938 ± .062	.297 ± .031	1.250	#20 .032	P
DCH	RN30	X	30.1-10 Meg	15-100 Meg	2	—	750	2.062 ± .062	.297 ± .031	2.375	#20 .032	P
MDA	RN60	D	10-1 Meg	10-5 Meg	—	1/4	300	.406 ± .015	.130 ± .010	.545	#22 .0253	M
MDB	RN65	D	10-2 Meg	10-5 Meg	—	1/2	350	.594 ± .015	.203 ± .015	.733	#22 .0253	M
MDC	RN70	D	10-2.49 Meg	10-25 Meg	—	1	500	.719 ± .020	.261 ± .020	.863	#20 .032	M
MDF	RN75	B	10-5.11 Meg	10-50 Meg	—	1	500	1.105 ± .020	.395 ± .020	1.253	#20 .032	M
MDH	RN80	B	30.1-10 Meg	15-100 Meg	—	2	750	2.234 ± .020	.395 ± .020	2.378	#20 .032	M

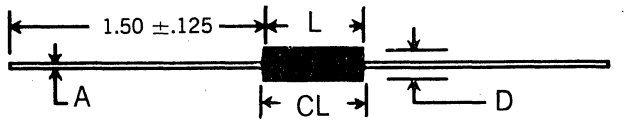
CONFORMALLY COATED (C)

PAINT COATED (P)



*These high resistance values, being above the highest MIL-R-10509 top values, have higher temperature coefficients, but otherwise are designed to meet the requirements of the specification. These high resistance values must be measured carefully under controlled conditions of humidity and temperature, to reduce possible variations due to test conditions and temperature coefficients. Due to higher temperature coefficient, value above approximately two times MIL maximum will be supplied with a standard tolerance of ±2.0%.

MOLDED (M)



TRW®
ELECTRONIC COMPONENTS

MIL-R-55182 ESTABLISHED RELIABILITY RESISTORS

ER SERIES METAL FILM RESISTORS

IRC Type	MIL Type*	Failure Rate Level	Resistance Range (Ohms)	Wattage Rating @ 125°C (Watts)	Voltage Rating (Volts)	DIMENSIONS IN INCHES			Lead Gage (A)
						Body Length (L)	Body Diameter (D)	Max.Clean Lead Length (CL)	
MMC	RNC50	S	49.9 - 100K	1/20	200	.152 ± .020	.065 ± .010	.200	#26 .016**
CCM	RNC55	S	49.9 - 200K	1/10	200	.250 ± .031	.088 ± .010	.325	#22 .0253
CCA	RNC60	S	49.9 - 499K	1/8	250	.400 ± .031	.140 ± .020	.540	#22 .0253
CCB	RNC65	S	49.9 - 1 Meg	1/4	300	.594 ± .031	.180 ± .020	.732	#22 .0253

* RNR and RNN also are available. ** Lead length 1.00 ±.062.

TYPICAL ENVIRONMENTAL EFFECTS ON TRW/IRC RESISTORS The following chart shows the comparison between the maximum allowable percent change in resistance as specified by MIL-R-55182, Characteristics H, J or K, and the typical change found in the resistors manufactured by TRW/IRC. The typical characteristics have been derived from over 170 million government monitored test hours of data. For more detailed information on any specific environmental condition, contact either your local TRW Sales Office or the factory.

Environmental Conditions	Maximum Change per MIL-R-55182(±%)	Typical TRW/IRC Performance(±%)
Temperature Cycling	0.20	0.02
Overload	0.20	0.05
Low Temperature Operations	0.15	0.03
Terminal Strength	0.20	0.02
Dielectric Withstanding Voltage	0.15	0.05
Resistance to Soldering Heat	0.10	0.02
Moisture Resistance	0.40	0.15
Shock, Medium Impact	0.20	0.05
Vibration, High Frequency	0.20	0.02
2000 Hour Life	0.50	0.10
10,000 Hour Life	2.00	0.30
High Temperature Exposure	0.50	0.10

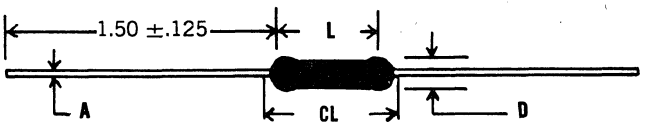
TOLERANCE Standard resistance tolerance 0.1% (B), 0.5% (D), 1.0% (F). Closer tolerance for special specifications are available upon request.

Our capabilities are not limited to the specifications shown on this page. Should you have an application for special TC's, ranges and sizes, we can help you.

Customizing the established reliability specs to meet your particular Hi-Rel needs is our specialty.

TEMPERATURE COEFFICIENTS		
TC Code	MIL. Char.	TCR
T0	K	0 ± 100ppm/°C
T2	H	0 ± 50ppm/°C
T9	J	0 ± 25ppm/°C

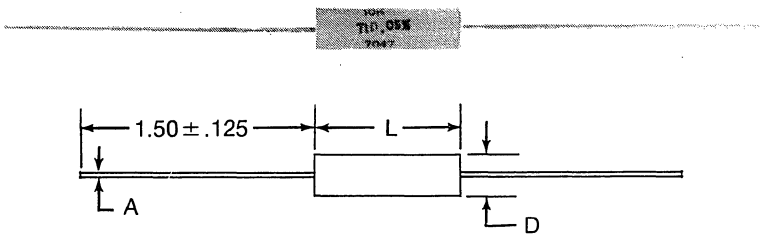
CONFORMALLY COATED



PRECISION THIN-FILM RESISTORS

TRW®
ELECTRONIC COMPONENTS

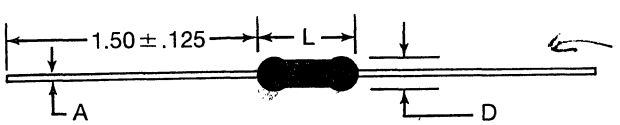
AR SERIES LOW T.C., METAL FILM RESISTORS

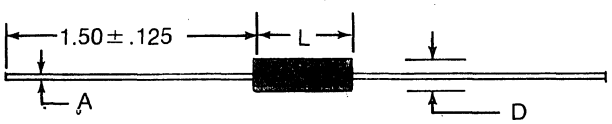


IRC Type	Resistance Range* (Ohms)	Temperature Coefficients −20°C to +85°C (±ppm/°C)	Tolerances (±%)	Power Rating @ 85°C (Watts)	Voltage Rating (Volts)	DIMENSIONS IN INCHES		
						Body Length (L Max.)	Body Diameter (D Max.)	Lead Gage (A)
AR3	50 - 100K	T10 = 15	1, 0.5, 0.25,	1/20	200	.225	.100	#26 .016**
AR5	50 - 250K	T13 = 10	0.1, 0.05,	1/10	250	.375	.125	#22 .0253
AR6	50 - 500K	T16 = 5	0.02, 0.01	1/8	300	.475	.160	#22 .0253
AR7	50 - 1 Meg			1/4	500	.675	.200	#22 .0253

* Wider ranges available, contact factory.
** Lead length 1.00 ± .062.

BR SERIES POWER METAL FILM RESISTORS

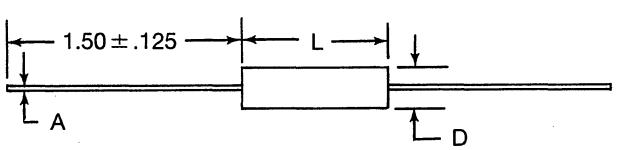




IRC Type	Resistance Range (Ohms)	Temperature Coefficient (±ppm/°C)	Tolerances (± %)	Power Rating @ 25°C* (Watts)	Voltage Rating (Volts)	DIMENSIONS IN INCHES			Body Style
						Body Length (L Max.)	Body Diameter (D Max.)	Lead Gage (A)	
BR3	10 - 25K	25, 50,	1, 0.5,	1	200	.172	.075	#26 .016**	C
BR5	30.1 - 50K	100	0.25, 0.1	2	300	.421	.140	#22 .0253	M
BR7	49.9 - 200K			3	525	.739	.281	#20 .032	M

* Derate by 50% for ±0.1% tolerance.
** Lead length 1.00 ± .062.

CR SERIES HIGH TEMPERATURE/HIGH VOLTAGE RESISTORS



IRC Type	Resistance Range (Ohms)	Tolerance (± %)	Operating Temperature (°C)	Power Rating @ 200°C* (Watts)	Voltage Rating* (Volts)	DIMENSIONS IN INCHES		
						Body Length (L Max.)	Body Diameter (D Max.)	Lead Gage (A)
CR7	500 - 25 Meg	5	−65 to +350	1	8,000	.580	.157	#20 .032
CR8	1K - 50 Meg	5	−65 to +350	1.5	12,500	.938	.157	#20 .032
CR10	2K - 200 Meg	5	−65 to +350	3	12,500	2.125	.328	#20 .032

* Voltage and wattage dependent on resistance, operating temperature and environment (i.e. Oil, Air, Vacuum, Inert, etc.).

TRW®
ELECTRONIC COMPONENTS

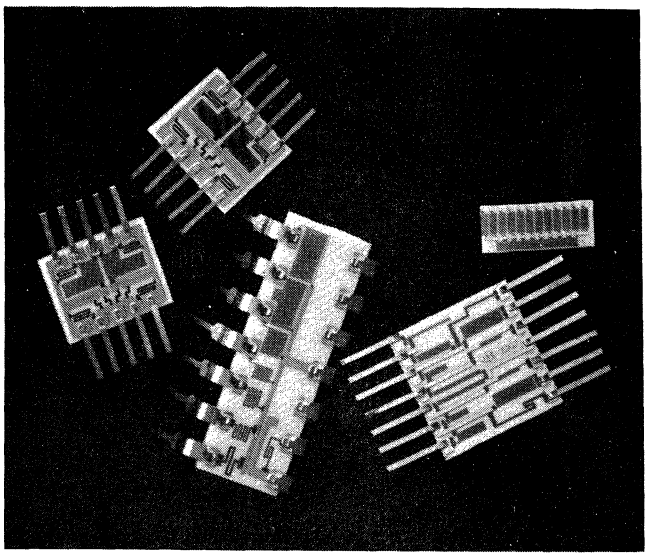
PRECISION RESISTOR NETWORKS

TaNFilm* PRECISION THIN-FILM RESISTOR NETWORKS

The IRC Burlington Division of TRW has for years been the leader in metal film resistor technology. Now this thin film resistor know-how has been applied to subminiature, precision, resistor networks. TRW TaNFilm networks are made of sputtered tantalum nitride, using TRW designed equipment and processes.

TaNFilm is inherently immune to electrolytic attack, since the manufacturing process passivates each resistor with an anodized surface layer. The precision processes used to manufacture TaNFilm networks allow routine tolerances of ±0.1% and make tolerances of ±0.03% economically feasible. The continuously sputtering process makes TaNFilm very uniform, so resistors track over the full temperature range to a few parts per million. The many hours of test data on TaNFilm and its well defined chemistry allow accurate performance prediction.

A variety of standard TaNFilm networks are available. Custom TaNFilm networks can be fabricated to your requirements in dual in-line packages, flat packs, conformal coating or unencapsulated for wire bonding, or beam lead attachment.

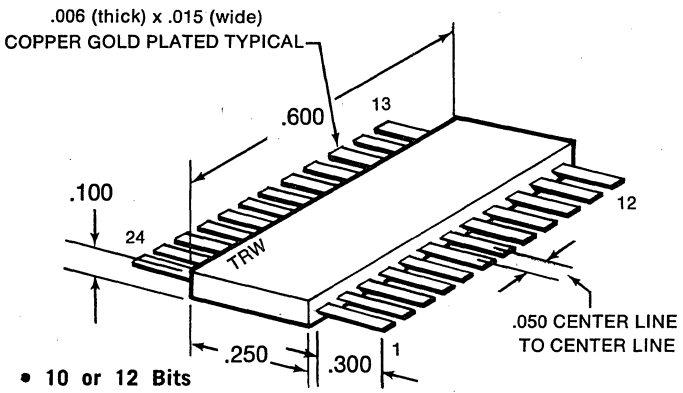


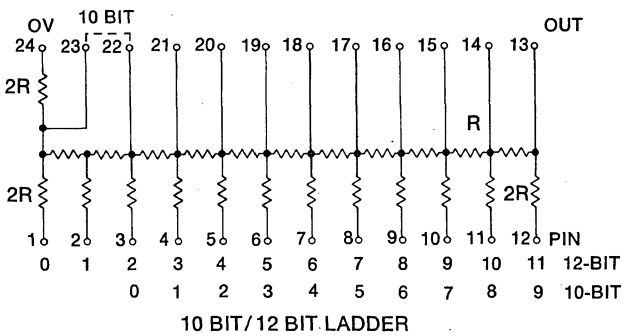
TYPICAL TaNFilm Design CRITERIA[1]

Resistive Value	20Ω to 100,000Ω
Tolerance	±0.03% to ±1.0%
TCR	0 to −80 ppm/°C
TCR Tracking	0 to 5 ppm/°C
Settling Time	< 10nSec.
Drift	0.1% per year
Noise	< −25dB
Voltage Coefficient	< 5 ppm/V
Series Inductance	< 5 nH
Shunt Capacitance	< 0.1 pF

[1] These are not absolute units. Contact factory for your specific requirements.

HIGH PRECISION TaNFilm* R-2R LADDER NETWORKS





10 BIT/12 BIT LADDER

- **10 or 12 Bits**
- **Inherent Passivation** 10/12 BIT PACKAGE
- **Wide Temperature Range**
- **Subminiature**

These subminiature R-2R ladders feature the inherent passivation of TRW TaNFilm tantalum nitride thin film, yielding hermetic performance without hermetic cost.

They will meet a wide range of requirements and offer the inherent low noise, excellent stability and short settling time of TRW TaNFilm.

*Trademark of TRW Inc. for its Tantalum Nitride thin film.

SPECIFICATIONS[1]

Ladder Resistance (R)	5K
Temperature Coefficient	−50 to −100 ppm/°C
T.C. Tracking	±2 ppm/°C
Settling Time	20 ns
Noise	< −25dB
Temperature Range	−55°C to +125°C
Accuracy	±½ Least Significant Bit
Switch Compensation	up to −5%

[1] Standard characteristics, contact factory for special requirements.

IRC BURLINGTON DIVISION OF TRW INC. • P.O. BOX 887 • BURLINGTON, IA. 52601 • (319) 754-8491 • TWX 910-525-1135

1/8 AND 1/4 WATT MOLDED METAL GLAZE RESISTORS (TYPE RG)

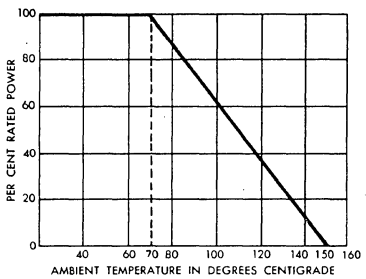
TRW®
ELECTRONICS GROUP

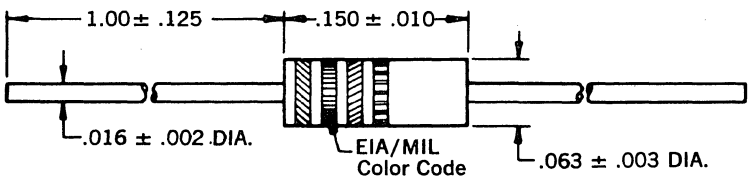
1/8 WATT

RG⅛ SPECIFICATIONS

MIL-R-11 style equivalent RC05
Resistance Range ..... 10Ω through 100K
Resistance Tolerance ..... ±5%
Power Rating ..... ⅛ Watt at 70°C, derated to 0 at 150°C
Temperature Coefficient ..... Less than ±500 PPM/°C
Maximum Continuous Working Voltage 200V
Dielectric Withstanding Voltage ..... 300V at atmospheric pressure
Insulation Resistance ..... 1,000 Megohms, Dry

DERATING CURVE TEMPERATURE — POWER

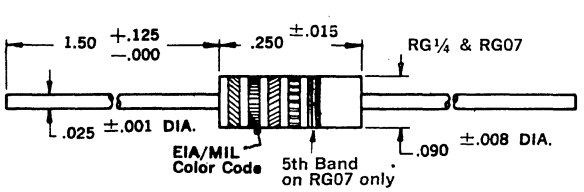




1/4 WATT

RG¼ SPECIFICATIONS

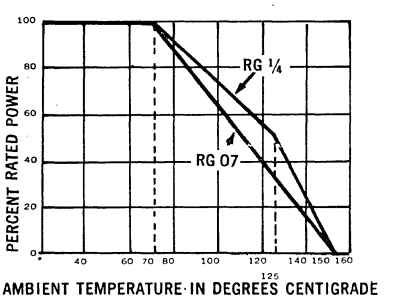
MIL-R-11 style equivalent RC07
Resistance Range ..... 6.2Ω through 680K
Resistance Tolerance ..... ±5%
Power Rating ..... ¼ Watt @ 70°C, derated to 0 at 150°C
Commercial — ½ watt @ 70°C
¼ watt @ 125°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 250V
Dielectric Withstanding Voltage ..... 500V RMS at atmospheric pressure
325V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... ¼ watt — 20°C, ½ watt — 40°C



RG07 SPECIFICATIONS

MIL-R-22684 style equivalent RL07
MIL-R-39017 style equivalent RLR07
Resistance Range ..... 10Ω through 150K
Resistance Tolerance ..... ±2% and ±5%
Power Rating ..... ¼ Watt at 70°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 250V
Dielectric Withstanding Voltage ..... 500V RMS at atmospheric pressure
325V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 20°C

DERATING CURVE TEMPERATURE — POWER FOR RG¼ & RG07



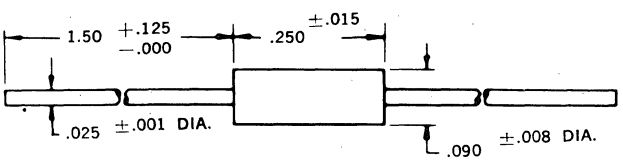
TRW® 1/4 AND 1/2 WATT PRECISION MOLDED THICK FILM RESISTORS (TYPES T & TF)

ELECTRONICS GROUP

1/4 WATT

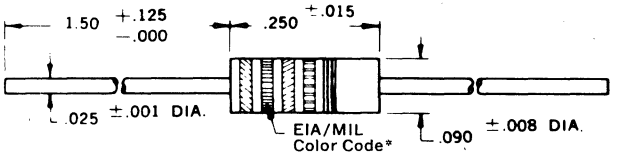
T-55 AND TO-55 SPECIFICATIONS

MIL-R-10509 style equivalent RN55
Resistance Range ..... T-55 — 10Ω through 301K
TO-55 — 10Ω through 499K
Resistance Tolerance ..... ±1%
Temperature Coefficient (PPM/°C) ..... T-55 — +200, −500
TO-55 — ±100
Power Rating ..... ¼ Watt at 70°C, derated to 0 at 160°C
⅛ Watt at 125°C, derated to 0 at 160°C
Maximum Continuous Working Voltage 250V
Dielectric Withstanding Voltage ..... 500V RMS at atmospheric pressure
325V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 20°C



TF07 SPECIFICATIONS

MIL-R-22684 style equivalent RL07
Resistance Range ..... 1Ω through 10Ω
Resistance Tolerance ..... ±1%, ±2% and ±5%
Temperature Coefficient (PPM/°C) ..... ±100
Power Rating ..... ¼ Watt at 70°C, derated to 0 at 150°C
Dielectric Withstanding Voltage ..... 500V RMS at atmospheric pressure
325V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 20°C

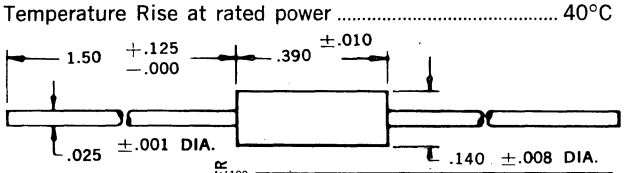


*On ±2 and ±5% units. Printed markings standard on ±1% units.

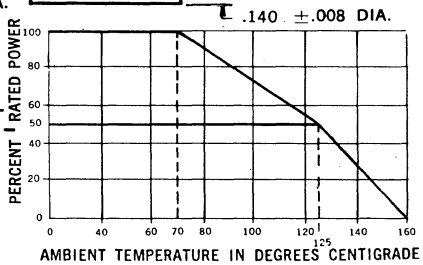
1/2 WATT

T-60 AND TO-60 SPECIFICATIONS

MIL-R-10509 style equivalent RN60
Resistance Range ..... T-60 — 24.9Ω through 499K
TO-60 — 10Ω through 1 Meg.
Resistance Tolerance ..... ±1%
Temperature Coefficient (PPM/°C) ..... T-60 — +200, −500
TO-60 — ±100
Power Rating ..... ½ Watt at 70°C, derated to 0 at 160°C
¼ Watt at 125°C, derated to 0 at 160°C
Maximum Continuous Working Voltage 350V
Dielectric Withstanding Voltage ..... 700V RMS at atmospheric pressure
400V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 40°C

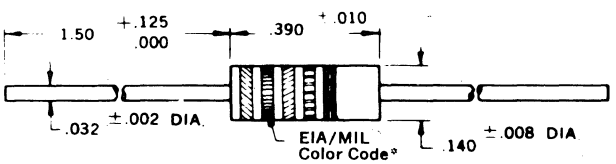


DERATING CURVE TEMPERATURE — POWER FOR T-55, TO TO-55, T-60 & TO-60



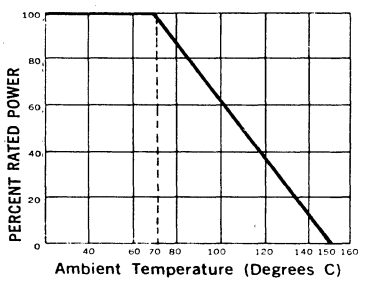
TF20 SPECIFICATIONS

MIL-R-22684 style equivalent RL20
Resistance Range ..... 1Ω through 10Ω
Resistance Tolerance ..... ±1%, ±2% and ±5%
Temperature Coefficient (PPM/°C) ..... ±100
Power Rating ..... ½ Watt at 70°C, derated to 0 at 150°C
Dielectric Withstanding Voltage ..... 700V RMS at atmospheric pressure
400V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 40°C



*On ±2 and ±5% units. Printed markings standard on ±1% units.

DERATING CURVE TEMPERATURE — POWER FOR TF07 & TF20



1/2, 1 AND 2 WATT MOLDED METAL GLAZE RESISTORS (TYPE RG)

TRW ELECTRONICS GROUP

1/2 WATT

RG20 SPECIFICATIONS

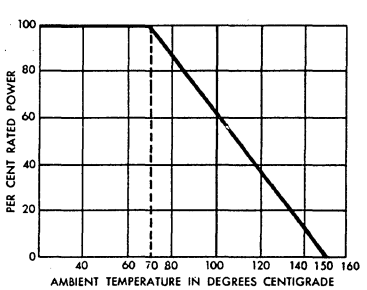
MIL-R-22684 style equivalent RL20
MIL-R-39017 style equivalent RLR20
Resistance Range ..... 4.3Ω through 470K
Resistance Tolerance ..... ±2% and ±5%
Power Rating ..... ½ Watt at 70°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 350V
Dielectric Withstanding Voltage ..... 700V RMS at atmospheric pressure
400V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 40°C

1 WATT

RG32 SPECIFICATIONS

MIL-R-22684 style equivalent RL32
MIL-R-39017 style equivalent RLR32
Resistance Range ..... 10Ω through 1.0 Meg.
Resistance Tolerance ..... ±2% and ±5%
Power Rating ..... 1 Watt at 70°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 500V
Dielectric Withstanding Voltage ..... 1000V RMS at atmospheric pressure
500V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 55°C

DERATING CURVE TEMPERATURE — POWER FOR RG20, RG32, RG2 & RG42



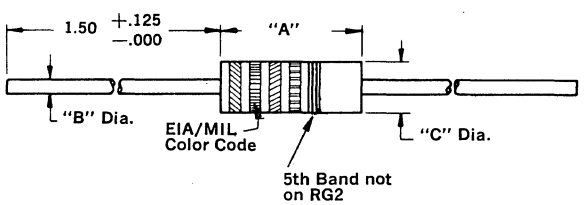
2 WATTS

RG2 SPECIFICATIONS

Resistance Range ..... 10Ω through 1.5 Meg.
Resistance Tolerance ..... ±5%
Power Rating ..... 2 Watts at 70°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 500V
Dielectric Withstanding Voltage ..... 1000V RMS at atmospheric pressure
500V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 90°C

RG42 SPECIFICATIONS

MIL-R-22684 style equivalent RL42
Resistance Range ..... 10Ω through 1.5 Meg.
Resistance Tolerance ..... ±2% and ±5%
Power Rating ..... 2 Watts at 70°C, derated to 0 at 150°C
Maximum Continuous Working Voltage 500V
Dielectric Withstanding Voltage ..... 1000V RMS at atmospheric pressure
500V RMS at 3.4 inches of Mercury
Insulation Resistance ..... 1,000 Megohms, Dry
Temperature Rise at rated power ..... 90°C



DIMENSIONS

IRC TYPE	"A"	"B"	"C"
RG20	.390 ± .010	.032 ± .002	.140 ± .008
RG32	.562 ± .031	.040 ± .002	.190 ± .015
RG2	.688 ± .040	.032 ± .002	.318 ± .018
RG42	.688 ± .040	*.045 ± .002	.318 ± .018

*.032 leads available on request.

TRW® MINIATURE PRECISION POWER WIREWOUND RESISTORS

ELECTRONICS GROUP

IRC Type	MIL-R-26E Equiv. & Rating (Watts) at 25°C	IRC Rating 350°C Max. Hot Spot (Watts) at Ambient 125°C	25°C	Commercial Range (Ohms) Min.	Max.	Max. Cont. Working Volt.	Non-Inductive Ranges (Ohms) Min.	Max.
AS-1/2		0.5	1	0.5	6K	100	*	*
AS-1	RW70U (1)	1	2	0.1	7.5K	130	0.1	3.8K
AS-2	RW69V (3)	2	3	0.1	20K	140	0.5	10K
AS-2A		2.5	4	0.1	42.1K	300	0.5	21K
AS-2B	RW79U (3)	3	4	0.1	24K	185	0.5	12K
AS-3		3	5	0.1	30K	200	0.5	15K
AS-5	RW74U (5) RW67V (6.5)	5	7	0.1	60K	400	0.8	30K
AS-7		7	9	0.1	90K	600	1.0	45K
AS-10	RW68V (11) RW78U (10)	10	14	0.1	175K	1000	3.0	50K
ASC-10	RW55V (7)	7	10	0.1	90K	600	1.0	45K
ASC-15	RW56V (14)	10	15	0.1	175K	1000	3.0	50K

*Inductance on AS-½ is less than 1 μh at 1 MC.

MIL-R-26C IRC Type	MIL Type	Rating (Watts) G	V	Range (Ohms) Min.	Max.
AS-2	RW59, 69	2.5	3	0.1	2K
AS-5	RW57, 67	5	6.5	0.1	8.2K
AS-10	RW58, 68	8	11	0.1	20K
ASC-10	RW55	5	7	0.1	5.1K
ASC-15	RW56	10	14	0.1	8.2K

MIL-R-23379A IRC Type	MIL Type	Rating (Watts)	Range (Ohms) Min.	Max.
AS-1	RWP-18	1	1	1.21K
AS-2	RWP-20	3	0.1	3.57K
AS-5	RWP-21	5	0.1	12.1K
AS-10	RWP-23	10	0.499	40.2K

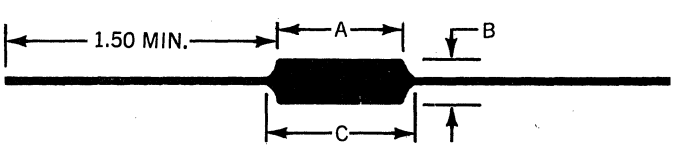
AVAILABLE RESISTANCE/TOLERANCE OHMS

IRC Type	0.1%	0.25%	.5%, 1%	3%, 5%
AS-1/2	5-2K	2.5-2K	1-6K	0.5-6K
AS-1	5-3K	2.5-3K	1-7.5K	0.1-7.5K
AS-2	5-4.2K	2.5-4.2K	1-20K	0.1-20K
AS-2A	5-8K	2.5-8K	1-42.1K	0.1-42.1K
AS-2B	5-4.5K	2.5-4.5K	1-24K	0.1-24K
AS-3	5-6.5K	2.5-6.5K	1-30K	0.1-30K
AS-5	5-15.5K	2.5-15.5K	1-60K	0.1-60K
AS-7	5-22K	2.5-22K	1-90K	0.1-90K
AS-10	5-55K	2.5-55K	1-175K	0.1-175K
ASC-10	5-22K	2.5-22K	1-90K	0.1-90K
ASC-15	5-55K	2.5-55K	1-175K	0.1-175K

PHYSICAL DIMENSIONS INCHES

IRC Type	Dim. A ±.032	Dim. B ±.032	Dim. C Max.	Lead Dia.	Weight Grams
AS-1/2	.312	.062	.375	.020	.185
AS-1	.406	.093	.500	.020	.235
AS-2	.500	.218	.625	.032	.960
AS-2A	.812	.187	.937	.032	1.10
AS-2B	.562	.187	.687	.032	.900
AS-3	.687	.250	.812	.040	1.60
AS-5	.875	.312	1.000	.040	2.57
AS-7	1.250	.312	1.375	.040	3.32
AS-10	1.812	.375	1.937	.040	5.46
ASC-10	1.375	.468	1.468	.040	10.3
ASC-15	2.000	.468	2.093	.040	14.0

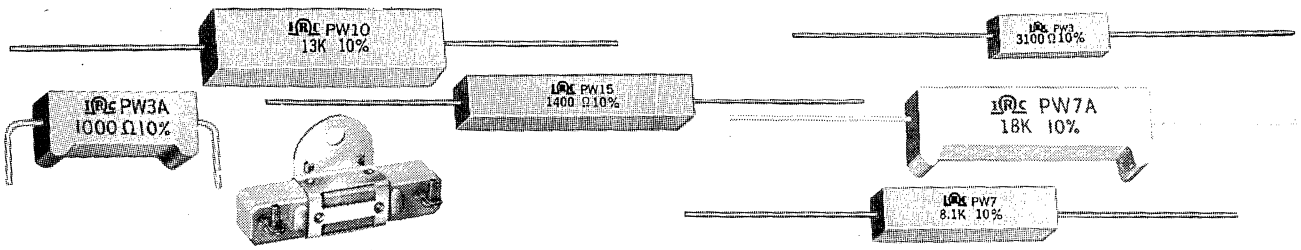
PACKAGING—Ladder Pack (standard) and Lead Tape (optional at additional cost).
CUT & FORMED LEADS—Contact TRW with your requirements.
POSITIVE TEMPERATURE COEFFICIENT—Available to +5500 PPM/°C, contact TRW.
FUSIBLE TYPES —Available for missile, computer and other critical applications, contact TRW.
CONTROLLED RISE TIME—devices available, contact TRW.



IRC BOONE DIVISION OF TRW INC. • P.O. BOX 393 • BOONE, N. C. 28607 • (704) 264-8861 • TWX 510-936-3241

HIGH TEMPERATURE POWER RESISTORS

TRW®
ELECTRONICS GROUP



FEATURING FIREPROOF INORGANIC CONSTRUCTION
for temperature compensation • circuit protection

IRC Type PW Wirewound Resistors are available in nine ratings: 2, 3, 5, 7, 10, 15, 20, 22 and 50 watts.

DESIGN AND CONSTRUCTION: The resistance elements of PW resistors are rigorously quality controlled for resistance, temperature coefficient, diameter and elongation. The wire is wound on a fiberglass core, which forms a smooth, uniform surface. The fill is the same inorganic fireproof material used in premium IRC resistors. The husky, oxygen-free copper lead wires are held by ¼ hard brass terminals. The whole assembly is then sealed in a crackfree steatite ceramic case. Special PW resistors are also available for circuit protection and temperature compensation. Optional construction is available for printed circuit board applications.

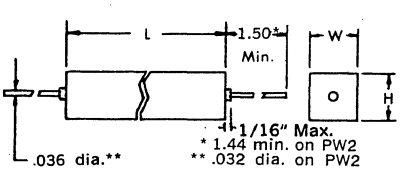
TOLERANCE: ±10% is the standard tolerance on Standard Temperature Coefficient Resistors.

SPECIFICATIONS

IRC Type	Power Rating† W @ °C	Resistance Min.* (ohms)	Resistance Max. (ohms)	Standard Temperature Coefficient (—55°C to +275°C) 0.06%/°C (ohms)	Standard Temperature Coefficient (—55°C to +275°C) 0.03%/°C (ohms)	Special Temperature Coefficients +0.55%/°C (ohms)	+0.45%/°C (ohms)	+0.26%/°C (ohms)	+0.13%/°C (ohms)
PW2	2 85	0.18	2.4K	0.18 to 0.62	0.68 to 2.4K	0.1 to 30	0.24 to 130	0.82 to 120	1.0 to 10
PW3	3 40	0.1	7.5K	0.1 to 0.27	0.3 to 7.5K	0.1 to 56	0.1 to 270	0.20 to 270	0.24 to 20
PW5	5 40	0.1	8.5K	0.1 to 0.36	0.39 to 8.5K	0.1 to 68	0.1 to 300	0.24 to 300	0.27 to 22
PW7	7 40	0.1	18K	0.1 to 0.56	0.62 to 18K	0.1 to 150	0.15 to 680	0.51 to 670	0.62 to 51
PW10	10 40	0.18	30K	0.18 to 0.91	1.0 to 30K	0.1 to 240	0.24 to 1100	0.82 to 1100	1.0 to 82
PW15	15 25	0.18	30K	0.18 to 0.91	1.0 to 30K	0.1 to 240	0.24 to 1100	0.82 to 1100	1.0 to 82
PW20	20 25	0.24	2K	0.24 to 0.39	0.43 to 560	0.1 to 3	0.1 to 16	0.14 to 36	0.14 to 39
PW22	22 25	.27	12K	0.27 to 1.3	1.3 to 12K	0.15 to 360	0.36 to 1800	1.25 to 1800	1.5 to 120
PW50	50 25	0.43	560	—	0.43 to 560	0.1 to 5	0.1 to 27	0.24 to 60	0.24 to 65

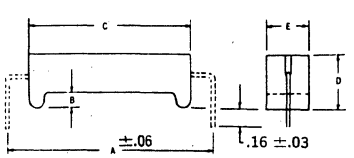
*CONSULT TRW FOR LOWER RANGES. †Derated to 0 @ 250°C.

DIMENSIONS
2, 3, 5, 7, 10, 15 and 22-WATT STYLES



DIMENSIONS ±.03

TYPE	L	W	H
PW2	.69	.25	.25
PW3	.88	.31	.31
PW5	.88	.38	.35
PW7	1.39	.38	.35
PW10	1.88	.38	.35
PW15	1.88	.50	.50
PW22	2.50	.50	.50

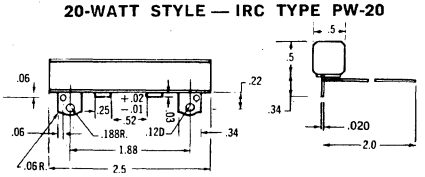


RECOMMENDED MTG. DIM.

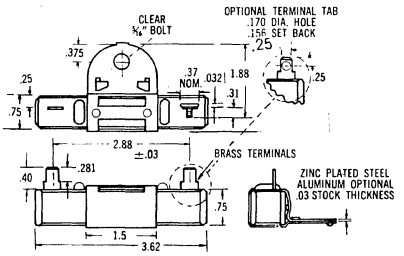
TYPE	A	B	C	D	E
PW-2A	1.06	.06	.69	.31	.25
PW-3A	1.25	.06	.88	.38	.31
PW-5A	1.25	.06	.88	.41	.38
PW-7A	1.75	.12	1.39	.47	.38
PW-10A	2.25	.12	1.88	.47	.38
PW-15A	2.25	.12	1.88	.50	.50

Standard parts are supplied with straight axial leads. Consult factory for available configurations for printed circuit mounting.

20-WATT STYLE — IRC TYPE PW-20



50-WATT STYLE — IRC TYPE PW-50



TRW® HIGH FREQUENCY, HIGH VOLTAGE RESISTORS

ELECTRONICS GROUP

SPECIFICATIONS

WITH LUG TERMINALS OR COLLOIDAL SILVER TERMINALS

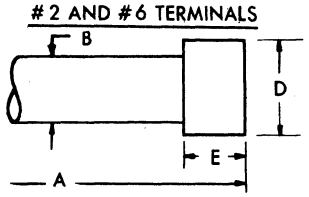
Type	Terminal Type	Power Rating† (W @ 25°C)	MP Peak Voltage Rating* (Volts)	MV Peak Voltage Rating* (KV)	MV Minimum Available Resistance ±10% or ±20% Tolerance	MV Minimum Available Resistance ±5% Tolerance	MV Maximum Available Resistance (Megs)	MP Resistance Min. in Ohms	MP Resistance Max. in Megs	Body Length	Dimensions in Inches: Resistor Body Diameter	Dimensions in Inches: Ceramic Inside Diameter	Dimensions in Inches: Width of Silver Bands #15 Term.
MPC/MVC-1	‡**	1	500	3.5	2.5K	10K	10,000	20	30	1.00±.03	.31±.03	Thd. #6-32	—
MPC/MVC-2	‡**	2	750	7.5	5K	25K	20,000	35	70	1.75±.03	.31±.03	Thd. #6-32	—
MPC/MVC-3	‡**	3	1,400	15.0	10K	100K	40,000	50	130	3.00±.03	.31±.03	Thd. #6-32	—
MPC/MVC-5	‡**	5	2,600	30.0	20K	200K	75,000	100	250	5.5 ±.06	.31±.03	Thd. #6-32	—
MPX/MVX-1	Axial Leads	1	500	3.5	See page 2895 For Ranges			20	25	1.00±.03	.25±.03	—	—
MPX/MVX-2	Axial Leads	2	750	10.0				30	100	2.00±.03	.25±.03	—	—
MPX/MVX-3	Axial Leads	3	1,250	15.0				50	150	3.00±.06	.25±.03	—	—
MPH/MVH-2	‡	4	1,000	15.0	20K	150K	60,000	30	50	2.5 ±.06	.56±.03	Thd. #6-32	—
MPH/MVH-4	‡	6	1,750	25.0	50K	400K	100,000	50	100	4.00±.06	.56±.03	Thd. #6-32	—
MPF/MVF	12, 13	2	500	5.0	2.5K	25K	15,000	20	50	1.75±.03	.31±.03	.19±.03	.38±.03
MPG/MVG	12, 13, 15, 16, 17	4	500	5.0	10K	100K	25,000	20	20	2.00±.03	.56±.03	.38±.03	.56±.06
MPJ/MVJ	12, 13, 15, 16, 17	5	1,000	10.0	20K	200K	50,000	35	50	3.00±.03	.56±.03	.38±.03	.56±.06
MPB/MVB	15	7.5	1,200	12.0	50K	400K	100,000	20	30	3.11±.03	1.00±.03	.75±.03	.56±.06
MPD/MVD	15	10	1,500	15.0	100K	700K	100,000	25	40	3.80±.03	1.00±.03	.75±.03	.56±.06
MPK/MVK	15, 16, 17	10	2,000	20.0	40K	300K	100,000	70	100	5.00±.03	.56±.03	.38±.03	.56±.06
MPP/MVP	12, 13, 15, 16, 17	10	1,750	15.0	50K	400K	100,000	35	70	4.5 ±.06	.75±.03	.50±.03	.56±.06
MPA/MVA	15, 16, 17	20	2,750	25.0	200K	1.0meg	100,000	35	75	6.5 ±.06	1.12±.03	.75±.03	.56±.06
MPZ/MVZ	15, 16, 17	20	2,750	25.0	200K	1.0meg	100,000	35	70	6.12±.06	1.12±.03	.75±.03	.56±.06
MPE/MVE	15, 16, 17	25	3,800	40.0	300K	1.5meg	100,000	40	100	8.31±.06	1.12±.03	.75±.03	.56±.06
MPO/MVO	15, 16, 17	30	4,750	50.0	400K	2.0meg	100,000	50	125	10.5±.06	1.12±.03	.75±.03	.56±.06
MPQ/MVQ	15, 17	50	4,750	50.0	500K	3.5meg	100,000	30	65	10.5±.12	2.00±.05	1.56±.03	.88±.06
MPR/MVR	15, 17	90	8,500	100.0	1meg	7.0meg	100,000	60	130	18.5±.12	2.00±.05	1.56±.03	.88±.06
MVM-5	‡	5	—	30.0	Std. Tol. ±2% 100 Meg. to 1500 Meg.			—	—	5.5 ±.06	.31±.03	Thd. #6-32	—
MVM-6	‡	6	—	30.0	Std. Tol. ±2% 100 Meg. to 1500 Meg.			—	—	6.0 ±.06	.31±.03	Thd. #6-32	—

‡ Solder lug or screw mounted.
* Rated continuous working voltage determined by $E = \sqrt{PR}$
E should not exceed value listed in column above
** Also available with axial leads.
†Derated to 0 at 105°C

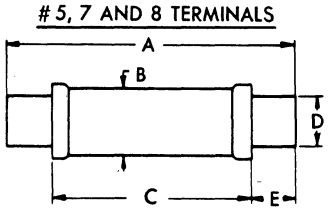
E = Max. continuous voltage
P = Power in watts
R = Resistance in ohms

These resistors are also available as ferrules in some sizes. Consult TRW.

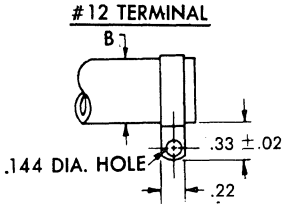
#2 AND #6 TERMINALS



#5, 7 AND 8 TERMINALS



#12 TERMINAL



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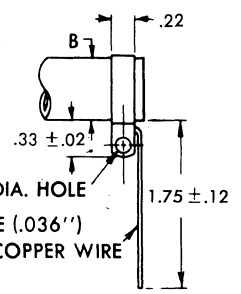
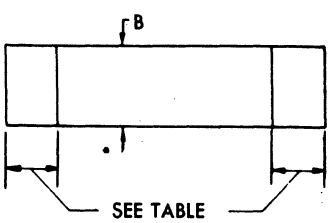
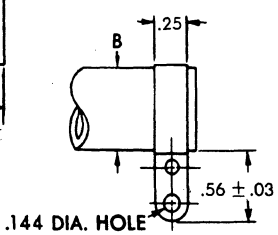


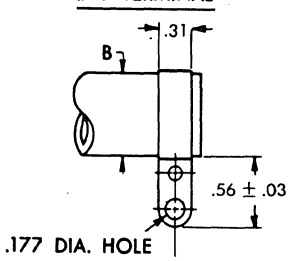
#15 TERMINAL



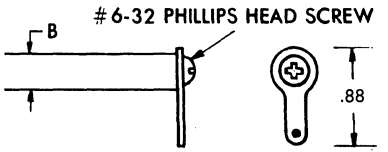
#16 TERMINAL



#17 TERMINAL

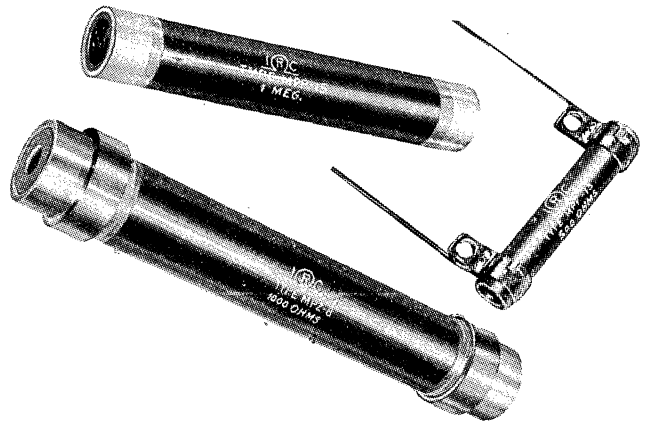


SOLDER LUG TERMINAL



HIGH FREQUENCY, HIGH VOLTAGE RESISTORS

TRW®
ELECTRONICS GROUP



TYPE MP

IRC type MP resistors have a specially designed resistance film which provides optimum performance in all characteristics while operating at high frequencies. The cross-sectional area of this exclusive film is held to less than 0.001" thickness to assure low inherent capacity and freedom from skin-effect.

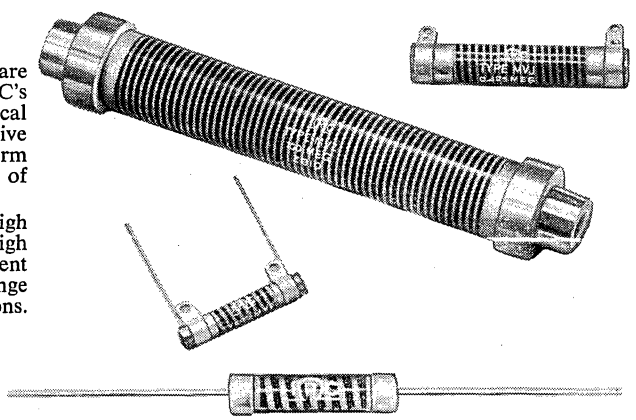
Terminal bands of colloidal silver are applied to each end of the resistor to form a permanent low resistance contact to the resistance film. Lug, axial lead or ferrule terminals, when required, are secured to the silver end-bands. A protective coating is baked on the entire resistor film.

Type MP Resistors are used extensively for applications such as broad band RF amplifiers, RF probes, rhombic antenna terminating resistors, dummy loads for transmitters and dielectric heating equipment, television side-band filters, surge generator and other circuits involving high frequency measuring circuits and radar pulse equipment.

TYPE MV

For high voltage requirements where high resistance and power are needed, IRC Type MV Resistors offer exceptional stability. IRC's exclusive composition film type resistance coating is applied in helical form on a ceramic tube to provide a conducting path of long, effective length. The mechanical spacing of the helical turns gives a uniform pitch, and allows uniform voltage gradient throughout the length of the resistor.

MV Resistors are particularly suited for voltmeter multipliers, high resistance standards, bleeders, grid leaks, voltage dividers, TV high voltage circuits, cathode ray tube circuits. Also, protective equipment for high voltage circuits, photoelectric cell applications, high range bridge circuits, ionization chambers and similar electronic applications.

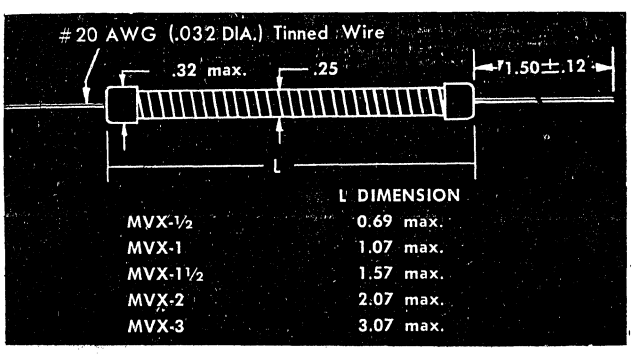


HIGH OHMIC—TYPE MVX

Type MVX meets the requirements for a small, high-range resistor with axial leads. It can be mounted through a hole in a panel or terminal board of insulating material without terminal interference. Construction corresponds to that of other MV types except for the terminal and method of terminal attachment.

TERMINALS. MVX Resistors can be furnished with or without end caps and axial leads. When furnished without leads, contact must be made to .25-inch silvered ends by pressure clips, since they cannot be soldered.

TOLERANCE. Standard tolerance for MVX Resistors is ±20%. ±5% and ±10% are available as shown in the table at right, at extra cost.



Type	Power Rating In Watts	Peak Voltage Rating	MINIMUM AVAILABLE RESISTANCE ±5%, 10%, 20% Tolerance	MAXIMUM AVAILABLE RESISTANCE ±5% Tol. In Megs	±10% Tol. In Megs	±20% Tol. In Megs
MVX-½	.5	1,000	1K	200	1,000	4,000
MVX-1	1	3,500	2.5K	350	2,500	8,000
MVX-1½	1.5	7,500	5K	700	5,000	16,000
MVX-2	2	10,000	10K	1,000	10,000	20,000
MVX-3	3	15,000	10K	1,000	12,500	30,000

TRW®

ELECTRONIC COMPONENTS

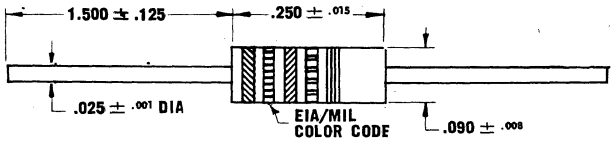
¼ TO 2 WATTS CARBON COMPOSITION AND WIREWOUND RESISTORS

TYPE GBT®-¼

¼ Watt Carbon Composition

SPECIFICATIONS

MIL-R-11 Style	RC07
MIL-R-39008 Style	RCR07
Resistance, Standard	RC07-2.7 Ohms thru 22 Megohms RCR07-2.7 Ohms thru 22 Megohms (EIA/MIL Standard Values)
Tolerances, Standard	±5%, 10%, 20%
Power Rating	¼ Watt @ 70°C derating to 0 @ 150°C



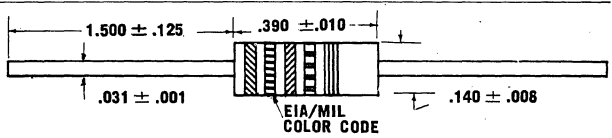
Maximum Continuous Working Voltage	250 Volts
Minimum Insulation Resistance — Dry	10,000 Megohms
Minimum Insulation Resistance — Wet	100 Megohms
Minimum Dielectric Withstanding Voltage:	
Atmospheric Pressure	500 Volts, R.M.S.
Reduced Pressure	325 Volts, R.M.S.
Hot Spot Temperature Rise at ¼ Watt	32°C, Average
Shunt Capacitance	0.15 pf, Average

TYPE GBT®-½

½ Watt Carbon Composition

SPECIFICATIONS

MIL-R-11 Style	RC20
MIL-R-39008 Style	RCR20
Resistance, Standard	RC20-2.7 Ohms thru 22 Megohms RCR20-2.7 Ohms thru 22 Megohms
Special	24 Megohms thru 100,000 Megohms (EIA/MIL Standard Values)
Tolerances, Standard	±5%, 10%, 20%
Special	±5%, 10%, 20%, 30% (depending on resistance value)
Power Rating	½ Watt @ 70°C derating to 0 @ 150°C



Maximum Continuous Working Voltage	350 Volts
Minimum Insulation Resistance — Dry	10,000 Megohms
Minimum Insulation Resistance — Wet	100 Megohms
Minimum Dielectric Withstanding Voltage:	
Atmospheric Pressure	700 Volts, R.M.S.
Reduced Pressure	450 Volts, R.M.S.
Hot Spot Temperature Rise at ½ Watt	50°C, Average
Shunt Capacitance	0.175 pf, Average

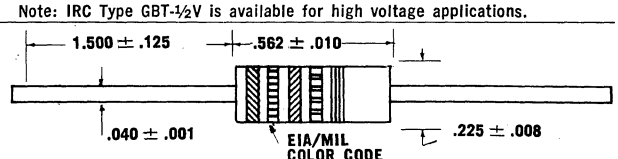
Note: IRC Type GBT-½V is available for high voltage applications.

TYPE GBT®-1

1 Watt Carbon Composition

SPECIFICATIONS

MIL-R-11 Style	RC32
MIL-R-39008 Style	RCR32
Resistance, Standard	RC32-2.7 Ohms thru 22 Megohms RCR32-2.7 Ohms thru 22 Megohms
Tolerance, Standard	±5%, 10%, 20%
Power Rating	1 Watt @ 70°C derating to 0 @ 150°C



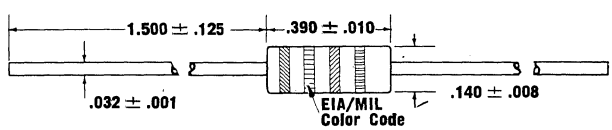
Maximum Continuous Working Voltage	500 Volts
Minimum Insulation Resistance — Dry	10,000 Megohms
Minimum Insulation Resistance — Wet	100 Megohms
Minimum Dielectric Withstanding Voltage:	
Atmospheric Pressure	1000 Volts, R.M.S.
Reduced Pressure	625 Volts, R.M.S.
Hot Spot Temperature Rise at 1 Watt	70°C, Average
Shunt Capacitance	0.25 pf, Average

TYPE BW-20

1 Watt Wirewound

SPECIFICATIONS

EIA RS-344 Style	CRU1
MIL-R-11 Style Size Equivalent	RC20
Resistance, Standard	0.24 Ohms thru 750 Ohms (EIA/MIL Standard Values)
Tolerances, Standard	±5%, 10%
Special	±2%
Power Rating	1 Watt 50°C ½ Watt 100°C ¼ Watt 125°C; derating to 0 @ 160°C



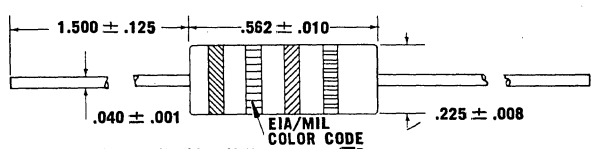
Maximum Continuous Working Voltage	$\sqrt{PR}$
Minimum Insulation Resistance — Dry	10,000 Megohms
Minimum Insulation Resistance — Wet	100 Megohms
Minimum Dielectric Withstanding Voltage:	
Atmospheric Pressure	700 Volts, R.M.S.
Reduced Pressure	450 Volts, R.M.S.
Hot Spot Temperature Rise at 1 Watt	100°C
Marking	Standard EIA/MIL Color Code (double width first band)

TYPE BWH

2 Watts Wirewound

SPECIFICATIONS

EIA RS-344 Style	CRU2
MIL-R-11 Style Size Equivalent	RC32
Resistance, Standard	0.10 Ohms thru 2400 Ohms (EIA/MIL Standard Values)
Tolerances, Standard	±5%, 10%
Power Rating	2 Watts @ 70°C 1 Watt @ 115° C ½ Watt @ 137°C; derating to 0 @ 160°C



Maximum Continuous Working Voltage	$\sqrt{PR}$
Minimum Insulation Resistance — Dry	10,000 Megohms
Minimum Insulation Resistance — Wet	100 Megohms
Minimum Dielectric Withstanding Voltage:	
Atmospheric Pressure	1,000 Volts, R.M.S.
Reduced Pressure	625 Volts, R.M.S.
Hot Spot Temperature Rise at 2 Watts	115°C
Current Noise	Negligible
Marking	Standard EIA/MIL Color Code (double width first band)

PACKAGING AND CUT & FORMED LEADS

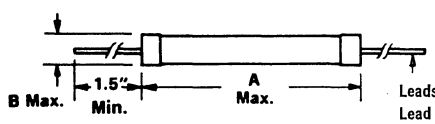
IRC general purpose resistors are packaged in a variety of styles. Cut and formed leads are also available. Consult TRW with your specific requirements.

VICTOREEN RESISTORS

When You Require Precision Resistors for Ultracritical Applications Involving

HIGH VOLTAGE · HIGH IMPEDANCE · HIGH STABILITY · HIGH WATTAGE

TYPE MOX (Metal Oxide Glaze) RESISTORS



Leads are 20 AWG tinned Copper or Dumet. Lead diameter =.020" for MOX-400,750,1125; .032" for MOX 1-5.

Type Number	Resistance Range	Wattage Rating @ 70°C	Max* Oper Voltage	Max. Oper Temp	Dimensions, inches A	Dimensions, inches B	Encapsulation
MOX-400	2500 megohms	.25	1000 V	220°C	.420±.050	.130±.010	Si Conformal
MOX-750	5000 megohms	.50	2000 V	220°C	.790±.050	.130±.010	Si Conformal
MOX-1125	10,000 megohms	1.00	5000 V	220°C	1.175±.060	.130±.010	Si Conformal
MOX-1	500 megohms	2.5	7500 V	220°C	1.050±.050	.295±.015	Si Conformal
MOX-2	1000 megohms	5	15,000 V	220°C	2.050±.050	.295±.015	Si Conformal
MOX-3	1500 megohms	7.5	22,500 V	220°C	3.050±.050	.295±.015	Si Conformal
MOX-4	2000 megohms	10	30,000 V	220°C	4.000±.050	.295±.015	Si Conformal
MOX-5	2500 megohms	12.5	37,500 V	220°C	5.050±.050	.295±.015	Si Conformal

*Applicable above critical resistance

MOX-1E — MOX-5E in same values with diameter (B) .345 max.

2 and 5% available in all values. 1% to 1000 megohms.

Temp Coefficient: This parameter varies with resistance value. Coefficients of 100 ppm in the low resistance values can be maintained, increasing to 2000 ppm in the higher values.

Voltage Coefficient: This parameter also depends on resistance value. Where a low voltage coefficient is required, it is possible to obtain values of 5 ppm or less.

Stability: Better than ± 2% for 2000 hours at full load for MOX-400, -750, -1125; better than ± 1% for 2000 hours for MOX-1 through -5.

Dielectric Withstanding: Adequate to 750 volts. With our special epoxy versions MOX-1E—MOX-5E this increases to 3500 dc volts with an attendant loss of power handling capabilities.

Insulation Resistance: MOX-1 through MOX-5 will meet the requirements of MIL-R-10509F, paragraph 3.14.

Standard Tolerances: For MOX-1 through MOX-5, 5% in all values and 1% available to 1000 megohms. 0.5% for limited values on request. For MOX-400, MOX-750 and MOX-1125: 1%, 2% and 5% available below 1000, 2000 and 3000 megohms respectively. 2%, 5% and 10% are available in the upper ranges for each type respectively.

Varnished Carbon Resistors

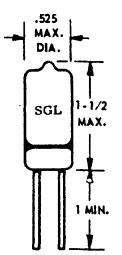
HV Series High Voltage Resistors Features—Resistances from .01—25,000 megohms. Power ratings: Radial lug 1—10W; axial lead 1—5W. Max working voltages: Radial lug 3500—40,000 volts; axial lead 3500—30,000 volts.

HP Series High Power Resistors Features—Radial band type. Resistances 0.5—100,000 megohms. Power ratings 12—100W. Max. working voltages 15—125 KV.

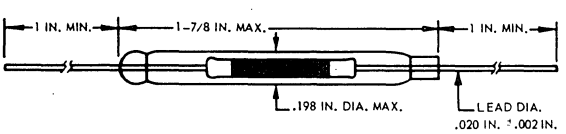
HF Series High Frequency Resistors — Elements are applied as a solid coating resulting in low inductance. Features: Resistances 20 ohms—100 megohms. Power ratings: Radial lug 1—10W; radial band 12—90W; axial lead 1—5W. Max working voltages: Radial lug 375—3100; radial band 1250—8500; axial lead 375—2600 volts.

Protective Spark Gaps

Types SGL, SGS, and SGC Series spark gaps are available for designing into equipment a high degree of protection from nearby lightning strikes or other transient producing phenomena. Various configurations and mounting arrangements available. Complete specifications on request.



TYPE RX-1 HI-MEGOHM RESISTORS



Features — Hi-Megohm resistors continue to be Victoreen's forte and the Type RX-1 series is pre-eminent as the most reliable of its type. Manufactured in accordance with MIL-R-14293A, characteristic T. Carbon coated glass rod resistor element banded with silver for electrical contact. Special silicone varnish coating. Noise level negligible. Available in resistances from 10^7—10^{14} ohms. Power rating is 1 divided by resistance in megohms. Tolerance 1% below 10^{12}, 2% and 5% below 10^{13} ohms, 10% over entire range. Max working voltage 1000V. Max ambient temperature 100°C.

VICTOREEN INSTRUMENT DIV. of VLN
10101 WOODLAND AVENUE • CLEVELAND, OHIO 44104

VICTOREEN

A-3505

VISHAY RESISTOR PRODUCTS

A DIVISION OF VISHAY INTERTECHNOLOGY, INC.
63 LINCOLN HIGHWAY ■ MALVERN, PA. 19355
TELEPHONE: (215) 644-1300 ■ TWX: 510-668-8944

PRECISION RESISTORS

TEMPERATURE COEFFICIENT

Vishay Resistors are produced by applying a specific bulk metal film of known and controllable properties on glass. This self-compensating system of glass and metal produces a dome shaped TC curve with zero TC at 25°C, and a maximum variation of 1ppm from 0 to 60°C.

TOLERANCE

The Vishay patented process, which combines photoetching techniques and bulk metal film set on glass, permits trimming to extremely high accuracy. Coarse and fine adjustment to tolerances of ±0.005% is standard and ±0.001% is available when resistors are hermetically sealed.

TRACKING

Optimum TC tracking between all Vishay resistors — *regardless of value* — is obtained because all are made of the same alloy, are of identical thickness, and are set in the same manner on glass. Vishay will guarantee TC tracking of their resistors *even when manufactured more than 2 years apart!*

RISE TIME

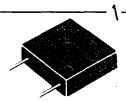
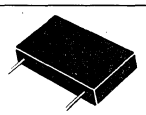
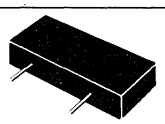
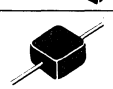
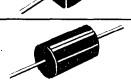
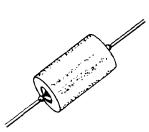
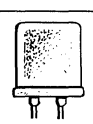
The etched planar construction of Vishay resistors results in extremely low and reproducible reactance. Settling time is less than 1 nanosecond for individual resistors; when grouped in network form, a typical R/2R ladder of 10 bits will have less than 10 nanoseconds rise time and less than 50 nanoseconds settling time; and no ringing.

STABILITY

Flexible welded ribbon leads and elastomeric encapsulation isolate the resistive element from mechanical stresses, giving the Vishay resistor ultra-high stability. The standard Vishay stability guarantee is 25ppm/yr. (50ppm max. over 3 years); and by hermetically sealing the resistors, Vishay can achieve 5ppm/yr.

1 PPM/ C. (0 to +60 C.) FOR ALL VALUES | **±0.001%** | **1/2 PPM/ C. FOR ALL VALUES** | **1 NANOSECOND** | **5 PPM/YR.**

Other characteristics, including .04% ΔR through Load Life; and non-measurable Noise, make Vishay resistors the most significant breakthrough in advancing circuit design since the transistor.

STYLE	DIMENSIONS	VALUE RANGE and WATTAGE RATING[1]	TOLERANCE	TEMPCO FOR ALL VALUES		SHELF LIFE
				Absolute 0°C. to 60°C.	Tracking	
S102 Lead spacing: 150±.010	H — .320±.020 L — .295±.010 W — .100±.010	30Ω to 75KΩ 0.30 watts	0.005% to 1.00%	1ppm/°C.	1.5ppm/°C.	25ppm/yr. (50ppm max. 3 yrs.)
S104 Lead spacing: .400±.020 	H — .520±.020 L — .565±.020 W — .150±.010	60Ω to 150KΩ 0.50 watts				
S105 Lead spacing: .650±.020 	H — .520±.020 L — .810±.020 W — .150±.010	90Ω to 225KΩ 0.75 watts				
S106 Lead spacing: .650±.020 	H — .520±.020 L — 1.190±.020 W — .245±.020	120Ω to 300KΩ 1.00 watts				
S302 	H — .200±.020 L — .375±.020 W — .375±.020	30Ω to 75KΩ 0.30 watts				
C302 	D — .275±.010 L — .510±.020	30Ω to 75KΩ 0.30 watts				
HA412	⅜" dia. x ⅝" long	30Ω to 75KΩ 0.30 watts	0.0010% (min. 1KΩ)	1ppm/°C.	0.5ppm/°C.	5ppm/yr.
HA512	½" dia. x ⅝" long	30Ω to 225KΩ 0.50 watts[2]	0.0025% (min. 500Ω)			
HA414 	⅜" dia. x 1" long	30Ω to 150KΩ 0.50 watts[2]	0.005% 0.01%			
HA516	½" dia. x 1" long	120Ω to 450KΩ 1.0 watts[2]	0.020% 0.05%			
HA518	½" dia. x 1½" long	180Ω to 750KΩ 1.25 watts[2]	0.10% 1.00%			
HP202 Lead spacing: .150±.010 	H — .400±.020 L — .425±.020 W — .177±.020	30Ω to 75KΩ 0.30 watts	0.001%	1ppm/°C.	0.5ppm/°C.	5ppm/yr.

NOTES: Leads are #22 AWG tinned copper. [1] rated @ 125°C. [2] maximum power listed at ambient temperature of 25°C. without heat sink. S104, S105, S106, HA and HP available in 1Ω to 30Ω values, upon request.

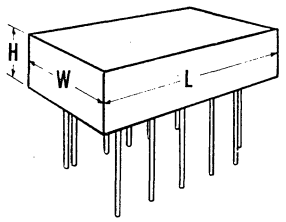
VISHAY RESISTOR PRODUCTS

A DIVISION OF VISHAY INTERTECHNOLOGY, INC.
63 LINCOLN HIGHWAY ■ MALVERN, PA. 19355
TELEPHONE: (215) 644-1300 ■ TWX: 510-668-8944

ONLY VISHAY MAKES NETWORKS WITH ALL THESE SPECIFICATIONS

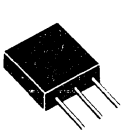
- RESOLUTION TO **16** BITS
- FULL SCALE ACCURACY TO **0.005%**
- RISE TIME LESS THAN **1** NANOSECOND
- SETTLING TIME LESS THAN **50** NANOSECONDS
- TEMPCO LESS THAN **1** PPM/°C FOR ALL VALUES (0°C TO 60°C)
- TRACKING TO **1/2** PPM/°C
- STABILITY **25** PPM OVER 3 YRS.
- **BCD** TO 4 DIGITS

STANDARD NETWORKS
BINARY and R-2R

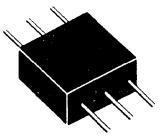


Model No.	No. Bits	L (inches)
Series 500	4 or 5	0.700
	6, 7, or 8	1.080
H = 0.5"	9 or 10	1.300
	11	1.500
W = 0.750"	12 or 13	1.660
	14 or 15	1.900
Series 375	4	0.730
	5 or 6	1.080
H = 0.375"	7 or 8	1.380
	9 or 10	1.680
W = 1.230"	11 or 12	1.980
	13 or 14	2.280
	15	2.590

EXTEND THE PERFORMANCE OF AMPLIFIERS, VOLTAGE DIVIDERS, AND R-2R LADDER NETWORKS BY USING THESE VISHAY 2-ELEMENT AND 4-ELEMENT RESISTOR NETWORKS:



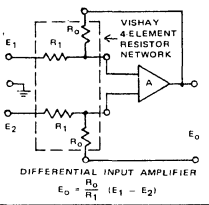
Model 300144
2-element
100" x .295" x .320"
Lead spacing .100"



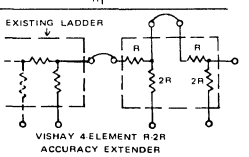
Model 300145
4-element
.200" x .375" x .375"
Lead spacing .125"

Power rating — 0.1 watt at 85°C

IMPROVE AMPLIFIER PERFORMANCE

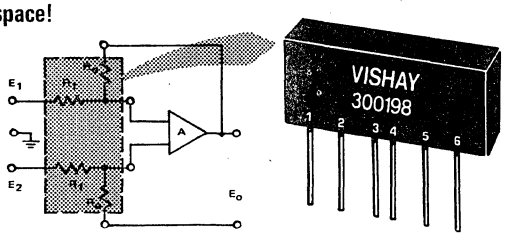


EXTEND ACCURACY OF LADDER NETWORKS

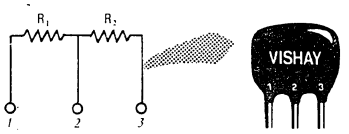


SAVE MONEY AND SPACE WHILE ELIMINATING ALL THESE OPERATIONS:

- Multi-component receiving inspection
- Sorting for TC or Ratio match
- Pre-packaging or binning
- Multi-insertions: With only ONE INSERTION you can assemble up to 4 resistors on a PC board, and in 1/8 the space!

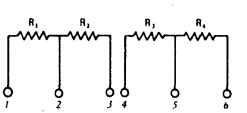
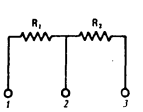


Typical op-amp feedback resistors showing how one VISHAY (actual size) pre-packaged 4 resistor assembly can be used to replace precision wirewounds.



VISHAY (actual size) pre-packaged 2 resistor voltage divider. Other configurations available with up to 4 discreet resistors.

VISHAY UNITIZED RESISTOR CIRCUITS

SPECIFICATIONS	TYPICAL PRICES (QTY. 100)
HIGH ACCURACY RATIO MATCH ■ Each Resistor: 100Ω to 75K ■ Absolute Tol. each R: To .005% ■ Absolute TC each R: ±5 ppm/°C (-55°/125°C) ■ Tol. Match: To .005% ■ TC Match: Within 3 ppm/°C (-55°/125°C)	 **$9.52 each** (0.01% match; tracking within 3 ppm/°C)
MEDIUM ACCURACY RATIO MATCH ■ Each Resistor: Up to 50K ■ Absolute Tol. each R: To .05% ■ Absolute TC each R: ±10 ppm/°C (-55°/125°C) ■ Tol. Match: To .1% ■ TC Match: Within 5 ppm/°C (0°/60°C)	 **$1.56 each** (1% match; tracking within 5 ppm/°C)

Unitized Resistor Circuits can also be used as bridges, rectifiers, attenuators, ladders, etc.

WELWYN RESISTORS

RELIABILITY IN RESISTORS — FROM 0.1 Ω TO 1,000,000 Meg.

MINIATURE OXIDES to MIL-R-22684B

Type	Rating Watts	Dielectric Strength	Rated Voltage	Resistance Range Min.	Max.
RL07	1/4	1000V	250 Volts	47 Ω	150K
RL20	1/2	1000V	350 Volts	10 Ω	470K

TYPE	LGTH.		DIA.		LEADS	
RL07	.250″	±.031″	.090″	±.008″	.025″	±.002″
RL20	.375″	±.025″	.145″	±.005″	.032″	±.002″

TOLERANCE: STD. AT ±2% AND ±5%

IDENTIFICATION: STD. COLOR BANDING

PRICES: .024 - .17 (BULLETIN M3B)

PLUS A COMPLETE LINE OF FLAMEPROOF POWER OXIDES, 2 - 10 WATT (BULLETIN M5).

PRECISION METAL FILM to 300 MEG.

Series	Wattage Rating @ 70°C	125°C	Max. Cont. Voltage	Surf. Temp. Rise °C	Dimensions L	D	A	T.C. in PPM	Order By Type No.	Resistance Range		
M20	.25	.125	250	30	.375″ ± .025″ (Molded construction)	.145″ ± .010″	.032″ ± .002″	25	M20E	50Ω	—	100K
								50	M20C	10Ω	—	1 Meg.
								100	M20D	1Ω	—	1 Meg.
								150	M20H	High Value 1.01 Meg. to 1.5 Meg.		
M11	.375	.187	300	30	.470″ ± .025″	.145″ ± .010″	.025″ ± .002″	25	M11E	50Ω	—	250K
								50	M11C	10Ω	—	1.5 Meg.
								100	M11D	1Ω	—	1.5 Meg.
								150	M11H	High Value 1.51 Meg. to 3.0 Meg.		
M22	0.5	0.25	350	35	.575″ ± .015″	.205″ ± .010″	.032″ ± .002″	25	M22E	50Ω	—	500K
								50	M22C	10Ω	—	2.0 Meg.
								100	M22D	1Ω	—	2.5 Meg.
								150	M22H	High Value 2.51 Meg. to 10 Meg.		
M13	1.0	—	500	50	.840″ ± .025″	.285″ ± .010″	.032″ ± .002″	25	M13E	50Ω	—	1.0 Meg.
								50	M13C	10Ω	—	7.5 Meg.
								100	M13D	10Ω	—	10 Meg.
								150	M13H	High Value 10.1 Meg. to 30 Meg.		
M14	2.0	—	1600	60	2.000″ ± .060″	.285″ ± .010″	.032″ ± .002″	25	M14E	120Ω	—	2.0 Meg.
								50	M14C	40Ω	—	15 Meg.
								100	M14D	10Ω	—	20 Meg.
								150	M14H	High Value 20.1 Meg. to 100 Meg.		

High Values up to 300 Meg. available on special order.
TOLERANCE: 1% STD. ALSO .5% AND 0.25%
PRICE: .09 - 4.50 (BULLETIN M14D)

HIGH VOLTAGE OXIDES

Welwyn Type	Watts @ 40°C	Termination	Dimensions L	D	**Working Voltage	Pulse Voltage	Temp. Rise	Tolerance	Resistance Range Min.	Max.
F43D	½	Standard Wire Leads	1.094″	0.312″	4KV	15KV	26°C	± 2%	2M	3,000M
F43KU	½	Comb. Lead/Threaded Cap	1.188″	0.312″	4KV	15KV	26°C	± 5%	2M	100,000M
*F43TU	½	Threaded Caps, Both Ends	1.280″	0.312″	4KV	15KV	26°C	±10%		
F44D	1	Standard Wire Leads	2.000″	0.312″	14KV	50KV	36°C	± 2%	2M	10,000M
F44KU	1	Comb. Lead/Threaded Cap	2.094″	0.312″	14KV	50KV	36°C	± 5%	2M	150,000M
*F44TU	1	Threaded Cap, Both Ends	2.187″	0.312″	14KV	50KV	36°C	±10%		

* 10-32 x 5/16″ Coupling Stud Supplied with Each Unit. TOLERANCE STD. AT ±2% AND ±5% PRICES: 0.60 to 3.50 (Bulletin M7C)

ULTRA LOW VALUES

TYPE	WATTS	% TOL.	LGTH.	DIA.	RESISTANCE RANGE MIN.	MAX.
A20	1/2	1, 2, 5	.400″	.145″	0.27 Ω	9.9 Ω
A31	1-1/2	2, 5, 10	.6875″	.203″	0.27 Ω	27 Ω
A32	3	2, 5, 10	.8906″	.328″	0.27 Ω	27 Ω

PRICES: .15 - .95 (BULLETINS LV10B)

ATTENUATOR PADS

WRITE FOR BULLETIN AP13 COVERING OUR EXTENSIVE LINE OF PADS.

ULTRA HIGH VALUES

MH52 — Sleeved,
MH51 — Sleeved, Miniature
M51 — Glass Enclosed

TYPE	VOLTS	LGTH.	DIA.	RANGE
MH52	3000	.88″	.140″ ± .020″	60M - 10KM
MH51	1500	.50″	.140″ ± .010″	30M - 5KM
M51	500	1.88″	.216″ ± .006″	10M - 1MM

TOLERANCE:
MH52 - 1%, 2%, 5%, 10%. MH51 - 10%, 20%. M51 - 1%, 2%, 5%, 10%.
PRICES: .80 - 25.00 (BULLETIN HV8C)

WELWYN NOW MARKETING & WAREHOUSING BEYSCHLAG OF WEST GERMANY

SUPERIOR QUALITY 5% DEPOSITED CARBONS PRICED COMPETITIVELY WITH COMPS

(Also available @ 2% Tolerance)

Europe's leading supplier of deposited carbon resistors Beyschlag products are now being stocked in depth both in the U.S.A. and Canada. Quality control at every step in the production process, coupled with highly automated manufacturing technique, guarantees the enviable reputation for quality and reliability that Beyschlag have earned throughout the world for over 20 years.

Type	Wattage @ 40°C	70°C	L	D	Wkg. Volt	Tol.	Range
BA	¼	⅛	.145″	.075″	100	5%	10 Ω - 100 K
BB	⅜	¼	.250″	.098″	150	5%	10 Ω - 1 M
0309	½	⅓	.325″	.114″	250	5%	1 Ω - 1 M
0617	1	⅔	.610″	.236″	630	5%	4.7 Ω - 22 M
0922	2	1⅓	.810″	.355″	750	5%	10 Ω - 22 M

(BULLETIN WB-1) PRICING: 1.2¢ & UP

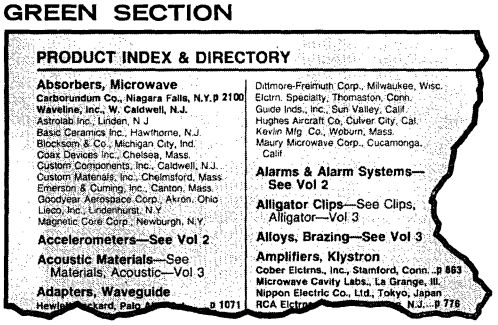
ALL PRICES SHOWN FOR GUIDANCE ONLY. SPECIFIC PRICES SUBJECT TO VALUE, TOLERANCE, QUANTITY AND SPECIFICATION.

USA: WELWYN INTERNATIONAL, INC. • 811 SHARON DR. • WESTLAKE, OHIO • (216) 871-8900 • CABLE WELINT • TELEX 00985276
CANADA: WELWYN CANADA LTD. • P.O. BOX 2484 • 1255 BRYDGES ST. • LONDON, ONT. • CAN. • (519) 451-9490 • CABLE WELCAN • TELEX 024-843

How to use eem

to find manufacturers of a specific product

GREEN SECTION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Blocksom & Co., Michigan City, Ind.
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Custom Materials, Inc., Chelmsford, Mass.
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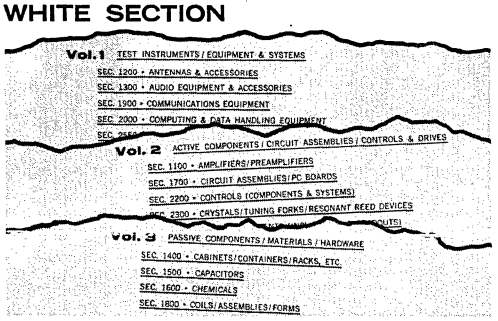
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol.1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
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SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
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SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

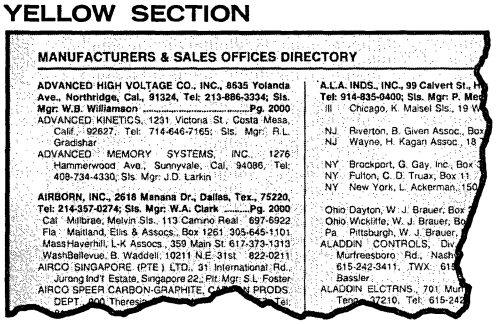
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

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Cal Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Elis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St 617-373-1313
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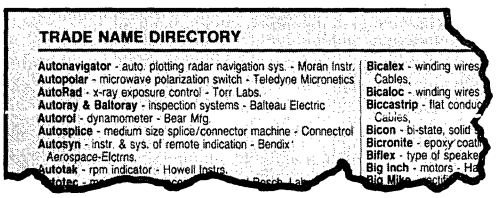
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22., Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA... PRODS. DEPT., 900 Theres... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill Chicago, K. Maisel Sls., 19 W...
NJ Riverton, B. Given Assoc., Box...
NJ Wayne, H. Kagan Assoc., 18...
NY Brockport, G. Gay, Inc., Box...
NY Fulton, C. D. Truax, Box 11...
NY New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa Pittsburgh, W. J. Brauer,...
ALADDIN CONTROLS, Div... Murfreesboro Rd., Nash... 615-242-3411, TWX: 615... Bassler...
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix' Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
[illegible]

Bicalex - winding wires... Cables,
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
[illegible]

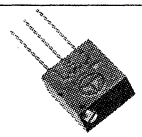
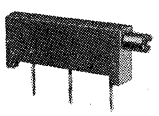
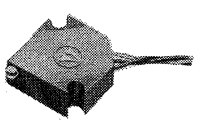
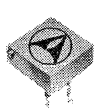
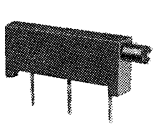
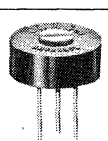
If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

MICROPOT® WIREWOUND TRIMMING POTENTIOMETERS

BUNKER RAMO AMPHENOL

Description	Amphenol Model No.	Adjustment Turns	Terminals[2]	Resistance Range in Ohms[3]	Resistance Tolerance	Temperature Range	Temperature Coefficient Potentiometer (PPM/°C)	Maximum Power Rating in Watts
1¼" Rectangular	992[1] 994[1]*	22	L,SL,P	10 to 50K	10 to 75 ±10% 100 ohms to 50K ±5%	−55°C to +125°C	70 ppm	1 @ 40°C
Microminiature ⅜" Square 	2300*	26	P,W,X	10 to 20K	±5%	−55°C to +150°C	50 ppm	¾ @ 85°C
Microminiature ¾" Rectangular 	2600 2610*	22	P	10 to 20K	±10%	−55°C to +125°C	100 ppm	1 @ 40°C
High Temperature 1¼" Rectangular	2750[1]*	22	P L,SL	10 to 20K 10 to 50K	±5%	−55°C to +150°C	50 ppm	¾ @ 85°C
High Temperature 1¼" Rectangular	2850[1]* 2860[1]	22	L,SL,P	10 to 50K	±5%	−55°C to +150°C	50 ppm	¾ @ 85°C
Subminiature ½" Square 	2900[1]*	25	P,L,W,X,Y	10 to 50K	±5%	−55°C to +150°C	50 ppm	¾ @ 85°C
Microminiature ⅜" Square Solvent-Resistant 	3600 3610*	23	P,W,X	100 to 20K	±10%	−55°C to +125°C	100 ppm	½ @ 40°C
Microminiature ¾" Rectangular Solvent-Resistant 	3800[4] 3810*[4]	15	P, K	10 to 20K	±10%	−55°C to +125°C	100 ppm	1 @ 40°C
Subminiature ½" Round 	6900	Single-turn	P	10 to 50K	±10%	−55°C to +125°C	50 ppm	1 @ 40°C

[1] Panel mounting bracket available.
[2] Terminations: L — Color coded wire leads
SL — Solder lugs
P — Printed circuit pins
W — Printed circuit pins (edge mount, top adjust leadscrew)
X — Printed circuit pins (edge mount, side adjust leadscrew)
[2] Terminations: Y — Printed circuit pins — staggered (edge mount, top adjust leadscrew)
K — Printed circuit pins with 0.200" spacing
[3] See Catalog T-2 for standard resistance values.
[4] For Vista-Trim top, use suffix -2, as: 3800P-100-2
* Humidity Proof

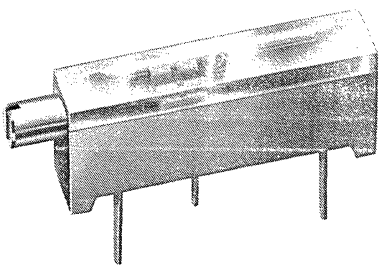
MICROPOT® WIREWOUND TRIMMING POTENTIOMETERS

BUNKER RAMO AMPHENOL

SIZE IN INCHES H	W	L	Application
0.32	0.28	1.25	Industrial Commercial
0.198 0.415 0.415	0.375 0.193 0.200	0.375P 0.375W 0.375X	MIL-R-27208 RT24
0.31	0.16	0.75	Commercial
0.32	0.19	1.25	MIL-R-27208 RT12
0.32	0.28	1.25	Military Industrial MIL-R-27208 RT-11
0.220 0.187 0.500 0.575 0.500	0.500 0.500 0.195 0.190 0.195	0.500P 0.500L 0.500W 0.500Y 0.500X	MIL-R-27208 RT22
0.20	0.375	0.375	Commercial
0.31	0.16	0.75	Commercial
0.255	0.500 Dia.		Industrial Commercial

® MICROPOT — Trademark registered U.S. Patent Office
Humidity-proof trimmers pass MIL-R-27208A moisture resistance test.

Vista-Trim Trimmers Allow Visual Settings of Approximate Desired Values...



Standard Resistances Available

Ohms	Wirewound 3800/3810	Cermet 3805/3815	Film-Met™ 3811
10	X	—	X
20	X	X	X
50	X	X	X
100	X	X	X
200	X	X	X
500	X	X	X
1,000	X	X	X
2,000	X	X	X
5,000	X	X	X
10,000	X	X	X
20,000	X	X	X
50,000	—	X	X
100,000	—	X	—
250,000	—	X	—
500.000	—	X	—
1,000,000	—	X	—

Speed Production and Reduce Labor Costs —

Once you've set one Vista-Trim trimmer to a given value, the same (approximate) value can be set on others by visual measurement.

Saves Valuable Time —

Both the element and contact carrier are visible through the semi-transparent top. Approximate final settings can be made with or without an ohmmeter. Example: For 50 ohms, set the contact at half the length of its travel along a 100 ohm element.

Reduce Field Service Time —

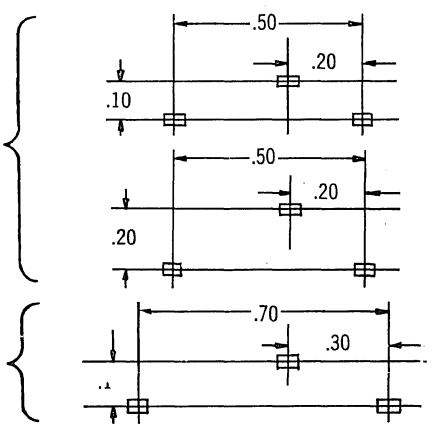
The repair of installed equipment is speeded up because the same advantages apply as for new equipment. The technician can visually adjust all units to approximate final settings. This saves time, aids him considerably by allowing quick easy final adjustments to balance the circuits.

Vista-Trim trimmers have the same electrical, mechanical and environmental specifications as the standard series presented in Amphenol Catalog T-2. To order, add suffix: -2 to the standard Amphenol part number, e.g. 3810P-101-2.

Optional 0.100" or 0.200" Pin Spacing on ¾" Commercial Trimmers

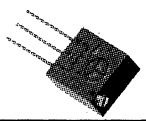
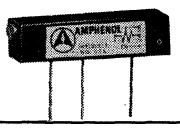
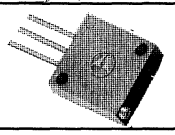
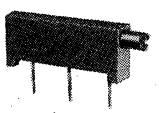
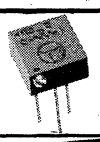
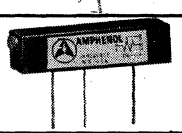
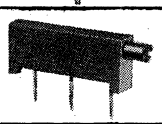
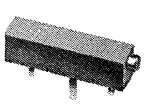
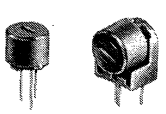
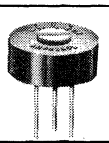
Amphenol has expanded its entire line of ¾" rectangular cermet, Film-Met™ and wirewound trimmers to include 0.200" pin spacing. You can now specify 0.100" or 0.200" pin spacing as standard on the following models. To order, indicate the appropriate terminal designation -P, K or Y- in Amphenol's part numbering system for the spacing desired, e.g. 3800**P**-101 or 6034**K**-101.

Models Available	Termination Designation	Pin Spacing
3805 3815 6034 3811 3800 3810	P	0.100"
	K	0.200"
6034	Y	0.100"



MICROPOT® INFINITE RESOLUTION TRIMMING POTENTIOMETERS

BUNKER RAMO AMPHENOL

	Description	Amphenol Model No.	Adjustment Turns	Terminals[2]	Resistance Range in Ohms[3]	Resistance Tolerance	Temperature Range	Temperature Coefficient Potentiometer (PPM/°C)
FILM-MET™‡	Microminiature ⅜″ Square 	2301*	26	P,W,X	10 to 10K	±10% (±5% avail.)	−55° to +150°C	50 ppm
	High-Temperature 1¼″ Rectangular 	2851[1]*	22	L,SL,P	20 to 20K	±10% (±5% avail.)	−55° to +150°C	50 ppm
	Subminiature ½″ Square 	2901[1]*	25	P,L,W,Y,X	10 to 20K	±10% (±5% avail.)	−55° to +150°C	50 ppm
	Microminiature ¾″ Rectangular Solvent-Resistant 	3811*[4]	15	P, K	10 to 20K	±10% (±5% avail.)	−55° to +125°C	50 ppm
CERMET	Microminiature ⅜″ Square 	2305*	26	P,W,X	10 to 1 Meg.	±10% (±5% avail.)	−55° to +150°C	±150 ppm (±100 ppm avail.▲)
	High Temperature 1¼″ Rectangular 	2855[1,3]	22	P,L,SL	20 to 1 Meg.	±10% (±5% avail.)	−55° to +150°C	±150 ppm (±100 ppm avail.▲)
	Subminiature ½″ Square	2905[1]*	25	P,L,W,Y,X	20 to 10 Meg.	±10% (±5% avail.)	−55° to +150°C	±150 ppm (±100 ppm avail.▲)
	Microminiature ¾″ Rectangular Solvent-Resistant 	3805[4] 3815*[4]	15	P, K	20 to 1 Meg.	±10% (±5% avail.)	−55° to +125°C	±150 ppm (±100 ppm avail.▲)
	Microminiature ¾″ Rectangular 	6034*	15	P,K,Y	10 to 1 Meg.	±10% (±5% avail.)	−55°C to +125°C	±100 ppm
	Microminiature ¼″ Round 	6203	Single Turn	P,X	10 to 2 Meg.	±20%	−25°C to +125°C	±100 ppm
	Subminiature ½″ Round 	6905	Single-turn	P	20 to 10 Meg.	±10% (±5% avail.)	−55° to +125°C	±150 ppm (±100 ppm avail.▲)

[1] Panel mounting bracket available.
[2] Terminations: L — Color coded wire leads
SL — Solder lugs
P — Printed circuit pins
W — Printed circuit pins (edge mount, top adjust leadscrew)
X — Printed circuit pins (edge mount, side adjust leadscrew)
Y — Printed circuit pins — staggered (edge mount, top adjust leadscrew)
K — Printed circuit pins with 0.200″ spacing
[3] See Catalog T-2 for standard resistance values.
[4] For Vista-Trim top, use suffix -2, as: 3800P-100-2
* Humidity Proof

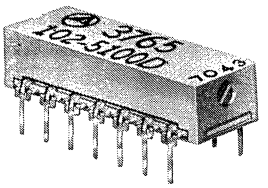
MICROPOT® INFINITE RESOLUTION TRIMMING POTENTIOMETERS

BUNKER RAMO AMPHENOL

Maximum Power Rating in Watts	SIZE IN INCHES H	W	L	Application
½ @ 85°C	0.198 0.415 0.415	0.375 0.193 0.200	0.375P 0.375W 0.375X	Military Industrial
¾ @ 85°C	0.32	0.28	1.25	Military Industrial
¾ @ 85°C	0.220 0.187 0.500 0.575 0.500	0.500 0.500 0.195 0.190 0.195	0.500P 0.500L 0.500W 0.500Y 0.500X	Military Industrial
¾ @ 40°C	0.31	0.16	0.75	Commercial
½ @ 85°C	0.198 0.415 0.415	0.375 0.193 0.200	0.375P 0.375W 0.375X	MIL-R-22097 RJ24
¾ @ 85°C	0.32	0.28	1.25	MIL-R-22097 RJ11
½ @ 85°C	0.220 0.187 0.500 0.575 0.500	0.500 0.500 0.195 0.190 0.195	0.500P 0.500L 0.500W 0.500Y 0.500X	MIL-R-22097 RJ22
¾ @ 40°C	0.31	0.16	0.75	Commercial
½ @ 85°C	0.20	0.16	0.75	Commercial
¼ @ 85°C	(X) 0.33 (P) 0.22	0.26 0.25 Dia.	0.26	Commercial
½ @ 40°C	0.255	0.500 Dia.		Industrial Commercial

® MICROPOT — Trademark registered U.S. Patent Office
Humidity-proof trimmers pass MIL-R-27208A moisture resistance test.
▲ 1K and up

TRN: A Unique Solution to Circuit Problems



Some background — Several developments recently have profoundly changed electronic industry design and manufacturing techniques—not the least of which has been the trend toward dual-in-line packaging (DIP). The quest for an effective DIP trimmer package has been industrywide. Several manufacturers already have modified existing trimming potentiometers by turning them on their side, adding terminals, and calling them DIP trimmers.

But this solution didn't go far enough for Amphenol. A DIP trimmer is a definite plus but the manufacturer of circuits still has to insert individual fixed resistors either by hand or machine. So Amphenol came up with a new concept: a trimmer with up to five fixed resistors on one substrate contained in one DIP package. We've named the product TRN, or Trimming Resistive Network*.

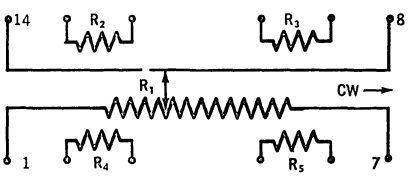
The product will conserve PC board "real estate" by a six to 1 ratio and will save its users money. With TRN there is only one component to procure, inventory and prep for insertion instead of six and the TRN can be automatically inserted.

Not only does Amphenol's new TRN offer exceptional economies, it does more jobs, and does them better, than anything currently available.

Consider: Amphenol's cermet TCR performance values of 50 or 100 ppm/°C. The one-paste, one-step deposition method that we use allows for uniform predictable drift of TCR within the range of ±10 ppm/°C of each other for each resistor in the circuit. In addition the unit features a ratio accuracy with respect to the variable resistor available as low as ±1%.

All componentry is housed in a single package, which means that ambient temperature for each resistor in the circuit is the same as for all others. Plus you get versatility of applications and reliable, long life.

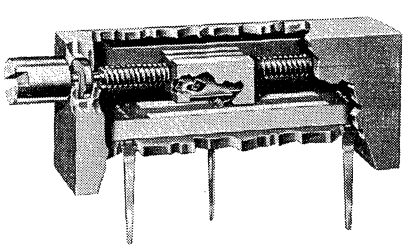
DIMENSIONS: In accordance with EIA Microelectronics Outline, DIP Family, 0.300 inch row spacing.



This voltage divider network consists of thick film cermet resistors R_1 through R_5 individually terminated to provide flexibility for connecting in various circuit configurations. R_1 is adjustable by means of a leadscrew.

*Patent Pending

Film-Met™ by Amphenol*



It's the first major improvement in infinite resolution trimmers since cermets. Film-Met is an exclusive Amphenol resistance element completely different from wirewound and cermet types.

100% METAL ELEMENT — Amphenol's exclusive Film-Met element uses the same vacuum deposition process as precision metal-film fixed resistors. Continuous monitoring techniques during deposition assure maintenance of established performance levels and continuing high quality.

ENDS COMPROMISE—This new trimmer won't always replace wirewounds and cermets. Their characteristics fit many design parameters perfectly. But not all!

TEMPERATURE COEFFICIENT — Film-Met has a low TCR of ±50 ppm/°C maximum as standard. Perfect for applications requiring extremely low TCR.

NOISE—For applications requiring critical low noise levels, Film-Met must be your choice. This is especially true in applications where other components feature low thermal noise. Film-Met is now available for that critical job.

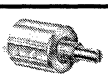
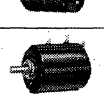
SETABILITY—Film-Met contact setability is improved over cermet because of lower contact resistance variation, and vastly improved over the resolution inherent in wirewound trimmers which have limited setability due to the turns of the resistance wire. The lower CRV of Film-Met results from the smooth metallic element surface which provides a low resistance interface with the precious metal contact.

OTHER FEATURES — Your choice for high frequency and pulse applications should also be Film-Met because of its excellent performance characteristics in these areas. Investigate Film-Met performance features for solutions to your circuit problems.

*U.S. Patent No. 3,354,134; also foreign patents.

MICROPOT® PRECISION POTENTIOMETERS

BUNKER RAMO AMPHENOL

	SIZE IN INCHES				Amphenol Model No.	Standard Resistance Range in Ohms[5]	Standard Resistance Tolerance	Linearity Tolerance —Standard	Temperature Range	Max. Power Rating, Watts
	Diameter	Length	Shaft Dia.							
SINGLE TURN	7/8	.797	1/8		2440	10 to 100K	±3%	≤50Ω ±1% 100-200Ω ±0.75% ≥500Ω ±0.5%	−55°C to +125°C	3 @ 40°C
	1 1/8	.593	1/8		2450	10 to 100K	<10K ±5% >10K ±3%	≤50Ω ±1% 100-500Ω ±0.75% ≥1KΩ ±0.5%	−55°C to +125°C	4 @ 40°C
	1 5/8	.818	1/4		2460	10 to 100K	<5K ±5% >5K ±3%	≤50Ω ±1% 100-200Ω ±0.75% ≥500Ω ±0.5%	−55°C to +125°C	4 @ 40°C
	2	1.018	1/4		2480	20 to 125K	<5K ±5% >5K ±3%	<50Ω ±1% >50Ω ±0.5%	−55°C to +125°C	5 @ 40°C
	3	1.018	1/4		2490	20 to 200K	<5K ±5% >5K ±3%	≤50Ω ±1% >50Ω ±0.5%	−55°C to +125°C	6 @ 40°C
	1 7/16	.656	1/4		3460	100 to 50K	±5%	±0.5%	−55°C to +125°C	4 @ 40°C
3-TURN	7/8	1.055 Serv. .930 Bush.	1/8		2130	10 to 50K	10-30Ω ±5% 100-50K ±3%	±0.5%	−55°C to +125°C	4 @ 40°C
	1 3/4	1 31/64	1/4		205-3T[1]	10 to 50K	10Ω ±10% 50-50K ±3%	±0.5%	−55°C to +105°C	3 @ 40°C
	2	1 3/8 Serv. 1 9/16 Bush.	1/4		930[2]	20 to 50K	≦100Ω ±10% ≥100Ω ±3%	±0.25%	−55°C to +125°C	3 @ 40°C
10-TURN	7/8	1	1/4		MF-78	500 to 125K	±3%	±0.2%	−55°C to +85°C	2 @ 40°C
	7/8	1.182	1/4		4100	100 to 100K	100-100K ±5%	±0.25%	−55°C to +125°C	2 @ 40°C
	7/8	1.455	1/4		2150	25 to 100K	25-50Ω ±5% 100-100K ±3%	±0.25%	−55°C to +105°C	3 @ 40°C
	7/8	1.455	1/8		2160	25 to 100K	25-50Ω ±5% 100-100K ±3%	±0.25%	−55°C to +105°C	3 @ 40°C
	7/8	1.455	1/4		4300	25 to 100K	25Ω-100K ±5%	±0.25%	−55°C to +105°C	3 @ 40°C
	7/8	1.573 Serv. 1.448 Bush.	1/8		2100	25 to 120K	25-50Ω ±5% 100-100K ±3% 120K ±5%	±0.25%	−55°C to +125°C	5 @ 40°C
	1 13/16	2 1/8	1/4		2200	25 to 300K	25-50Ω ±5% 100-100K ±3% >100K ±5%	100Ω-100K ±0.25%	−55°C to +105°C	5 @ 40°C
	1 13/16	2 1/8	1/4		2250[3]	25 to 300K	25-50Ω ±5% 100-100K ±3% 200K ±5%	<100Ω ±0.5% 100Ω-200K ±0.25% ≦200K ±0.5%	−55°C to +105°C	5 @ 40°C
	1 13/16	2 1/8	1/4		4400[3]	25 to 100K	25Ω-100K ±5%	<100Ω ±0.5% 100Ω-100K ±0.25%	−55°C to +105°C	5 @ 40°C
	1 3/4	2 1/8	1/4		205[1]	1.15 to 300K	<50Ω ±10% >50Ω ±3%	±0.1%	−55°C to +105°C	5 @ 40°C
	2	2 1/16 Serv. 2 1/4 Bush.	1/4		900[2]	1 to 100K	<25Ω ±10% <50Ω ±5% >100Ω ±3%	±0.1%	−55°C to +125°C	5 @ 40°C

[1] Zero base linearity standard
[2] Absolute linearity standard
[3] Different mounting configuration than Model 2200
[4] Available in equivalent QPL versions in Amphenol's 2500 Series.
[5] See Catalog PD-2 for standard resistance values.

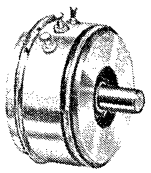
MICROPOT® PRECISION POTENTIOMETERS

BUNKER RAMO AMPHENOL

Type of Mounting	Maximum No. of Sections	Application
Bushing Servo[4]	6	Military Industrial
Bushing Servo[4]	6	Military Industrial
Bushing Servo[4]	8	Military Industrial
Bushing Servo[4]	8	Military Industrial
Bushing Servo[4]	8	Military Industrial
Bushing	3	Commercial
Bushing Servo	3	Military Industrial
Bushing	1	Military Industrial
Bushing Servo	3	Military Industrial
Bushing	1	Industrial Commercial
Bushing	1	Industrial Commercial
Bushing	2	Industrial Commercial
Bushing	2	Industrial Commercial
Bushing	1	Industrial Commercial
Bushing Servo	3	MIL-R-12934 RR1000
Bushing	3	Industrial Commercial
Bushing	3	Industrial Commercial
Bushing	1	Industrial Commercial
Bushing	1	Military Industrial
Bushing Servo	3	Military Industrial

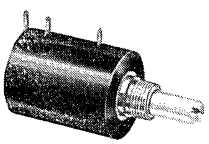
®MICROPOT—Trademark Reg. U.S. Patent Office

◀Linear Function Single-Turn Potentiometers



Amphenol offers five single-turn wirewound potentiometers that meet MIL-R-12934 in all requirements. The 2500 series potentiometers feature rugged welded terminations; a dual contact wiper that withstands up to 50 g's shock or acceleration; diallyl phthalate construction of rotor, insulator ring and element mount for high stability under varying humidity and temperature environments; and a movable clamp band that allows all phasing and zero settings to be accomplished in the field.

Multi-Turn Potentiometers

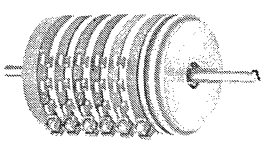


In precision multi-turn potentiometers, Amphenol offers a complete line of wirewound devices in both three-turn and ten-turn versions. Models range from the inexpensive ⅞" diameter 4100 series to the high precision, finely-made 2" diameter 900 series. The 900 and 205 series offer precision stainless steel leadscrews, molded windings, and fine linearity adjustment. The 4100 series offers high electrical precision with a durable, simple design which insures long, trouble-free operation at a modest price. Amphenol's line also includes MIL-type and MIL-qualified three- and ten-turn models.

▼Non-Linear • Loaded Linear • Sine-Cosine Functions CUSTOM ENGINEERED PRODUCTS

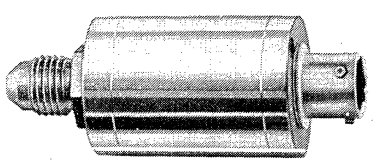
Amphenol offers a complete line of custom engineered products to meet your special requirements. Identified below are but a few examples of basic product lines which can be custom engineered to your exacting requirements. Special modifications or unusual mechanical features are available as adaptations to these standard designs which can be easily accomplished by our Engineering Department.

Conductive Plastic Potentiometers



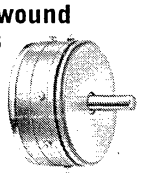
Infinite resolution, conductive plastic potentiometers are available in sizes ranging from ⅞" to 3" diameter, resistance values to 200K ohms, single cup or ganged. Features include: Operating life over 10 million cycles; constant low electrical noise; high linearity; stable resistance throughout operating life; minimum torque; comolded element, terminals, taps and base for high reliability through environmental extremes; taps, shorted or switching sections; output curves in linear and non-linear functions to meet every requirement.

Potentiometer Type Pressure Transducers



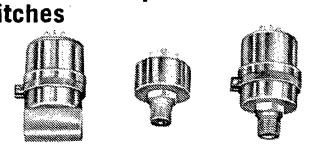
Amphenol's line of precision pressure transducers include bourdon tube, capsular diaphram and bellows types. Linear or non-linear precision potentiometer outputs are available. Pressure ranges from 1 to 10,000 psi absolute, gage or differential. Sizes from 1" to 3" diameter.

Precision Wirewound Potentiometers



Single-turn, wirewound potentiometers are available, in a complete line of linear, non-linear, sine-cosine functions, in sizes from ¾" to 6" diameter, single cup or ganged. Meet all requirements of MIL-E-5272 and MIL-R-12934 for linearity, resolution, operating life, noise and environmental compatibility. Taps, shorted or switching sections, output curves and special resistances available.

Adjustable Snap Action Pressure Switches



Amphenol offers a complete line of pressure switches for measuring gage, absolute and differential pressure changes in gases and liquids and all are adjustable under a wide selection of calibration ranges. A Ni-Span-C pressure capsule encased in a stainless steel housing utilizing a snap action switch make the units compatible with varied pressure medias and atmospheres. All are field adjustable with locking screw for positive settings. Pressure ranges from 2 to 200 psi gage and 0 to 100 psi absolute and differential.

ALLEN-BRADLEY
Milwaukee, Wisconsin 53204

Hot Molded Composition and Cermet Variable Resistors.

The Allen-Bradley name on variable resistors means quality performance that helps protect the reputation of the equipment you manufacture.

We give you a choice of composition or cermet resistance tracks to satisfy your applications. Many electrical and mechanical options are also available. You can select the precise combination for the performance level required.

The key to quality in A-B composition variable resistors is a unique hot-molded resistance track. This molded track has a large cross-section that results in low current densities for improved short-term overload protection and a long operating life. Control is smooth, resolution virtually infinite with a low noise level. Since they are essentially non-inductive, they can be used at high frequencies where wirewound units are impractical.

All composition types are available in five standard tapers (linear, modified linear, CW modified logarithmic, CCW modified logarithmic and CW exact logarithmic). Special tapers can be provided.

Allen-Bradley's perfected cermet resistance material is a natural for severe environmental applications in industrial or military equipment. Stability is exceptional in high temperatures and high humidity. Resolution is virtually infinite. Linear taper standard.

Series 70 MOD POT available with cermet or composition resistance tracks. Types CJ, CQ and SP have cermet tracks. Types J, K, G, L, W and GD have composition tracks.

Dual and triple section Type J, dual section Type GD and the multi-section Series 70 with composition tracks are ideally suited for attenuator applications. Special resistance values can be supplied.

Series 70 MOD POTs are extremely versatile variable resistors. The unique modular construction permits ganging resistance sections, switches and verniers in many combinations utilizing solid and concentric shafts. Various shaft and bushing diameters available.

Types J and G are MIL-R-94 approved for Styles RV4 and RV6 respectively. The most thoroughly field tested variable resistors available. Dependability is built-in.

Types G, GD, L, W, CQ and SP are miniature controls for critical applications where space is a factor.

Types K and CJ dissipate 3 watts and 5 watts respectively at 70°C. Available in dual or triple section versions.

Standard options for all types include a wide variety of shaft endings, shaft lengths, bushings and hardware.

Hot Molded Composition and Cermet Trimming Potentiometers.

Allen-Bradley trimmers are designed for you to install, set, and forget. Easy, pinpoint control and dependable stability are two of the best reasons why A-B's family of variable resistors are specified for high quality electronic equipment. A-B trimmers give you smooth adjustment with virtually infinite resolution. There are no abrupt changes in resistance to produce transients (common to wire-wound trimmers).

These rugged and compact trimmers will satisfy the most demanding requirements. Their continuous stepless resistance control makes possible easy and accurate adjustment. Since they have low distributed capacitance, and are relatively non-inductive, regardless of resistance value, Allen-Bradley trimmers can be used in applications where the ordinary wire-wound type trimmers are unsatisfactory.

© Allen-Bradley 1971

Standard options include vertical or horizontal mounting, panel mount bushing, and thumb-wheel adjustment, depending on type of trimmer.

TYPES F, FD, O, Y, R, and N feature Allen-Bradley's unique hot-molded composition technique. The resistance material, collector track, insulation and metal terminals are all molded into one integral structure for durability and dependability. The dual-section Type FD is ideally suited for Bridged-T or L-Pad attenuator applications. Linear tapers are standard; however, other tapers and special resistance values can be supplied.

TYPES S and Z are cermet trimmers, designed for severe environment applications. Allen-Bradley perfected cermets have exceptional stability in high temperature and high humidity environments. Leads are mechanically anchored and bonded.

EC 71-11

	Type	Resistance Range and Tolerance	Power Rating	Voltage Rating (rms or dc)	Operating Temperature Range	Electrical and Mechanical Rotation	Configurations	Case Dimensions	Enclosure
	Composition Series 70 MOD POT	50 ohms—10 megohms ±10% ±20%	1.0 W @ 70°C	350 V	−55°C to +120°C	300°	Single Dual Triple Quadruple Options include: • several switch types • vernier drive • concentric shafts	19/32 inch deep by 5/8 inch square (single section)	Dust and Splash Resistant
	Cermet Series 70 MOD POT	100 ohms—5 megohms ±10%	2.0 W @ 70°C		−55°C to +150°C				
	Composition J (RV4)	50 ohms—5 megohms ±10% ±20% (Special values to 1000 megohms available for Type J)	2.25 W @ 70°C	500 V	−55°C to +120°C	312°	Single* Dual* Triple *Available w or w/o SPST, SPDT or DPST switch (Type J only)	5/8 inch deep by 1-5/32 inch dia. (single section)	Dust and Splash Resistant
	Composition K		3.0 W @ 70°C		−55°C to +150°C				
	Cermet CJ	100 ohms—5 megohms ±10%	5.0 W @ 70°C	500 V	−65°C to +150°C	312°	Single Dual Triple	5/8 inch deep by 1-5/32 inch dia. (single section)	Dust and Splash Resistant
	Composition G (RV6)	100 ohms—5 megohms ±10% ±20%	0.5 W @ 70°C	350 V	−55°C to +120°C	295°	Single section w or w/o SPST switch	15/32 inch deep by 1/2 inch dia.	Immersion Sealed
	Composition L		0.8 W @ 70°C		−55°C to +150°C		Single section		
	Composition W	100 ohms—5 megohms ±10% ±20%	0.5 W @ 70°C	350 V	−55°C to +120°C	295°	Single section	15/32 inch deep by 1/2 inch dia.	Immersion Sealed
	Composition GD Dual	100 ohms—5 megohms ±10% ±20%	0.5 W @ 70°C	350 V	−55°C to +120°C	295°	Dual section	35/64 inch deep by 1/2 inch dia.	Immersion Sealed
	Cermet CQ	100 ohms—5 megohms ±10%	0.5 W @ 125°C	350 V	−65°C to +175°C	295°	Single section	15/32 inch deep by 1/2 inch dia.	Immersion Sealed
	Cermet SP	50 ohms—1 megohm ±10%	1.0 W @ 70°C	300 V	−65°C to +150°C	280°	Single section	7/16 inch deep by 3/8 inch dia.	Immersion Sealed

	Trimmer Type	Element and Adjustment Turns	Resistance Range and Tolerance	Power Rating	Operating Temperature Range	Voltage Rating (rms or ds)	Case Dimensions L H W	Terminal Types	Enclosure
	Type F	Composition Single turn	100 ohms—5 Megohms ±10% ±20%	0.25 W @ 70°C	−55°C to +120°C	350 V	1/2 Dia. x 17/32	Pin or Solder Lug	Immersion-proof
	Type FD (Dual)	Composition Single turn	100 ohms—50 Megohms ±10% ±20%	0.25 W @ 70°C	−55°C to +120°C	350 V	1/2 Dia. x 21/32 (dual section)	Front Section-Solder lug only. Rear-Pin or Lug Optional.	Immersion-proof
	Type O	Composition Single turn	100 ohms—5 Megohms ±10% ±20%	0.4 W @ 70°C	−55°C to +150°C	350 V	1/2 Dia. x 17/32	Pin or Solder Lug	Immersion-proof
	Type Y	Composition Single turn	100 ohms—5 Megohms ±10% ±20%	0.25 W @ 50°C	−55°C to +100°C	350 V	1/2 Dia. x 23/64	Pin (Solder Lug on snap-in version only)	Dust-tight and Splash-proof
	Type R (RJ11)	Composition 25 turn	100 ohms—2.5 Megohms ±10% ±20%	0.25 W @ 70°C	−55°C to +125°C	300 V	1-1/4 x 23/64 x 1/4	Pin or Solder Lug	Immersion-proof
	Type N	Composition 25 turn	100 ohms—2.5 Megohms ±10% ±20%	0.33 W @ 50°C	−55°C to +100°C	300 V	1-1/4 x 23/64 x 1/4	Pin	Immersion-proof
	Type S	Cermet Single turn	50 ohms—1 Megohm ±10%	0.5 W @ 85°C	−65°C to +150°C	300 V	3/8 Dia. x 3/8	Pin	Immersion-proof
	Type Z	Cermet Single turn	50 ohms—1 Megohm ±10% ±20%	0.5 W @ 70°C	−55°C to +125°C	300 V	1/4 x 1/4 x 1/4	Pin	Immersion-proof

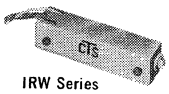
Note: Dimensions apply to versions shown. May vary for other versions.

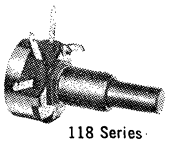
CTS CORPORATION ELKHART, INDIANA — TRIMMERS

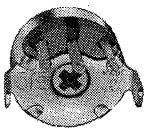
WIREWOUND

112 Series

111 Series


IRW Series


118 Series

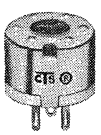

115 Series

Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp. (3 watts)	Order From
110-112	1700	3/4" Dia.	1.5-3	1/2Ω-10KΩ	105°C (180°C)	Berne
115-118	1750A	3/4" Dia.	2-3	1/2Ω-20KΩ	105°C (180°C)	Berne
IRW*	5625A	1¼" Rectilinear	1/2	400Ω-2KΩ	150°C	Canada

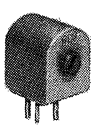
* Infinite resolution wirewound

COMPOSITION

220 Series

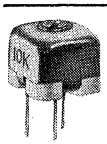

330 Series

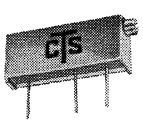
201 Series

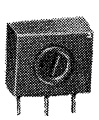

X331 Series

Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
201	1201A	19/32" Dia.	1/4	100Ω-5 Meg	85°C	Elkhart
X203	1203	Side-by-Side	1/8	100Ω-5 Meg	85°C	Asheville
220	2500A	7/16" x 1/2"	1/8	250Ω-2.5 Meg	85°C	Brownsville
330, X331 (Carbon Ceramic)	2330C	1/2" Dia.	3/8	100Ω-2.5 Meg	125°C	Keene

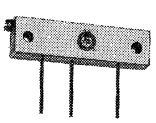
CERMET


340 Series

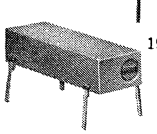

190 Series


360 Series

165 Series


195 Series

175 Series


125 Series

Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
125	3125	3/4" Rectilinear	3/4	20Ω-2 Meg	125°C	Berne
165*	3165B	3/8" Square	1/2	20Ω-2.5 Meg	150°C	Berne
170	3170	1/2" Square	3/4	20Ω-2 Meg	150°C	Berne
175**	3175	1/2" Square	1/2	50Ω-1 Meg	150°C	Berne
185	3185	1¼" Rectilinear	1	25Ω-1 Meg	175°C	Berne
B185	B3185	Bushing Mount	—	—	—	Berne
190-192	3190D	3/4" Rectilinear	1/2	20Ω-2 Meg	150°C	Berne
195***	3195A	1¼" Rectilinear	3/4	20Ω-1 Meg.	150°C	Berne
340	3340	1/4" Square	1/2	10Ω-1 Meg	150°C	Berne
360, 361	3360C	.434" x .360"	1/2	20Ω-2.5 Meg	125°C	Berne
362	3360C	.312" x .355"	1/2	20Ω-2.5 Meg	125°C	Berne
385	3385	11/32" Dia.	1/8-1/4	20Ω-500KΩ	175°C	Berne
630	3630B	1/2" Dia.	1/2	20Ω-2.5 Meg	150°C	Berne
660	3660A	3/8" Dia.	1/4	100Ω-500KΩ	175°C	Berne

* Approved to MIL-R-22097 Style RJ24
** Approved to MIL-R-22097 Style RJ22
*** Approved to MIL-R-22097 Style RJ12

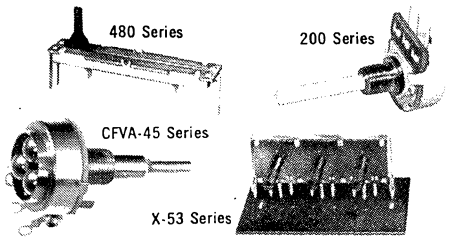
ORDERING INFORMATION: Place orders at locations shown above, using the following addresses:

CTS of Elkhart, Div., 1142 W. Beardsley Ave., Elkhart, Indiana 46514 • Telephone 219-523-0210 •TWX 810-294-2256
CTS of Asheville, Inc., Mills Gap Road, Skyland, North Carolina 28776 • Telephone 704-684-6451 • TWX 510-935-0059
CTS of Berne, Inc., 406 Parr Road, Berne, Indiana 46711 • Telephone 219-589-3111 • TWX 810-323-1580
CTS Microelectronics, Inc., P.O. Box 1278, Lafayette Indiana 47902 • Telephone 317-463-2565 • TWX 810-342-1882
CTS Keene, Inc., P.O. Box 1977, Paso Robles, Calif. 93446 • Telephone 805-238-0350 • TWX 510-842-1085

In Canada, order from:
CTS of Canada, Ltd., 80 Thomas Street, Streetsville, Ontario, Canada • Telephone 416-826-1141

CTS CORPORATION ELKHART, INDIANA — POTENTIOMETERS

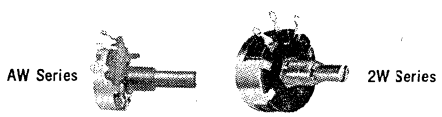
COMMERCIAL COMPOSITION



Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
450/45	Cat. 1001	15/16″ Dia.	1/4 to 1/2	50Ω-15 Meg	85C°	Elkhart Brownsville*
HV-45 (High Volt.)	1001-1	15/16″ Dia.	1/8 to 1/4	100Ω-10 Meg	85°C	Brownsville
VA45 (Vernier)	1150	15/16″ Dia.	1/4 to 1/2	100Ω-10 Meg	85°C	Brownsville
CFVA-45 (Vernier)	1151A	15/16″ Dia.	1/4 to 1/2	100Ω-10 Meg	85°C	Brownsville
70	1100	3/4″ Dia.	.2 to .3	200Ω-7.5 Meg	85°C	Brownsville
200	1200C	5/8″ Dia.	.2 to 1/4	100Ω-5 Meg	85°C	Elkhart
2-200 & C2-200	1200C	5/8″ Dia.	.2 to 1/4	100Ω-5 Meg	85°C	Elkhart
240	1350A	5/32″ Dia.	1/20	500Ω-1 Meg	85°C	Asheville
M-250	1300	9/32″ Dia.	1/10	100Ω-1 Meg	85°C	Asheville
480	1480C	2″ Slide con.	1/4 to 1/2	200Ω-5 Meg	85°C	Elkhart
490	1490A	2″ Slide con. Stereo	1/8 to 1/4 (per sect.)	200Ω-5 Meg	85°C	Elkhart
HVC	1600	2″ Dia.	2	5KΩ-50 Meg	100°C	Asheville
52-53	2700A	Side-by-Side	.165 to 1/3	100Ω-10 Meg	85°C	Asheville

*West of Mississippi River, excluding Minnesota, and South Eastern U.S. order 45 series from CTS of Brownsville.

COMMERCIAL WIREWOUND



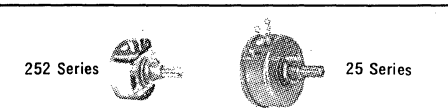
Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
252	1901A	1 17/64″ Dia.	2	3Ω-15KΩ	85°C	Keene
2W	1800A	1¼″ Dia.	2	1Ω-30KΩ	100°C	Asheville
AW	2100	15/16″ Dia.	5	1Ω-25KΩ	105°C	Asheville
VA-AW (Vernier)	1150	15/16″ Dia.	5	1Ω-25KΩ	105°C	Asheville
CFVA-AW (Vernier)	1151A	15/16″ Dia.	5	1Ω-25KΩ	105°C	Asheville

MILITARY COMPOSITION

Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
65 (RV5)*	2400A	3/4″ Dia.	1/2	100Ω-2.5 Meg	125°C	Brownsville
90 (RV2)*	2300A	15/16″ Dia.	1	100Ω-2.5 Meg	125°C	Brownsville

* Approved to MIL-R-94C

MILITARY WIREWOUND



Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
25 (RA30)*	2000	1 17/32″ Dia.	4	3Ω-25KΩ	105°C	Keene
252 (RA20)*	1900	1 17/64″ Dia.	2	3Ω-15KΩ	105°C	Keene

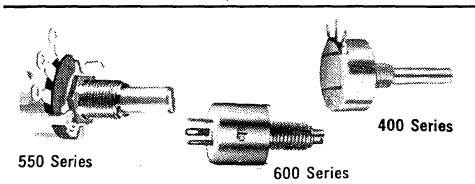
* Approved to MIL-R-19B

MILITARY AND INDUSTRIAL CARBON CERAMIC

Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
300 (RV6)*	2450A	1/2″ Dia.	3/4	100Ω-2.5 Meg	150°C	Keene
HV-300 (High Volt.)	2451	1/2″ Dia.	3/8	100Ω-2.5 Meg	150°C	Keene
VA-300 (Vernier)	2452	1/2″ Dia.	3/4	100Ω-2.5 Meg	150°C	Keene
320 (RV4)*	1400B	1 1/16″ Dia.	3	100Ω-1 Meg	150°C	Keene
321	1401A	1 1/16″ Dia.	3	250Ω-2.5 Meg	150°C	Keene

* Approved to MIL-R-94C

MILITARY AND INDUSTRIAL CERMET



Series	Data Sheet	Description	Wattage	Resistance Range	Max. Op. Temp.	Order From
400	3400	1¾″ Dia.	3	20Ω-5 Meg	175°C	Berne
500	3500	3/4″ Dia.	1½	20Ω-5 Meg	175°C	Berne
550	3550A	3/4″ Dia.	2	50Ω-5 Meg	150°C	Berne
551 (RVC5)*	3550A	3/4″ Dia.	2	50Ω-5 Meg	150°C	Berne
2-550 & C2-550	3550B	3/4″ Dia.	2	50Ω-5 Meg	150°C	Berne
600 (RVC6)*	3600	1/2″ Dia.	3/4	20Ω-2.5 Meg	175°C	Berne
660	3660	3/8″ Dia.	1/4	100Ω-500KΩ	175°C	Berne

Attached power switches available in rotary, push-pull and push-push types for most CTS potentiometers. Consult us for additional information.

* Approved to MIL-R-23285B

ORDERING INFORMATION: Place orders at locations shown above, using the following addresses:

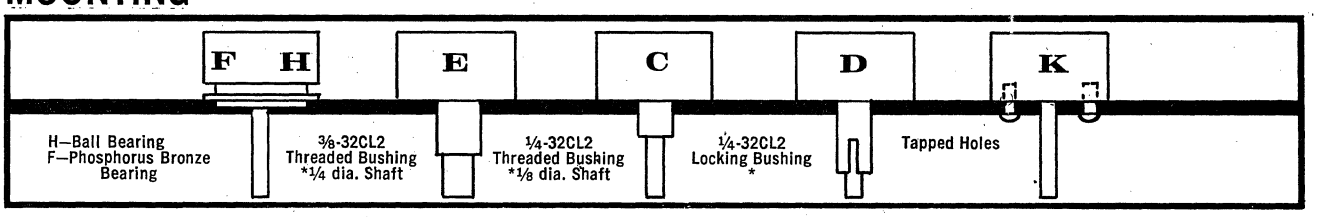
CTS of Elkhart, Div., 1142 W. Beardsley Ave., Elkhart, Indiana 46514 • Telephone 219-523-0210 • TWX 810-294-2256
CTS Keene, Inc., P.O. Box 1977, Paso Robles, Calif. 93446 • Telephone 805-238-0350 • TWX 510-842-1085
CTS of Asheville, Inc., Mills Gap Road, Skyland, North Carolina 28776 • Telephone 704-684-6451 • TWX 510-935-0059
CTS of Berne, Inc., 406 Parr Road, Berne, Indiana 46711 • Telephone 219-589-3111 • TWX 810-323-1580
CTS of Brownsville, Inc., 1100 Roosevelt Street, Brownsville, Texas 78520 • Telephone 512-546-5184 • TWX 910-870-1721
In Canada, order from:
CTS of Canada, Ltd., 80 Thomas Street, Streetsville, Ontario, Canada • Telephone 416-826-1141

CARTER
MANUFACTURING
CORPORATION

CARTER MANUFACTURING CORP. IS AN ORGANIZATION OF ENGINEERS AND CRAFTSMEN SPECIALIZING IN THE UNUSUAL IN POTENTIOMETERS AND SWITCH ENGINEERING AND THEIR MANUFACTURE. SINCE THE FOUNDING IN 1955 WE HAVE DEVELOPED FULL CAPABILITY IN WIRE WOUND AND CONDUCTIVE PLASTIC POTENTIOMETERS AND WILL WELCOME THE OPPORTUNITY TO WORK WITH YOU ON YOUR UNIQUE REQUIREMENTS AS WELL AS STANDARD COMMERCIAL OR MIL TYPES.

WIRE WOUND SINGLE TURN — MIL STD.									PLASTIC HOUSING—COM.		
SIZE	½"	⅞"	1 1/16"	1 7/16"	1 5/8"	1 3/4"	2"	3"	2"	3"	
TYPE	120	118	223	157	136	160	119	236	508	511	
MIL. SIZE	05	09	11	15	17	18	20	30	—	—	
FUNCTION ANGLE	320°	320°	320°	320°	320°	320°	350°	350°	320°	320°	
STD. LIN.	±.5%	±.4%	±.3%	±.25%	±.2 %	±.18%	±.15%	±.1%	±.25%	±.25%	
SPL. LIN.	±.3%	±.25%	±.2%	±.1%	±.1%	±.09%	±.09%	±.07%	±.2%	±.2%	
MAX. RES.	75KΩ	100KΩ	100KΩ	150KΩ	150KΩ	175KΩ	200KΩ	500KΩ	250KΩ	500KΩ	
WATTS	2	3	3.5	4	4	4	4.5	5	3	5	

MOUNTING



CONDUCTIVE PLASTIC SINGLE TURN — MIL STD.									PLASTIC HOUSING—COM.		
SIZE	½"	⅞"	1 1/16"	1 7/16"	1 5/8"	1 3/4"	2"	3"	2"	3"	
TYPE	CP120	CP118	CP223	CP157	CP136	CP160	CP119	CP236	CP508	CP511	
MIL. SIZE	05	09	11	15	17	18	20	30	—	—	
FUNCTION ANGLE	320°	340°	340°	345°	345°	345°	345°	345°	345°	345°	
STD. LIN.	±.7%	±.5%	±.5%	±.4%	±.4%	±.35%	±.3%	±.25%	±1%	±.7%	
SPL. LIN.	±.2%	±.1%	±.05%	±.04%	±.04%	±.03%	±.03%	±.01%	±.5%	±.25%	
MAX. RES.	60KΩ	100KΩ	150KΩ	150KΩ	175KΩ	200KΩ	250KΩ	400KΩ	250KΩ	400KΩ	
WATTS	1	1.4	1.6	2	2.2	2.6	3	5	3	5	

GENERAL SPECIFICATIONS

WIRE WOUND POTENTIOMETERS	CONDUCTIVE PLASTIC POTENTIOMETERS
Resistance Tolerance ±5% Std. Spl. Avail.	Resistance Tolerance ±10% Std. Spl. Avail.
Function Angles Spl. Available.	Function Angles Spl. Available.
Rotation Continuous, Stops Available.	Rotation Continuous, Stops Available.
Taps to Single Turn of Wire With Positive Elimination of Failure.	Taps of Low Resistance or Zero Width Available.
Power Rating to Zero Watts at 150°C.	Power Rating to Zero Watts at 150°C.
Ambient Temp. −65°C to +125°C Std. to 150°C Available.	Ambient Temp. −65°C to +125°C Std. to 150°C Available.

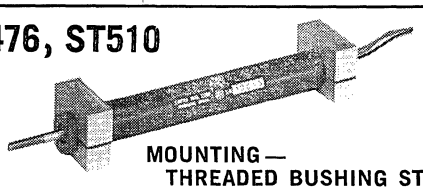
CARTER
MANUFACTURING
CORPORATION

WIRE WOUND MULTI-TURN POTENTIOMETERS

SIZE	½″	½″	½″		SIZE	⅞″	⅞″	⅞″	
TYPE	120-3	120-5	120-10		TYPE	118-3	118-5	118-10	
MIL SIZE	05	05	05		MIL SIZE	09	09	09	
FUNCTION ANGLE	1080°	1800°	3600°		FUNCTION ANGLE	1080°	1800°	3600°	
STD. LIN.	±.75%	±.5%	±.2%		STD. LIN.	±.15%	±.08%	±.04%	
SPL. LIN.	±.2%	±.1%	±.05%		SPL. LIN.	±.07%	±.04%	±.02%	
MAX. RES.	30KΩ	50KΩ	100KΩ		MAX. RES.	30KΩ	50KΩ	100KΩ	
WATTS	2	2	2		WATTS	3	3	3	
TAPS	AS SPEC.	AS SPEC.	AS SPEC.		TAPS	AS SPEC.	AS SPEC.	AS SPEC.	

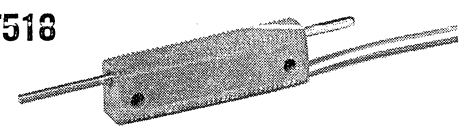
RECTILINEAR POTENTIOMETERS — WIRE OR CONDUCTIVE PLASTIC

ST476, ST510

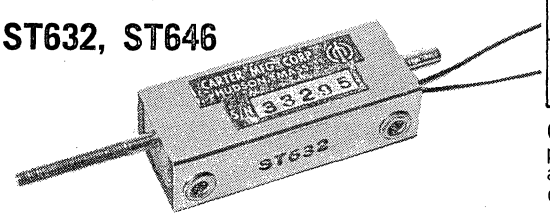


MOUNTING —
THREADED BUSHING STD.
CLAMPS - SPECIAL

ST518



ST632, ST646

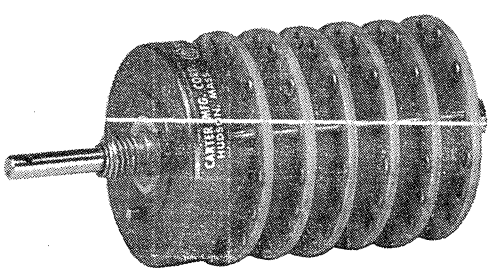


TYPE	SIZE	STROKE	RES. Ω	STD. LIN.	SPL. LIN.	ELEMENTS	WATTS 125°
ST476	½″ Dia.	To 8″	100K/″ Max.	2% Stroke	1% Stroke	1 or 2	1
ST510	¾″ Dia.	To 12″	150K/″ Max.	2% Stroke	1% Stroke	1 or 2	1.5
ST518	5/16″ x ¼″ x 1¼″	To ½″	75K/″ Max.	2% Stroke	1% Stroke	1	.25
ST403	1¼″ x 1¼″	To 36″	100K/″ Max.	2% Stroke	1% Stroke	1 or 2	1
ST632	5/16″ x ½″	To 4″	60K/″ Max.	1% Stroke	1% Stroke	1 or 2	.25
ST646	½″ x ½″	To 6″	60K/″ Max.	2% Stroke	2% Stroke	1	.25

CARTER manufactures many custom variations of these rectilinear potentiometers. When requesting quotations please specify stroke, resistance, linearity, any taps, any switching, environmental requirements and quantity.

Wire wound and conductive plastic elements can also be furnished for special requirements.

SWITCHES



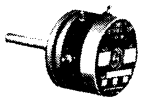
CARTER manufactures custom made switches in conjunction with potentiometers or as enclosed wafer types. They may be simple angle indicators or precision commutators. Such applications requiring high precision, miniaturization and sophisticated switching functions have been solved, many within the parameters of common switch approaches. CARTER's unique switch engineering has supplied the answer when the number of poles or contacts are in contradiction with the available space. When interconnections become a problem they can be greatly reduced by custom designed internal interconnections increasing reliability and improved appearance.

Infinite Resolution PRECISION COMPONENTS

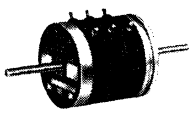
ROTARY Single-Turn POTENTIOMETERS

LINEAR-FUNCTIONAL/SINE-COSINE

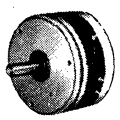
#50



#78



#105 (Ganged)



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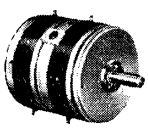
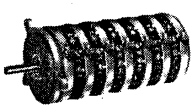


#206 (Ganged)



#175 (Ganged Special)

SPECIFICATIONS

	LINEAR	SINE-COSINE
Mechanical Rotation	360° Continuous	
Electrical Function Angle	350° Nominal	360°
Resistance Range	0.5KΩ-2 MegΩ	500Ω-50KΩ/Quad.
Best Linearity or Conformity	.1% ÷ Inch of Dia.	.3% P-P ÷ Inch of Dia.
Virtual Resolution	1/250,000	
Wattage	Diameter x 2 Watt(s)	
Temperature Range	—55°C to 150°C	
Taps, Maximum No.	Diameter x 6	
Starting Torque (In.—Oz.)	Diameter x .15	Diameter x .3
Guaranteed Life (at 100 R.P.M.)	To 30 Million Cycles Depending on Circuitry	

DIMENSIONS

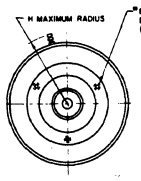
MODEL	50 Linear	78 Linear	105 Linear 106 Sin-Cos	155 Linear 156 Sin-Cos	175 Linear 176 Sin-Cos	175S 205S 305S Linear	205 Linear 206 Sin-Cos	305 Linear 306 Sin-Cos	505 Linear 506 Sin-Cos
A	1/2	7/8	1 3/32	1 7/16	1 3/4	—	2	3	5
B*	.4375	.7500	1.0300	1.3125	1.5620	—	1.8750	2.8750	4.8750
C*	—	—	—	—	—	—	—	.7500	.7500
D*	.1250	.1250	.1250	.1250	.2500	—	.2500	.2500	.2500
E	.060	.040	.040	.062	.060	—	.060	.047	.047
F	47/64	.635	.635	.725	.985	.725	.985	1.350	1.870
H	**	19/32	11/16	29/32	1 1/32	Each add'l cup adds only .200" Length	1 1/32	1 13/64	2 13/64
K	3/8	3/8	3/8	3/8	3/8		3/8	3/8	3/8
L	5/8	3/4	3/4	3/4	3/4		3/4	3/4	3/4

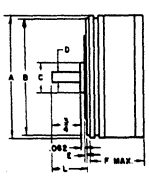
*+.0000 −.0005

**Axial Rear Terminations

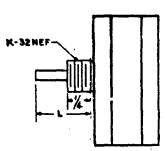
Low Torque-Low Inertia Pots are Available in 1¼" O.D.

	177 Linear	178 Sin-Cos
Torque, In.-Oz.	.1	.2
Inertia, Oz.-In.²	.025	.065





STANDARD



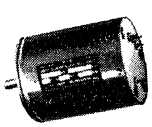
BUSHING MOUNT

ROTARY Multi-Turn POTENTIOMETERS

LINEAR-FUNCTIONAL

#5010

#7814



#20010

SPECIFICATIONS

MODEL	5010	7810**	7820**	7813/7814***	20010
Mechanical Rotation	3600° +20° —0°	3700° MIN.	7200° +100° —0°	3600° +100° —0°	3600° +110° —0°
Electrical Function Angle	3600° ±10°	3600° ±10°	7200° ±10°	3600° ±5°	3600° ±5°
Resistance Range	5KΩ—500KΩ	250Ω—125KΩ		5KΩ—1.5 MegΩ	5KΩ—3 MegΩ
Best Linearity or Conformity	0.1%	.075%	.05%	0.05%	0.01%
Virtual Resolution (Typical)	1/150,000	1/200,000		1/400,000	
Wattage at 25°C	2	1		2	4
Temperature Range	—55°C to +150°C				
Taps Maximum No.*	1	2		1	
Starting Torque (In.Oz) at 25°C	0.2	1.5		0.5	1.0
Guaranteed Life (at 100 R.P.M.)	To 100 x 10^6 Revolutions Depending on Circuitry				
Stop Strength	10 IN.-OZ. MAX.			75 IN.-OZ.	160 IN.-OZ.

* For voltage reference, specify 0° width taps. For current carrying, specify zero resistance taps.

** Available in Dual Units, same case dimensions.

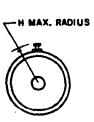
*** Model 7813 same as 7814 except for axial rear terminations

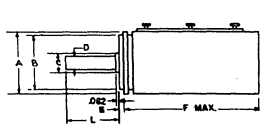
DIMENSIONS

MODEL	5010	7810	7820	7814	20010
A	.500	.875			2.000
B*	.4735	.750		.750	1.875
C	.188	.273		—	
D*	0.937	.1875		.1250	.250
E		.062			.035
F	1.531	1.953		1.875	2.625
H	.400	.600		.562	**
J		.250			.312
K	.250	.375			
L	.625	.750		.500	.750

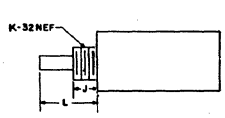
*+.0000 −.0005

** Axial Rear Terminations





STANDARD



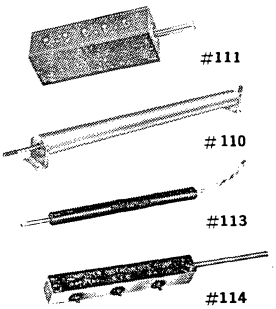
BUSHING MOUNT

COMPUTER INSTRUMENTS CORPORATION /92 MADISON AVE., HEMPSTEAD, N.Y. 11550/516-483-8200

Infinite Resolution PRECISION COMPONENTS

LINEAR MOTION POTENTIOMETERS

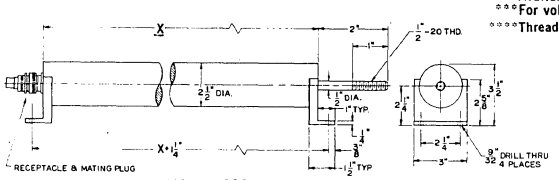
LINEAR-FUNCTIONAL



SPECIFICATIONS

MODEL	110*	111*	112	113*	114	116**	117	118**	119*
Electrical Stroke	To 60"	To 28"	To 12"	To 4"	To 1"	To 1.5"	To 1.5"	To 1.25"	To 10"
Cross Section Configuration	○	□	□	○	□	□	▭	▭	○
Resistance Range	250Ω/in. to 200KΩ/in.	150Ω/in. to 200KΩ/in.		500Ω/in. to 250KΩ/in.		150Ω/in. to 125KΩ/in.	250Ω/in. to 125KΩ/in.	500Ω/in. to 250KΩ/in.	350Ω/in. to 250KΩ/in.
Best Linearity	0.2% ÷ Length of Electrical Stroke								
Virtual Resolution	1/400,000								
Wattage	1 Watt per Inch of Stroke								
Temperature Range	−55° to +150°C								
Taps Maximum No.***	4	To Suit		1		To Suit	1		
Starting Force Oz. at 25°C	16	8	4	8	4		8		
Life	30 Million Strokes, Depending on Circuitry								
Shaft Misalignment Feature	Available			Not Available		Available	Not Available	Available	

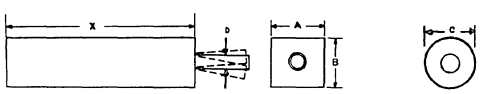
*Available in Dual Units, same case dimensions.
**Available in Dual Unit providing the resistance and function of both elements is the same.
***For voltage reference, specify zero width taps. For current carrying, specify zero resistance taps.
****Threaded, ball, spring-return and other shaft endings available.



MODEL 110

DIMENSIONS

MODEL	110*	111*	112	113*	114	116**	117	118**	119*
A	—	1.00	.500	—	.250	.500	.967	.875	—
B	—	1.00	1.10	—	.312	1.100	.635	.500	—
C	2.50	—	—	.500	—	—	—	—	.750
D	.50	.250	.187	.125	.0625	.1875	.1565	.1875	
X	Length of Mech. Travel +6"	Length of Mech. Travel +1.125"	Length of Mech. Travel +1.210"	Length of Mech. Travel +1.375"	1.75"	Length of Mech. Travel +1.210"	3.01"	2.50"	Length of Mech. Travel +2.00"



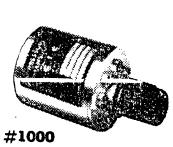
PRESSURE TRANSDUCERS & SWITCHES

LINEAR/AIR SPEED/ALTITUDE/SQUARE ROOT/FLOW

SPECIFICATIONS

MODEL	1000 Miniature	3000 Commercial	4000 Commercial	4500 Oil Filled	4500F Delta P Flow	6000 Low Pressure	6100 Mil Standard	6200 Hi Pressure	7000 Altitude	7100 Air Speed
Pressure Range, PSI.	0-15 to 0-350 Gage, Diff., Absolute	0-200 to 0-5000 Gage	0-2 to 0-200 Gage, Diff., Absolute	0-2 to 0-200 Differential		0-.01 to 0-2 Gage, Differential	0-2 to 0-200 Gage, Diff., Absolute	0-100 to 0-5000 Gage, Diff., Absolute	0-100,000 ft.	0-1000 Knots
Linearity	To 0.5%		To 0.3%		—	0.3%			0.4%	±1 Knot
Repeatability	±0.1%		±.05%	±0.1%		.05%			15'	±0.4 Knot
Temp. Sensitivity	.02% per °C			.01% per °C					.01% per °C	±01% per °C
Input: Wattage	0.2		0.25.	0.4	0.25	.20	.25		.25	
Standard Case Pressure	200 PSIA	—	200 PSIA	1000 PSIA		100 PSIA	150 PSIA	500 PSIA	—	
Diameter A	1.156	1.62	2.00			3.20	2.44		2.44	
Length B	1.39	0.90	2.16	3.20		2.84		1.09	2.84	
Switch Differential	1%	.8%	.6%	1%		2%	.8%	.6%	—	
Switch Current	2 Amperes, Max., Resistive, All Models									
Switch Life	10 Million Cycles, Depending on Circuitry									

Note: Also available in current type pressure transmitters: ranges 0-2 to 0-5000 PSIA and current output of 1-5 ma, 4-20 ma. in EXPLOSION-PROOF housing.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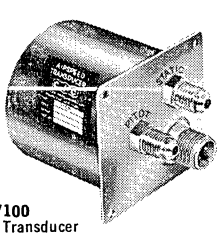
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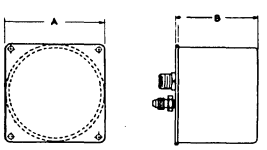
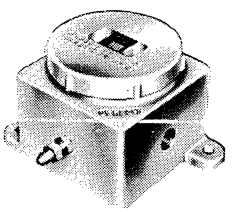
Air Speed Transducer




EXPLOSION-PROOF
(Available in All Models)

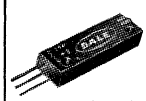
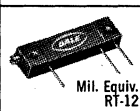
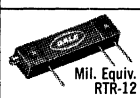
COMPUTER INSTRUMENTS CORPORATION /92 MADISON AVE., HEMPSTEAD, N.Y. 11550/516-483-8200

DALE® *for Optimum Value in Potentiometers*

TRIMMER QUICK REFERENCE GUIDE

- New fastpack DIP models for automatic and hand insertion
- Expanded low-priced Econo-Trim series with sealability for pennies more
- Mil-style construction methods used throughout
- Panel mount models available in most series

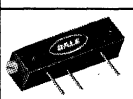
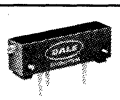
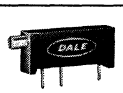
MILITARY GRADE TRIMMER POTENTIOMETERS (High Temperature, Precision)

SERIES	ILLUSTRATION	MODEL	SEAL† TYPE	CONFIGURATION	STANDARD RESISTANCE & TOLERANCE	POWER RATING	OPERATING TEMP. RANGE	ADJUSTMENT TURNS	HEIGHT	WIDTH	LENGTH
600	 Mil. Equiv. RT-10	691 680 690* 697* 692*	1 1 2 2 2	• Alternate position Printed Circuit Pins 22 AWG • Printed Circuit Pins 22 AWG • Hook Type Wire Solder Terminal • 28 AWG Stranded Teflon Leads • 26 AWG Solid Leads	10 ohms to 100K ohms ±5%	1 watt at 70° C, derated to 0 at 175° C	−65° C to 175° C	15±2	.18	.32	1.00
1200	Mil. Equiv. RT-11	1287 1288* 1299*	1 2 1	• Printed Circuit Pins 21 AWG • Stranded Teflon Leads 28 AWG • Spade Type Solder Lug	10 ohms to 100K ohms ±5%	1 watt at 70° C, derated to 0 at 175° C	−65° C to 175° C	25±2	.28	.31	1.25
1600	 Mil. Equiv. RT-12	1680 1697* 1692* 1690*	1 2 2 2	• Printed Circuit Pins 21 AWG • Stranded Teflon Leads 28 AWG • 22 AWG Solid Wire • Solder Lug	10 ohms to 100K ohms ±5%	1 watt at 70° C, derated to 0 at 175° C	−65° C to 175° C	22±3	.19	.32	1.25
1800	 Mil. Equiv. RTR-12	1880 1897	3 3	• Printed Circuit Pins, Gold Plated Nickel • 28 AWG Stranded Teflon Insulated Leads	10 ohms to 20K ohms ±5%	.75 watt at 85° C, derated to 0 at 150° C	−65° C to 150° C	22±3	.19	.32	1.25
5000	Mil. Equiv. RT-22	5050 5080 5091 5087	2 1 1 1	• Stranded Teflon Leads 30 AWG • Printed Circuit Pins 21 AWG, Edge Mount • Printed Circuit Pins 21 AWG • Printed Circuit Pins 21 AWG, Side Adjust	10 ohms to 50K ohms ±5%	1 watt at 70° C, derated to 0 at 175° C	−65° C to 175° C	25±2	.19 .22 .22 .22	.50 .50 .50 .50	.50 .50 .50 .50
5800	Mil. Equiv. RT-24	5850 5891 5880 5887	2 1 1 1	• Stranded Teflon Leads 30 AWG • Printed Circuit Pins 22 AWG, Base Mount • Printed Circuit Pins 22 AWG, Edge Mount • Printed Circuit Pins 22 AWG, Side Adjust	10 ohms to 50K ohms ±5%	1 watt at 70° C, derated to 0 at 175° C	−65° C to 175° C	25±3	.145 .150 .145 .150	.375 .375 .375 .375	.375 .375 .375 .375

*Indicates model is also available in Panel Mount version.

COMMERCIAL/INDUSTRIAL GRADE POTENTIOMETERS

WIREWOUND ELEMENT

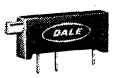
SERIES	ILLUSTRATION	MODEL	SEAL† TYPE	CONFIGURATION	STANDARD RESISTANCE & TOLERANCE	POWER RATING	OPERATING TEMP. RANGE	ADJUSTMENT TURNS	HEIGHT	WIDTH	LENGTH
2100		2187 2188* 2199*	4 4 4	• Printed Circuit Pins 21 AWG • Stranded Vinyl Leads 28 AWG • Spade Type Solder Lug	10 ohms to 100K ohms ±10%	1 watt at 70° C, derated to 0 at 125° C	−65° C to 125° C	25±2	.28	.31	1.25
2300		2387 2317 2389 2319	4 5 4 5	Printed Circuit Terminals, Gold Plated Hook-type Solder Lugs, Gold Plated	10 ohms to 50K ohms ±10%	0.5 watt at 25° C, derated to 0 at 105° C	−55° C to 105° C	15 turns nominal	.36	.28	1.00
2400		2487 2417	4 5	Printed Circuit Terminals, Gold Plated	10 ohms to 50K ohms ±10%	1 watt at 40° C, derated to 0 at 125° C	−55° C to 125° C	20 turns nominal	.31	.16	.75
2600		2699 2619 2687 2617	4 5 4 5	Printed Circuit Terminals, Gold plated, machine insertable Printed Circuit Terminals, Gold plated, hand insertable	10 ohms to 50K ohms ±10%	1 watt at 40° C, derated to 0 at 125° C	−65° C to 125° C	20 turns nominal	.19	.25	.75
1100	Same configuration as corresponding 1200 Series models. Humidity proof for industrial/commercial applications.										
2200	Same configuration as corresponding Models 680, 692 and 697. Humidity proof for industrial/commercial applications.										

*Indicates model is also available in Panel Mount version.

DALE® for Optimum Value in Potentiometers

COMMERCIAL/INDUSTRIAL GRADE POTENTIOMETERS

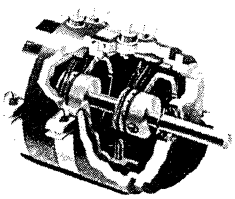
FILM ELEMENT

SERIES	ILLUSTRATION	MODEL	SEAL† TYPE	CONFIGURATION	STANDARD RESISTANCE & TOLERANCE	POWER RATING	OPERATING TEMP. RANGE	ADJUSTMENT TURNS	HEIGHT	WIDTH	LENGTH
8300		8387 8317 8389 8319	4 5 4 5	Printed Circuit Terminals, Gold Plated Hook-type Solder Lugs, Gold Plated	10 ohms to 2 Megohms ±10% 100Ω thru 500K ±20% all other values	.75 watt at 25° C, derated to 0 at 105° C	−55° C to 105° C	15 turns nominal	.36	.28	1.00
8400		8487 8417	4 5	Printed Circuit Terminals, Gold Plated	10 ohms to 2 Megohms ±10% 100Ω thru 500K ±20% all other values	.75 watt at 25° C, derated to 0 at 125° C	−55° C to 125° C	20 turns nominal	.31	.16	.75
8600		8699 8619 8687 8617	4 5 4 5	Printed Circuit Terminals, Gold plated, machine insertable Printed Circuit Terminals, Gold plated, hand insertable	10 ohms to 2 Megohms ±10% 100Ω thru 500K ±20% all other values	.75 watt at 25° C, derated to 0 at 125° C	−55° C to 125° C	20 turns nominal	.19	.25	.75
800		887 817	4 6	Printed Circuit Pins 26 AWG	10 ohms to 2 Megohms ±10% 100Ω thru 500K ±20% all other values	.3 watt at 25° C, derated to 0 at 150° C	−65° C to 150° C	10 turns nominal	.15	.10	.50
85		85 85A	5 5	• Printed Circuit Terminals, Gold Plated, machine insertable • Printed Circuit Terminals, Gold Plated, hand insertable	10 ohms to 1 Megohm ±20%	.5 watt at 25° C, derated to 0 at 125° C	−55° C to 125° C	12 turns nominal	.19	.265	.28
87		87 87A	5 5	• Printed Circuit Terminals, Gold Plated, machine insertable • Printed Circuit Terminals, Gold Plated, hand insertable	10 ohms to 1 Megohm ±20%	.5 watt at 25°C, derated to 0 at 125° C	−55° C to 125° C	Single turn	.19	.265	.28

†SEAL TYPE IDENTIFICATION

1. Immersion proof per MIL-R-27208
2. Humidity proof per MIL-STD-202, Method 106
3. Sealed per MIL-R-39015
4. Humidity proof per MIL-STD-202, Method 103, Condition B
5. Immersion proof—sealed for board washing, leak tested in 70° C water
6. Immersion proof per MIL-R-22097

PRECISION POTENTIOMETERS—SINGLE TURN *(Write for Catalog B)*



• Precision machined anodized aluminum cups • Molded Diallyl Phthalate liners • Welded tap and terminal construction • Precious metal wipers and slip rings • Flush clamp bands • Gold-plated terminals • Precision sleeve or ball bearings • Centerless ground stainless steel shafts • Single or ganged units.

SPECIFICATIONS:

- Meet requirements of MIL-R-12934 and NAS-710
- Eight physical sizes, 3/4" to 3" diameter
- Electrical angles and functions to specification
- Special mechanical configurations available

ORDERING INFORMATION

WHERE TO ORDER:

From your Authorized Dale Distributor, your Dale Representative, or Dale Electronics, Inc., Box 609, Columbus, Nebraska 68601—PHONE 564-3131 AREA CODE 402 TWX 910-626-8314

TERMS: 1% 10—Net 30 **F.O.B. POINT:** Columbus, Nebraska

SPECIAL CHARGES:

Minimum Order Charge.....$10.00
Minimum Item Charge.....$ 7.50

DALE ELECTRONICS, INC.
P. O. Box 609, Columbus, Nebraska 68601
A subsidiary of The Lionel Corporation

Centralab potentiometers and trimmers are available in the size, resistance wattage and styles you need!

Request your copy of this potentiometer catalog through Centralab's advertising department.

Below is a brief summary of the types listed in our sixty page potentiometer catalog. These potentiometers are in many cases available ganged and with either front or rear mounted wafer switches as well as rear mounted line switches. Special tapers for almost every application are already available.

Most of these potentiometers have dustproof construction. Equivalent noise resistance of as low as ½% of nominal maximum resistance is available.

Many models are available with numerous mountings and terminal configurations, enabling easy fitting into printed circuit boards or wired construction.

Diameter Inches	Rotation Mechanical	Resistance Range, Ohms	Tapers	Terminals	Power Rating	Application Mil.	Com'l.	Ind.
MODEL 1 MINIATURE COMPOSITION—SPST Switch Available								
5/8 without knob 45/64 with knob	260°	200—10 meg	variety	solder lug or P.C.	.2W @ 40°C		X	X
MODEL 2 COMPOSITION—Available in an almost unlimited range of mountings, terminals, shafts & line switches								
15/16	300°	200—10 meg	variety	variety of solder lugs & P.C.	.5W @ 40°C		X	X
MODEL 3 COMPOSITION								
43/64	260°	100—10 meg	variety	solder lug	.25W @ 40°C	X	X	X
43/64	260°	100—10 meg	variety	solder lug	.5W @ 70°C	X	X	X
MODEL 3W WIRE WOUND								
43/64	250°	30K—10 meg	variety	solder lug	1.5W @ 40°C		X	X
43/64	250°	30K—10 meg	variety	solder lug	2.W @ 70°C	X		X
MODEL 4 WIRE WOUND								
1-5/32	295°	1—100K	variety	solder lug	.5W @ 40°C	X	X	X
MODEL 5 COMPOSITION SINGLE OR MULTIPLE MINIATURE TRIMMERS (with integral fixed PEC® resistors & capacitors on ceramic plate optional)								
approx. 3/4" square (single unit)	290°	200—10 meg	linear	solder lug or P.C.	.25W @ 70°C	X	X	X
MODEL 6 MINIATURE COMPOSITION—SPST Switch Available								
1/2	250°	200—10 meg	variety	solder lug	.1W @ 40°C		X	X
MODEL 8 MICRO-MINIATURE COMPOSITION—SPST Switch Available								
9/32	250°	200—10 meg	variety	P.C.	.1W @ 40°C		X	
MODEL 9 MINIATURE COMPOSITION								
45/64	260°	100—10 meg	variety	solder lug or P.C.	.2W @ 40°C	X	X	X
MODEL 12 HOT MOLDED								
1-7/64	312°	10-5 meg	variety	solder lug	2.25 @ 70°C	X	X	X

FOR IMMEDIATE DELIVERY

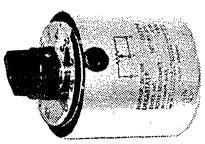
Many types, in most popular resistance ranges, are stocked by Centralab Industrial Distributors.

CENTRALAB
Electronics Division
GLOBE-UNION INC.
5757 NORTH GREEN BAY AVENUE
MILWAUKEE, WISCONSIN 53201

e|s|i® precision decades and components

Electro Scientific Industries makes available panel mount decades, dividers and individual resistors that provide the nucleus components for all our precision measurement and calibration equipment (see Section 2900). The patented Dekadial® stacked decades save panel space at 0.02% accuracy in the decades, 20 ppm for the dividers. Solid silver-alloy switches are used throughout, plus silicone-treated ceramic switch wafers. The wire-wound resistors are produced by a proprietary winding aging process for highest precision and stability.

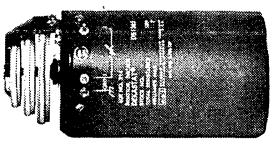
Resistive Decades



DS 12 Individual Decade Resistor

Nine different total resistances available for DC and audio frequency applications. Can be used as a divider by cutting jumper.

Dekastats®



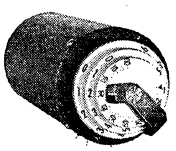
DS 1365 Precision Dekastat

Three coaxial decades available in four different total resistances.

MODEL	DESCRIPTION	PER STEP	TOTAL RESISTANCE	NOMINAL ACCURACY	PRICE
DS 12	Single 10-step resistance decades	0.01 Ω—1 MΩ	0.1 Ω—10 MΩ	0.02%	**$25.—$110.**
DS 1265	Decade resistor, coaxial 2 decades plus rheostat	0.1, 1, 10 Ω/dial div.	1.2, 12 kΩ	0.02%	**95.**
			120 kΩ*	0.02%	**115.**
DS 1365	Decade resistor, coaxial, 3 decades	1, 10, 100 Ω	1.2, 12, 120 kΩ	0.02%	**95.**
		0.01 Ω	120 Ω*	0.02%	**120.**
DS 1463	4 dial coaxial, 3 decades plus rheostat	0.1, 1 Ω/dial div.	12, 120 kΩ	0.02%	**110.**
DS 1464	Decade resistor—4 decade coaxial	0.1, 1 Ω	1.2, 12 kΩ	0.02%	**115.**
		10 Ω	120 kΩ	0.02%	**125.**
		0.01 Ω, 100 Ω	120 Ω, 1.2 MΩ*	0.02%	**150.**

*Special order

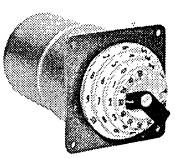
Dekapot® Dividers



DP 1311 Decade Potentiometer

Kelvin-Varley linearity is guaranteed 20 ppm stable/yr. Three decades plus 100-division potentiometer gives resolution of 0.0003%. Three different values available.

Dekatrans®

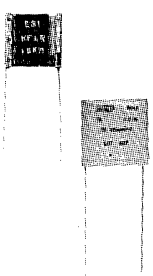


DT 1145 Miniature Decade Ratio Transformer

Dekatrans are inductive voltage dividers for use at audio frequencies. High input impedance, low output, and low phase shift make it ideal for testing voltage and current division, turns-ratio measurement, divider calibration and impedance comparison.

MODEL	DESCRIPTION	VALUE OR RATIO	LINEARITY	PRICE
*DV 411	Resistive divider, adjustable base, 3 decades plus pot	10, 100 kΩ	20 ppm	$195.
DP 1211	Panel-mounting—coaxial dial decade potentiometer (Kelvin-Varley); 2 decades plus pot	1, 10 kΩ	20 ppm	100.
		100 kΩ*	20 ppm	115.
		1 k to 100 kΩ*	20 ppm	150.
DP 1311	Decade potentiometer—3 decades plus pot	1, 10, 100 kΩ	20 ppm	150.
		1 kΩ to 100 kΩ	20 ppm	180.
DT 1135	Panel mounting ratio transformer—2 decades plus pot	1.1105	100 ppm	190.
DT 1145	Panel mounting ratio transformer—3 decades plus pot	1.11100	10 ppm	260.

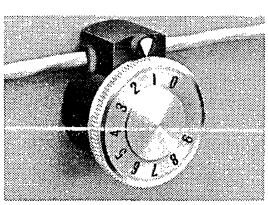
*Special order



Wirewound Resistors

A special ageing process ensures stability to 0.005% standard, or 0.001% on the best available. Standard accuracy is 0.01%, but 0.0015% is available. Changes in environment have little affect and ac residuals are low. Come in open frames (RF), encased in daillyl phthalate (RC) or hermetically sealed cases (RH).

Special Feature



New DATA-DIAL easily adapts calibration instruments for automatic data logging. Simple knob replaces all decade switches on front panel of your calibration equipment. Each DATA-DIAL contains circuitry and wiring for digital output. Take off old knob, put on DATA-DIAL without removing panel, dust cover or exposing switch decks. Costs only $35.00 per dial.

See ESI's Instruments and Standards in Section #2900

e|s|i Electro Scientific Industries, 13902 N.W. Science Park Drive, Portland, Oregon 97229

CUSTOM DIVISION

nei new england instrument company

GENERAL OFFICES 14 KENDALL LANE • NATICK, MASSACHUSETTS 01760 • TEL. 617-873-9711

SINGLE-TURN CONDUCTIVE PLASTIC AND WIREWOUND PRECISION POTENTIOMETERS

- **AVAILABLE WITH LINEAR OR NONLINEAR FUNCTIONS**
- **AVAILABLE WITH MULTIPLE TAPS**
- **AVAILABLE IN SINGLE OR MULTI-CUP CONFIGURATIONS**
- **AVAILABLE IN SERVO OR BUSHING MOUNTS**
- **AVAILABLE WITH OTHER COMPONENTS DESIGNED-IN** (SPRING-RETURNS, STOPS, SWITCHES, MOTORS, ETC.

RELATIVE MERITS OF CONDUCTIVE PLASTIC VS. WIREWOUND

The major advantages of conductive plastic potentiometers over wirewounds are infinite resolution and longer life. In most other respects, the two types are comparable. NEI has made it a strong point over the years to maintain **balanced** capability in conductive plastic and wirewound potentiometers. Each has its advantages in given applications, and NEI is the **only** company that can objectively recommend and supply **either** type.

GENERAL SPECIFICATIONS — CONDUCTIVE PLASTIC

Resistance Tolerance
Standard: ±10%

Ambient Temperature Range
Standard: −55°C to +150°C

Bearings
Stainless steel ball bearings are standard.

Mechanical Rotation
Normally continuous; however, stops are available.

Electrical Function Angle
Standard: 340° ±5°

Travel Resolution
Essentially infinite

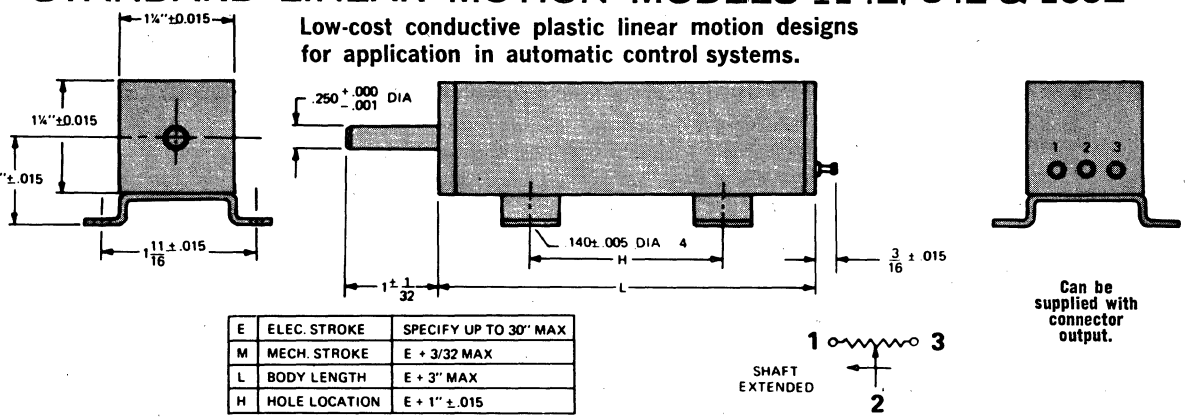
Life
50 million revolutions

SERIES	DIAMETER	NOMINAL RESISTANCE RANGE	NOMINAL POWER RATING	MAXIMUM STARTING TORQUE	NOMINAL ACCURACY
55 FT	½"	1K to 10K	0.5 W @ 25°C	0.35 oz-in	±1.0%
34 FT	¾"	1K to 20K	1.0 W @ 25°C	0.35 oz-in	±0.75%
78 FT	⅞"	1K to 25K	1.0 W @ 25°C	0.35 oz-in	±0.75%
116 FT	1 1/16"	1K to 50K	1.0 W @ 25°C	0.35 oz-in	±0.5%
176 FT	1 7/16"	1K to 75K	1.5 W @ 25°C	0.50 oz-in	±0.5%
158 FT	1⅝"	1K to 75K	2.0 W @ 25°C	0.50 oz-in	±0.5%
200 FT	2"	1K to 100K	3.0 W @ 25°C	0.75 oz-in	±0.3%
300 FT	3"	1K to 100K	5.0 W @ 25°C	1.0 oz-in	±0.25%

VALUES SHOWN ABOVE ARE NOMINAL. FOR SPECIFIC REQUIREMENTS, REFER TO NEI'S COMPLETE CATALOG OR CONTACT OUR APPLICATIONS ENGINEERING DEPARTMENT.

STANDARD LINEAR MOTION MODELS 114L, 34L & 100L

Low-cost conductive plastic linear motion designs for application in automatic control systems.



E	ELEC. STROKE	SPECIFY UP TO 30" MAX
M	MECH. STROKE	E + 3/32 MAX
L	BODY LENGTH	E + 3" MAX
H	HOLE LOCATION	E + 1" ±.015

Can be supplied with connector output.

WAFERPOT™ SINGLE-TURN PRECISION CONDUCTIVE PLASTIC POTENTIOMETERS

(LINEAR & NONLINEAR FUNCTION POTENTIOMETERS SPECIFICALLY DESIGNED FOR HIGH-DENSITY PACKAGING)

		MODEL 78FT	MODEL 116FT	MODEL 176FT	MODEL 200FT
MECHANICAL SPECIFICATIONS	Body Diameter	⅞"	1 1/16"	1 7/16"	2"
	Length (single cup only)	.680	.680	.680	.680
	Length each additional cup	.200	.200	.200	.200
	Starting Torque (per cup, additional)	.35 oz-in MAX. .25 oz-in MAX.	.35 oz-in MAX. .25 oz-in MAX.	.50 oz-in MAX. .35 oz-in MAX.	.75 oz-in MAX. .50 oz-in MAX.
ELECTRICAL	Standard Resistance Values	1K to 50K	1K to 50K	1K to 75K	1K to 100K
	Standard Resistance Tolerance	±10%	±10%	±10%	±10%
	Standard Accuracy	±0.5%	±0.5%	±0.5%	±0.3%
	Travel Resolution (essentially infinite for all models)				
	Electrical Function Angle	340° ±5°	340° ±5°	340° ±5°	340° ±5°
	Power Rating @ 25°C (derates linearly to 0 watts @ 125°C)	1.0 watt	1.0 watt	1.5 watts	3.0 watts

THE SPECIFICATIONS SHOWN ABOVE ARE TYPICAL. SPECIAL ELECTRICAL REQUIREMENTS AND MECHANICAL REQUIREMENTS CAN BE MET FOR VIRTUALLY ALL PARAMETERS.

STANDARDS DIVISION

new england instrument company

GENERAL OFFICES 14 KENDALL LANE • NATICK, MASSACHUSETTS 01760 • TEL. 617-873-9711

SPECIFICATIONS

ECONOPOT® MKI *

HI-RELIABILITY

MODEL NUMBER	MOUNTING	INDEPENDENT LINEARITY (STANDARD)	TOTAL RESISTANCE	(100 PCS. OR MORE)
78ESA102	Servo	1%	1K	$13.60
78ESA502	Servo	1%	5K	13.60
78ESA103	Servo	1%	10K	13.60
78ESB102	Servo	0.5%	1K	16.45
78ESB502	Servo	0.5%	5K	16.45
78ESB103	Servo	0.5%	10K	16.45
78ESC102	Servo	0.25%	1K	19.55
78ESC502	Servo	0.25%	5K	19.55
78ESC103	Servo	0.25%	10K	19.55
78EBA102	Bushing	1%	1K	11.55
78EBA502	Bushing	1%	5K	11.55
78EBA103	Bushing	1%	10K	11.55
78EBB102	Bushing	0.5%	1K	14.40
78EBB502	Bushing	0.5%	5K	14.40
78EBB103	Bushing	0.5%	10K	14.40
78EBC102	Bushing	0.25%	1K	17.50
78EBC502	Bushing	0.25%	5K	17.50
78EBC103	Bushing	0.25%	10K	17.50

All data subject to change without notice

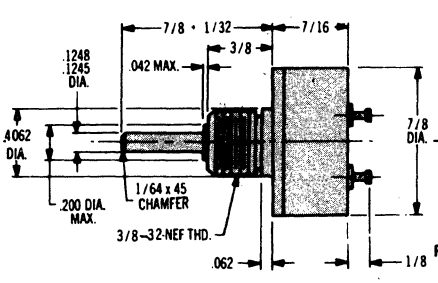
ELECTRICAL CHARACTERISTICS — ALL MODELS

PARAMETER	VALUE	REMARKS
Resistance	1K, 5K, 10K	See table
Linearity	1%, 0.5%, 0.25%	See table
Electrical Angle	340° ±5°	
Output smoothness		As per MIL-R-39023
Rotational Life (Servo)	10,000,000 revolutions	without catastrophic failure
Resolution		Essentially infinite
Minimum Voltage		As specified in MIL-R-39023
End Voltage	0.5% of total applied voltage, maximum	As specified in MIL-R-39023
Power Rating	1 watt at 70°C derated to 0 at 125°C	As per Class 5 of MIL-R-39023
Insulation Resistance	1000 megohms minimum	As specified in MIL-R-39023
Dielectric Withstanding Voltage	750 volts rms	As specified in MIL-R-39023 for units less than 1⅛" diameter
Resistance Tolerance	±10%	

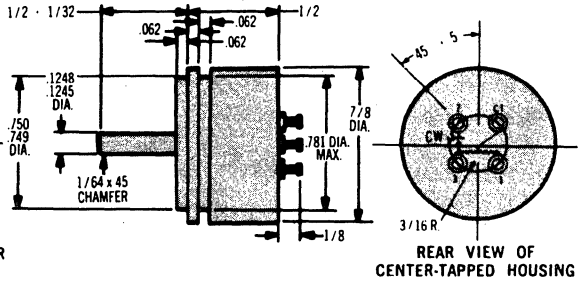
ENVIRONMENTAL CHARACTERISTICS — ALL MODELS

PARAMETER	VALUE
Temperature Cycling	Test condition C, Method 102 of MIL-STD-202C
Operating Temperature	−65°C to +125°C
Humidity Cycling	Will meet MIL-R-12934 for Class 5 units
Salt Spray	Will meet test as specified in MIL-R-12934
Shock	50G, 11 milliseconds as per MIL-R-12934 Test Condition C
Vibration	0.06 inches double amplitude or 15G, whichever is less, from 10-2000 cps, as specified in MIL-R-12934, Test Condition B

INDUSTRIAL ECONOPOT MODEL C



REAR VIEW OF REGULAR THREE TERMINAL UNIT



REAR VIEW OF CENTER-TAPPED HOUSING

ELECTRICAL SPECIFICATIONS

BUSHING MODEL

Model	Mounting	Independent Linearity (standard)	Total Resistance ±20%	Price (100 pcs. or more)
78CBA102	Bushing	1%	1K	4.99
78CBA502	Bushing	1%	5K	4.99
78CBA103	Bushing	1%	10K	4.99
78CBB102	Bushing	0.5%	1K	7.50
78CBB502	Bushing	0.5%	5K	7.50
78CBB103	Bushing	0.5%	10K	7.50

Electrical Angle: 342° ±5°
Life: 25,000,000 revolutions — Servo
25,000,000 manual settings — Bushing
Power Rating: 1 watt at 70°C derated to 0 at 125°C, as per class 5 of MIL-R-39023
Torque: 1.0 oz. in. (standard)

SERVO MODEL

Model	Mounting	Independent Linearity (standard)	Total Resistance ±20%	Price (100 pcs. or more)
78CSA102	Servo	1%	1K	7.60
78CSA502	Servo	1%	5K	7.60
78CSA103	Servo	1%	10K	7.60
78CSB102	Servo	0.5%	1K	9.70
78CSB502	Servo	0.5%	5K	9.70
78CSB103	Servo	0.5%	10K	9.70
78CSC102	Servo	0.25%	1K	12.25
78CSC502	Servo	0.25%	5K	12.25
78CSC103	Servo	0.25%	10K	12.25

1/4" Diameter shaft - available on request
1/4" Long bushing - available on request
Design options available on request.

*Available as ganged units (designated Mark II).

MEMCOR COMPONENTS

A PRODUCT OF
LTV ELECTROSYSTEMS, INC.
MEMCOR DIVISION
HUNTINGTON, INDIANA 46750

POWER RHEOSTATS

TYPE 12 1/2
12½ WATT
1-5000 OHMS
7/8" DIAM.-.035 LBS.

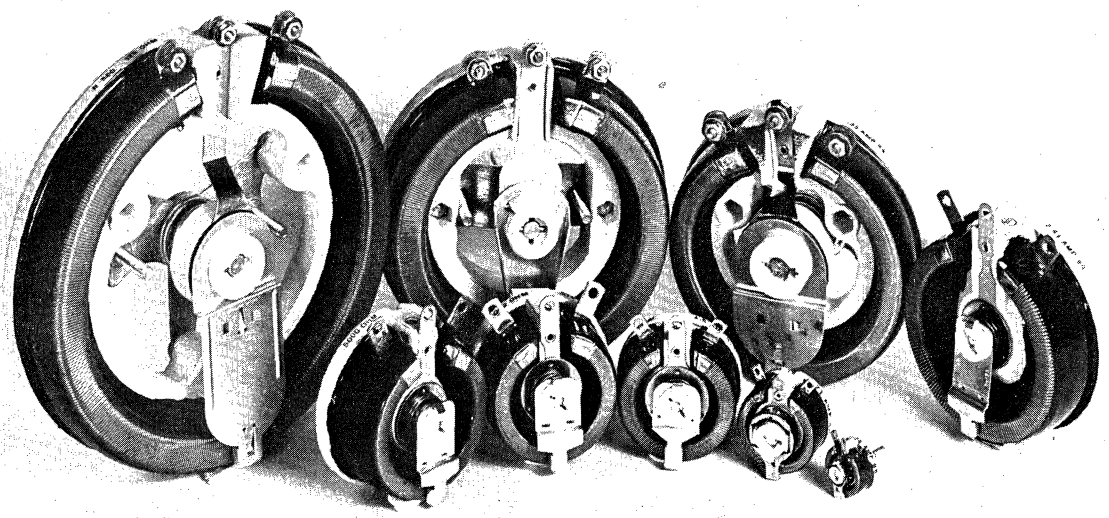
TYPE 25
25 WATT
1-5000 OHMS
1 9/16" DIAM.-0.23 LBS.

TYPE 50
50 WATT
0.5-10,000 OHMS
2 15/16" DIAM.-0.45 LBS.

TYPE 75
75 WATT
0.5-10,000 OHMS
2 3/4" DIAM.-0.60 LBS.

TYPE 100
100 WATT
0.5-10,000 OHMS
3 1/8" SIAM.-0.72 LBS.

TYPE 150
150 WATT
0.5-10,000 OHMS
4" DIAM.-1.50 LBS.



TYPE 225
225 WATT
1-2500 OHMS
5" DIAM.-2.18 LBS.

TYPE 300
300 WATT
1-2500 OHMS
6" DIAM.-3.0 LBS.

TYPE 500
500 WATT
1-2500 OHMS
8" DIAM.-3.75 LBS.

TYPE 750
750 WATT
1-2500 OHMS
10" DIAM.-7.31 LBS.

TYPE 1000
1000 WATT
1-2000 OHMS
12" DIAM.-10.0 LBS.

SPECIAL RHEOSTATS WITH TAPERED SECTIONS, LOCKING DEVICES, OFF POSITIONS, TANDEM MOUNTINGS, SPECIAL SHAFTS ON BUSHINGS, AND MANY OTHER VARIATIONS CAN BE SUPPLIED

OHMITE has the answer in wirewound rheostats

Twelve sizes in wirewound, vitreous enameled rheostats are stocked by Ohmite distributors all over the country and at the Ohmite factory. This selection, the most extensive available to industry, covers ratings that meet the major portion of design, production and emergency needs. Ratings of 7½, 12½, 25, 50, 75, 100, 150, 225, 300, 500, 750 and 1000 watts are standard.

FEATURES OF CONSTRUCTION: Ohmite rheostats are designed to produce permanently smooth, close control. The construction is all ceramic and metal; there is nothing to smoke, char, shrink, or shift. All models have insulated shafts with provision to keep the rheostat from turning on the panel. The resistance wire is wound over a solid ceramic core. Each turn is a separate resistance step and is locked against shifting by vitreous enamel (except Model C). The core and base are also bonded by vitreous enamel. The pivoted universal-action-mounted contact brush is of metal-graphite and varies to fit current and resistance. It rides upon a large flat surface and assures perfect contact without wear on the wire. Pressure at the contact and at the center lead are independent. Ohmite Rheostat Models H, J, G, K, L, P, and N, all marked Series A, are listed under the Underwriters' Laboratories Reexamination Service.

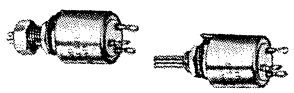
RATING: The current carrying capacities shown in the tables are for use in **free air;** when units are enclosed, these currents should be reduced possibly as much as 30% to 50%, depending upon the degree of ventilation. The rated current will cause the rheostat to dissipate its rated wattage when the full resistance is in the circuit.

MODEL C, MINIATURE — 7.5 Watts* (See Bul. 203)

The Model C provides greater design flexibility. In addition to its small size, its versatile solder terminals will also plug into common transistor sockets or circuit boards. It is stocked with both standard and locking type bushings.

Ohms	Amps.	Std. Shaft Catalog No.	Locking Shaft Catalog No.
10	.86	4908	4948
15	.71	4909	4949
25	.55	4910	4950
35	.46	4911	4951
50	.39	4912	4952
75	.32	4913	4953
100	.27	4914	4954
150	.22	4915	4955
200	.19	4916	4956
250	.17	4917	4957
350	.15	4918	4958
500	.12	4919	4959
750	.10	4920	4960
1000	.086	4921	4961
1500	.071	4922	4962
2500	.055	4923	4963
3500	.046	4924	4964
5000	.039	4925	4965

* Rating on Metal Panel.



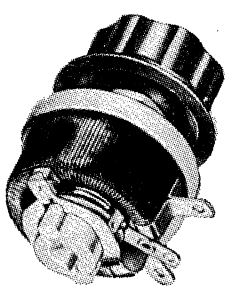
Diameter: .515″ max.
Shaft: ⅛″ Diameter.
Standard—**Code:** C—_____—S-1 Ohms
Locking—**Code:** C—_____—LO-1 Ohms
Resistace Tolerance: ±10%
Torque: 0.25 to 3 oz.-inch
Weight: 0.27 oz.
Standard Mounting: For panels up to ⅛″ by ¼-32 bushing with non-turn projection. Solder terminals also fit EIA type TSE-3R100 transistor socket.
Rotation: 300° ±5°
Standard Knob: No. 5151. Specify separately on order when desired.

MODEL H — 25 Watts

Diameter: 1 1/16″. **Code:** H—_____—F-2. Ohms **Shaft:** ¼″ diameter.
Resistance Tolerance: ±10%. **Torque:** 0.25 to 0.5 pound-inch. **Weight:** 0.19 lb. **Standard Mounting:** For panels up to ¼″ by ⅜″-32 bushing with No. 5050 non-turn washer. **Rotation:** 300° ±5°. **Standard Knob:** No. 5150. Specify separately on order when desired.

Catalog No.	Total Ohms	Max. Amps.	Catalog No.	Total Ohms	Max. Amps.
0140	1	5.000	0154	250	.316
0141	2	3.540	0155	350	.267
0142	3	2.880	0156	500	.222
0143	6	2.040	0157	750	.182
0144	8	1.770	0158	1,000	.155
0145	10	1.580	0159	1,500	.129
0146	15	1.290	0160	2,500	.100
0147	25	1.000	0161	3,500	.084
0148	35	.845	0162	5,000	.070
0149	50	.707	4200†	7,500	.058
0150	75	.575	4201†	10,000	.050
0151	100	.500	4202†	15,000	.041
0152	125	.445	4203†	20,000	.035
0153	175	.375	4204†	25,000	.032

† Silicone-ceramic coating, 500 V. max. Not listed UL Series A.

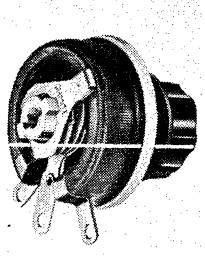


MODEL J — 50 Watts

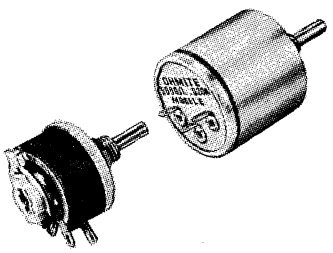
Diameter: 2 5/16″. **Code:** J—_____—F-2. Ohms **Shaft:** ¼″ diameter.
Shaft: ¼″ diameter. **Resistance Tolerance:** ±10%. **Torque:** 0.25 to 2.0 pound-inches. **Weight:** 0.32 lb. **Standard Mounting:** For panels up to ¼″ by ⅜″-32 bushing with No. 5050 non-turn washer. **Rotation:** 300° ±5°. **Standard Knob:** No. 5150. Specify separately on order when desired.

Catalog No.	Total Ohms	Max. Amps.	Catalog No.	Total Ohms	Max. Amps.
0308	0.5	10.000	0324	500	.316
0309	1	7.070	0325	800	.250
0310	2	5.000	0326	1,000	.224
0311	4	3.530	0327	1,600	.176
0312	6	2.880	0328	2,500	.141
0313	8	2.500	0329	3,500	.119
0314	12	2.040	0330	5,000	.100
0315	16	1.760	0331	8,000	.079
0316	22	1.500	0332	10,000	.070
0317	35	1.190	4210†	15,000	.058
0318	50	1.000	4211†	20,000	.050
0319	80	.790	4212†	25,000	.045
0320	125	.630	4213†	30,000	.041
0321	150	.575	4214†	40,000	.035
0322	225	.470	4215†	50,000	.032
0323	300	.408			

†Silicone-ceramic coating, 750 V. max. Not listed UL Serial A.



MODEL E — 12.5 Watts*



Diameter: ⅞″ Unenclosed.
Code: E—_____—R-1 Dia: 1 3/64″ in Ohms aluminum enclosure
Code: EW—_____—R-1 Ohms
Shaft: ⅛″ Diameter.
Resistance Tolerance: ±10%.
Torque: 1 to 6 oz.-inch
Weight: 0.6 oz.; enclosed 0.85 oz.
Standard Mounting: For panels up to ⅛″ by ¼″-32 bushing, with non-turn projection.
Rotation: 300° ±5°.
Standard Knob: No. 5151. Specify separately on order when desired.

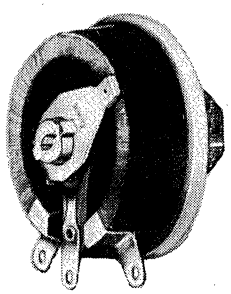
Total Ohms	Max. Amps.	Catalog No.	Catalog No.
1	3.53	0101	W0101
2	2.50	0102	W0102
2.5	2.24	0102A	W0102A
3	2.04	0103	W0103A
5	1.58	0103A	W0103A
6	1.44	0104	W0104
8	1.25	0105	W0105
10	1.12	0106	W0106
15	.91	0107	W0107
25	.71	0108	W0108
35	.60	0109	W0109
50	.50	0110	W0110
75	.41	0111	W0111
100	.35	0112	W0112
125	.32	0113	W0113
150	.29	0113A	W0113A
175	.27	0114	W0114
200	.25	0114A	W0114A
250	.22	0115	W0115
350	.19	0116	W0116
500	.16	0117	W0117
750	.13	0118	W0118
1,000	.11	0119	W0119
1,500	.091	0120	W0120
2,500	.071	0121	W0121
3,500	.060	0122	W0122
5,000	.050	0123	W0123
7,500	.041	4190†	W4190†
10,000	.035	4191†	W4191†
12,500	.031	4192†	W4192†
15,000	.029	4193†	W4193†

† Silicone-ceramic coating, 350 V. max.
* Rating on metal panel.

MODEL G — 75 Watts

Diameter: 2¾″. **Code:** G—_____—F-2. Ohms **Shaft:** ¼″ diameter.
Resistance Tolerance: ±10%. **Torque:** 0.5 to 2.0 pound-inches. **Weight:** 0.52 lb. **Standard Mounting:** For panels up to ¼″ by ⅜″-32 bushing with No. 5050 non-turn washer. **Rotation:** 300° ±5°. **Standard Knob:** No. 5150. Specify separately on order when desired.

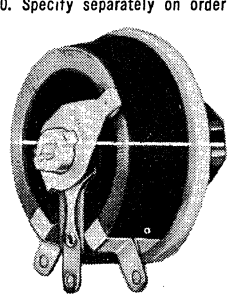
Catalog No.	Total Ohms	Max. Amps.	Catalog No.	Total Ohms	Max. Amps.
1100	0.5	12.300	1112	200	.612
1101	1	8.660	1113	300	.500
1102	2	6.120	1114	400	.433
1103	3	5.000	1115	500	.388
1104	5	3.880	1116	750	.316
1105	7.5	3.160	1117	1,000	.274
1106	10	2.740	1118	1,500	.224
1107	16	2.170	1119	2,000	.194
1108	25	1.730	1120	2,500	.173
1109	50	1.230	1121	5,000	.123
1110	75	1.000	1122	7,500	.100
1111	100	.866	1123	10,000	.087



MODEL K — 100 Watts

Diameter: 3½″. **Code:** K—_____—F-2. Ohms **Shaft:** ¼″ diameter.
Resistance Tolerance: ±10%. **Torque:** 0.5 to 2.0 pound-inches. **Weight:** 0.64 lb. **Standard Mounting:** For panels up to ¼″ by ⅜″-32 bushing with No. 5050 non-turn washer. **Rotation:** 300° ±5°. **Standard Knob:** No. 5150. Specify separately on order when desired.

Catalog No.	Total Ohms	Max. Amps.	Catalog No.	Total Ohms	Max. Amps.
0440	0.5	14.100	0452	200	.707
0441	1	10.000	0453	300	.575
0442	2	7.070	0454	400	.500
0443	3	5.750	0455	500	.447
0444	5	4.470	0456	750	.365
0445	7.5	3.650	0457	1,000	.316
0446	10	3.160	0458	1,500	.258
0447	16	2.500	0459	2,000	.224
0448	25	2.000	0460	2,500	.200
0449	50	1.410	0461	5,000	.141
0450	75	1.150	0462	7,500	.115
0451	100	1.000	0463	10,000	.100



FOR DETAILS ON OTHER MODELS FROM 150 TO 1000 WATTS PLUS SPECIAL TAPERED WINDINGS AND FEATURES, WRITE FOR CATALOG 201.

OHMITE MFG. CO., a NORTH AMERICAN PHILIPS company • 3635 HOWARD STREET, SKOKIE, ILLINOIS 60076 • PHONE (312) 675-2600 • TWX 910-223-0805

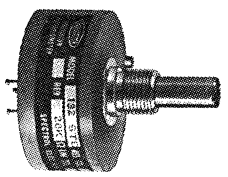
Spectrol

Precision Potentiometers
Trimming Potentiometers
Multidials • Switches

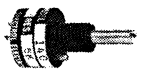
THE INDUSTRY'S FINEST PRECISION POTENTIOMETERS

For more than fifteen years, Spectrol has been a leader in the design and manufacture of precision potentiometers, both linear and non-linear, standard and special designs. All Spectrol single-turn, three-turn, five-turn, and ten-turn precision potentiometers meet or exceed applicable military and commercial specifications for rotational load life, temperature range, shock, vibration, humidity, and salt spray; and Spectrol is the only manufacturer who produces every Mil-Approved precision potentiometer qualified to MIL-R-1294.

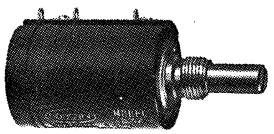
⅔ Actual Size



Models 132, 138, 139



Model 140

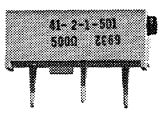


Model 532

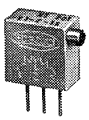
HIGH-QUALITY COMPETITIVELY PRICED TRIMMERS

For more than ten years, Spectrol has been engaged in the design and manufacture of high quality trimming potentiometers. Spectrol's complete lines of both cermet and wirewound trimmers are available in all the primary configurations—rectangulars, squares, and rounds—in both low-cost industrial and Mil-Approved versions, and Spectrol trimmers are stocked in depth at more than 75 distributor locations throughout the United States and Canada.

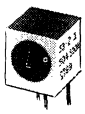
Actual Size



Model 41-2

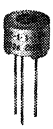


Model 51

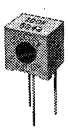


Model 53-2

Model 84



Model 62-1



Model 62-2

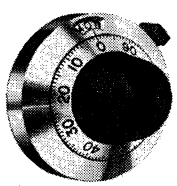
Model 53-1

Models 42, 78, RT12

ATTRACTIVE PRECISION-MADE MULTIDIALS

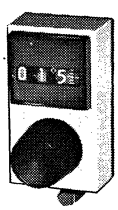
Spectrol's line of handsome, precision-made Multidials includes both vernier and digital types. These turns-counting dials, for use on multi-turn potentiometers and other rotating devices, are not only superior in appearance but also in sturdy design, "feel," and precise operation.

½ Actual Size



Model 21

Model 11



Model 15

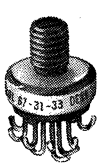
VERSATILE ROTARY SELECTOR SWITCHES

Spectrol's versatile Model 87 Rotary Selector Switch brings a new dimension of flexibility to discrete component circuitry. Available in volume quantities at production line prices, these handy switches can be mounted directly on to printed circuit boards or panel mounted. They can be used in many ways... often to make other components do multiple duty.

Actual Size

Model 87-11

Model 87-21



Model 87-31

CONDUCTIVE PLASTIC, CERMET, AND WIREWOUND CAPABILITY

At Spectrol, there is a tradition of personalized engineering service to assist the customer in selecting standards or developing "specials" that will fit his design best. This tradition is backed by an unusual in-depth capability that is dedicated to the design and production of wirewound, cermet, and conductive plastic potentiometers, trimmers, and related components.

SPECTROL ELECTRONICS CORPORATION 17070 E. GALE AVE., CITY OF INDUSTRY, CALIF. 91745 • PHONE: (213) 964-6565 • TWX: (910) 584-1314

Spectrol

Precision Potentiometers
Trimming Potentiometers
Multidials • Switches

PRECISION POTENTIOMETERS—Single Turn and Multiturn

Diameter	Turns	Model No.	Resistance Element	Resistance Range (Ohms)	Resistance Tolerance	Linearity Tolerance		Max. Power Rating (Watts)	Operating Temp. Range	Mounting Available
						Standard	Best Practical			
½"	1	140/142	Wire	50 to 70K	±3%	±1.0%	±.50%	2 @ 40°C	−55°C to +125°C	Bushing
½"	10	162	Wire	100 to 100K	±3%	±5%	±.15%	2 @ 40°C	−55°C to +125°C	Bushing
½"	10	163	Wire	100 to 100K	±3%	±5%	±.15%	2 @ 40°C	−55°C to +125°C	Bushing (⅜")/Servo
½"	10	164	Wire	100 to 100K	±3%	±5%	±.15%	2 @ 40°C	−55°C to +125°C	Bushing/Servo
⅞"	1	152	Wire	5 to 40K	±3%	500Ω and above ±0.5%	±.35%	2 @ 40°C	−55°C to +125°C	Bushing/Servo
⅞"	1	158	C.P.	500 to 100K	±10%	±1.0%	±.25%	2 @ 40°C	−55°C to +125°C	Bushing/Servo
⅞"	1	159	Cermet	100 to 2 Meg.	±10%	±1.0%	±.25%	3.5 @ 40°C	−55°C to +125°C	Bushing/Servo
⅞"	1	702*	Wire	5 to 109K	±3%	500Ω to 109K ±0.5%	±.25%	1.25 @ 70°C	−65°C to +125°C	Bushing
⅞"	3	552	Wire	5 to 45K	±3%	±.25%	±.125%	1.0 @ 70°C	−65°C to +125°C	Bushing/Servo
⅞"	5	520	Wire	10 to 76K	±3%	±.25%	±.15%	2 @ 40°C	−55°C to +105°C	Bushing
⅞"	10	502*	Wire	15 to 152K	±3%	±.25%	±.05%	2.0 @ 70°C	−65°C to +125°C	Bushing/Servo
⅞"	10	532	Wire	15 to 180K	±5%	±.25%	±.10%	3 @ 40°C	−55°C to +105°C	Bushing
⅞"	10	510	Wire	15 to 152K	±3%[1]	±.25%	±.10%	3 @ 40°C	−55°C to +105°C	Bushing
⅞"	10	500	Wire	15 to 152K	±3%[1]	±.25%	±.05%	3 @ 40°C	−55°C to +125°C	Bushing/Servo
⅞"	10	530	Wire	15 to 150K	±3%	±.25%	±.10%	3 @ 40°C	−55°C to +105°C	Bushing
⅞"	10	534	Wire	25 to 150K	±5%	±.25%	±.075%	2 @ 40°C	−55°C to +125°C	Bushing/Servo
1"	10	570	Wire	20 to 185K	±3%	±.25%	±.05%	3 @ 40°C	−55°C to +105°C	Bushing/Servo/Screw
1 1/16"	1	122*	Wire	5 to 142K	±3%	200Ω to 142K ±0.5%	±.20%	1.5 @ 70°C	−65°C to +125°C	Bushing/Servo
1⅛"	1	110	Wire	5 to 30K	±3%	300Ω to 30K ±0.5%	±.20%	2 @ 40°C	−55°C to +105°C	Bushing/Servo
1 5/16"	1	100	Wire	5 to 39K	±3%	100Ω to 39K ±0.5%	±.15%	2.75 @ 40°C	−55°C to +105°C	Bushing/Servo
1 5/16"	1	132	Wire	5 to 39K	±3%	200Ω to 39K ±0.5%	±.20%	2.75 @ 40°C	−55°C to +105°C	Bushing
1 5/16"	1	138	C.P	500 to 100K	±10%	±0.5%	±0.5%	2.0 @ 40°C	−55°C to +125°C	Bushing
1 5/16"	1	139	Cermet	500 to 1 Megohm	±10%	±0.5%	±0.5%	5.0 @ 40°C	−55°C to +125°C	Bushing
1 7/16"	1	170*	Wire	5 to 49K	±3%	100Ω to 49K ±.50%	±.15%	2.75 @ 40°C	−55°C to +105°C	Bushing/Servo
1 7/16"	3	820	Wire	15 to 119K	±3%	±.25%	±.075%	3.75 @ 40°C	−55°C to +105°C	Bushing/Servo
1 7/16"	10	870*	Wire	40 to 398K	±3%	±.25%	±.03%	6.5 @ 40°C	−55°C to +105°C	Bushing/Servo
1⅝"	1	190	Wire	5 to 65K	±3%	500Ω to 65K ±.30%	±.15%	3.5 @ 40°C	−55°C to +105°C	Bushing/Servo/Screw
1¾"	1	202	Wire	5 to 65K	±3%	500Ω to 65K ±..25%	±.15%	3.5 @ 70°C	−65°C to +125°C	Bushing/Servo/Screw
1 13/16"	10	800	Wire	20 to 519K	±3%	±.25%	±.025%	8.0 @ 40°C	−55°C to +125°C	Bushing/Servo/Screw
1 13/16"	10	802*	Wire	20 to 519K	±3%	±.25%	±.025%	5.0 @ 70°C	−65°C to +125°C	Bushing/Servo/Screw
1 13/16"	3	852	Wire	15 to 155K	±3%	±.25%	±.05%	2.0 @ 70°C	−65°C to +125°C	Bushing
1 13/16"	10	860	Wire	20 to 519K	±3%[2]	±.25%	±.10%	8.0 @ 40°C	−55°C to +105°C	Bushing
1 13/16"	3	830	Wire	15 to 155K	±3%	±.25%	±.05%	3 @ 40°C	−55°C to +105°C	Bushing
2"	1	302*	Wire	5 to 85K	±3%	200Ω to 85K ±.25%	±.10%	4.0 @ 70°C	−65°C to +125°C	Bushing/Servo/Screw
3"	1	402*	Wire	10 to 155K	±3%	200Ω to 158K ±.25%	±.075%	6.0 @ 70°C	−65°C to +125°C	Bushing/Servo/Screw

*These configurations available in Mil-approved models per (RR Series) MIL-R-12934.
[1] ±5% below 100Ω. [2] ±5% below 200Ω.

TRIMMING POTENTIOMETERS—Rectangular, Square and Round

Configuration	Size	Model No.	Element	Resistance Range (Ohms)	Adjustment Ratio	TEMPCO (PPM/°C)	Maximum Power Rating (Watts)
Rectangular (PC)	¾"	41	Cermet	10 to 1 Meg.	15 to 1	±100	½ @ 70°C
Rectangular (L, PC, SH)	1¼"	74	Wire	10 to 50K	22 to 1	±50	1 @ 70°C
Rectangular (L, PC, SH)	1¼"	94	Wire	50 to 20K	22 to 1	±100	½ @ 70°C
Rectangular (L, PC, SH)	1¼"	78	Cermet	10 to 1 Meg.	22 to 1	±100	¾ @ 70°C
Rectangular (L, PC, SH)	1¼"	949	Cermet	100 to 1 Meg.	22 to 1	±100	¾ @ 70°C
Rectangular (L, PC)	1¼"	42 (RT12)	Wire	10 to 50K	22 to 1	±50	1 @ 70°C
Rectangular (L, PC, SH)	1¼"	44	Wire	10 to 50K	22 to 1	±50	1 @ 70°C
Square (L, PC)	⅜"	50	Wire	10 to 50K	23 to 1	±50	¾ @ 85°C
Square (PC)	⅜"	51 (RT24)	Wire	10 to 50K	23 to 1	±50	¾ @ 85°C
Square (L, PC)	½"	55 (RT22)	Wire	10 to 50K	23 to 1/42 to 1	±50	1½ @ 70°C
Round (PC)	¼"	62	Cermet	10 to 1 Meg.	1 to 1	±100	¾ @ 25°C
Round (PC)	5/16"	53	Wire	10 to 1 Meg.	1 to 1	±100	½ @ 85°C
Round (To −9, PC)	5/16"	80	Wire	10 to 50K	1 to 1	±50	1 @ 50°C
Round (PC, SH)	½"	84	Wire	10 to 50K	1 to 1	±50	1½ @ 70°C

DIALS — Concentric and Digital

Size	Model No.	Type	Number of turns	Minor Scale Division	Shaft Bore (Inches)	Finish
1" Dia.	11	Concentric	11	1/50 Turn	.250	Chrome
1 13/16" Dia.	21	Concentric	15	1/100 Turn	.250	Chrome
1" width	15	Digital (3)	10	1/500 Turn	.250	Chrome
1 13/16" Dia.	25-1	Digital (3)	11 (3 Digit)	1/500 Turn	.250	Chrome
1 13/16" Dia.	25-4	Digital (4)	100 (4 Digit)	1/500 Turn	.250	Chrome

SWITCHES—Rotary Selector

Configuration	Size	Model No.	Switch Action	Contact Current Rating	Life At Rated Current	Contact Resistance	Operating Temperature Range
Screwdriver Adjust	½"	87-11	Positive Detent, 36° Indexing, Stops	250MA @ 28VCD	4,000 Switching Operations, Per Position	.05Ω Max.	−65° to +150°C
Knob Adjust	½"	87-21					
Bushing Mount	½"	87-31					

SPECTROL ELECTRONICS CORPORATION 17070 E. GALE AVE., CITY OF INDUSTRY, CALIF. 91745 • PHONE: (213) 964-6565 • TWX: (910) 584-1314

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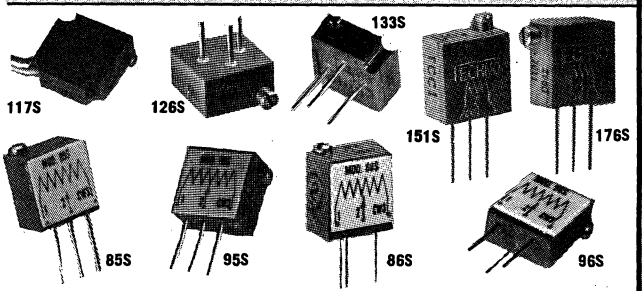
INDUSTRIAL WIREWOUND & NON-WIREWOUND TRIMMING POTENTIOMETERS

Backed by a vigorous and extensive program of reliability testing, Techno wirewound trimming potentiometers have earned a reputation for quality and performance unmatched in the industry. Complete Quality Assurance facilities, including a fully equipped and MIL-approved test and environmental laboratory, guarantee the consistently superior performance of every Techno trimmer.

Techno's unique design incorporates a limited number of internal parts into a two-half plastic case that permits 100% final inspection prior to sealing. The design provides maximum flexibility and a uniform standard of excellence for a wide variety of military and industrial applications. Throughout the electronics industry, designers and engineers have learned to trust Techno when precision trimming potentiometers are needed.

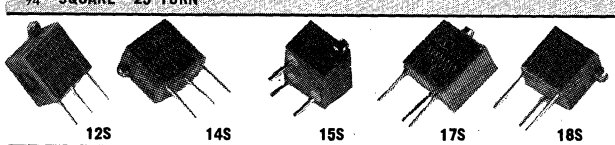
WIREWOUND TRIMMING POTENTIOMETERS

3/8" SQUARE 25 TURN



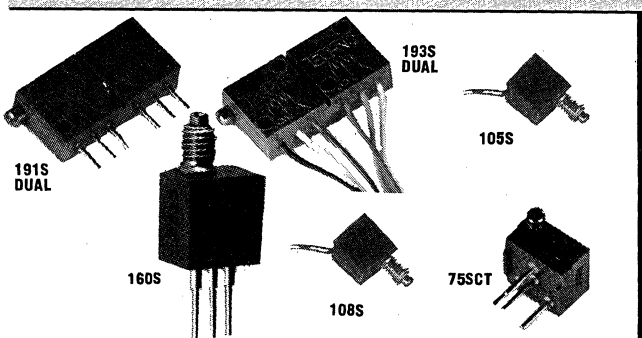
Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
117S	L	.375 x .375 x .150	.016	6"	10Ω - 50K	1w @ 50°C
126S	P	.375 x .375 x .218	.028	.172	10Ω - 50K	1w @ 50°C
133S	P[4]	.375 x .375 x .190	.020	.288	10Ω - 50K	1w @ 50°C
151S	W	.405 x .375 x .185	.028	.172	10Ω - 50K	1w @ 50°C
176S	X	.405 x .375 x .185	.028	.172	10Ω - 50K	1w @ 50°C
85S	W[7] Offset	.375 x .375 x .203	.020 .020	.300 .300	10Ω - 50K 10Ω - 50K	1w @ 50°C 1w @ 50°C
95S	X[7] Offset	.375 x .375 x .203	.020 .020	.300 .300	10Ω - 50K 10Ω - 50K	1w @ 50°C 1w @ 50°C
86S	W[7] Staggered	.375 x .410 x .203	.020 .020	.300 .300	10Ω - 50K 10Ω - 50K	1w @ 50°C 1w @ 50°C
96S	X[7] Staggered	.375 x .410 x .203	.020 .020	.300 .300	10Ω - 50K 10Ω - 50K	1w @ 50°C 1w @ 50°C

1/4" SQUARE 25 TURN



Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
12S	W[5]	.250 x .250 x .156	.013	.300	10Ω - 25K	½w @ 50°C
14S	X[6]	.250 x .250 x .156	.013	.300	10Ω - 25K	½w @ 50°C
15S	P[7]	.250 x .250 x .185	.020	.218	10Ω - 25K	½w @ 50°C
17S	W	.250 x .250 x .156	.016	.172	10Ω - 25K	½w @ 50°C
18S	X	.250 x .250 x .156	.016	.172	10Ω - 25K	½w @ 50°C

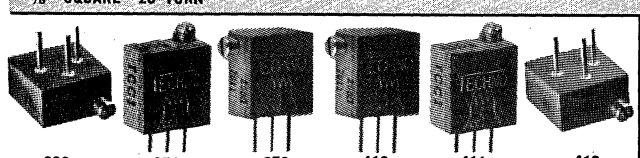
3/8" SQUARE SPECIAL 25 TURN



Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
191S Dual Trimmer	X[8]	.775 x .405 x .185	.031	.187	10Ω - 50K[8]	1w @ 50°C
193S Dual Trimmer	L[8]	.775 x .405 x .185	30AWG	5"	10Ω - 50K[8]	1w @ 50°C
105S Panel Mount	L	.437 x .453 x .282	30AWG	6"	10Ω - 50K	1w @ 50°C
160S Panel Mount	SH	.468 x .453 x .282	.031	—	10Ω - 50K	1w @ 50°C
108S Shaft Lock	L	.437 x .453 x .282	30AWG	5"	10Ω - 50K	1w @ 50°C
75SCT Center Tap	P	.375 x .375 x .250	.030	.218	10Ω - 50K	1w @ 50°C

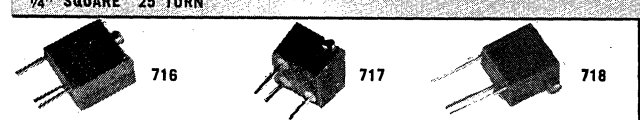
NON-WIREWOUND TRIMMING POTENTIOMETERS

3/8" SQUARE 25 TURN



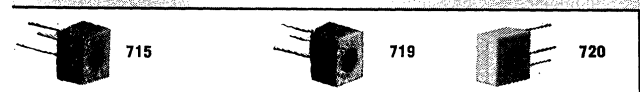
Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
226	P	.375 x .375 x .218	.028	.250	100Ω - 1meg	½w @ 85°C
251	W	.405 x .375 x .185	.028	.375	100Ω - 1meg	½w @ 85°C
276	X	.405 x .375 x .185	.028	.375	100Ω - 1meg	½w @ 85°C
410	X	.375 x .375 x .158	.025	.172	100Ω - 1meg	½w @ 85°C
411	W	.375 x .375 x .158	.025	.172	100Ω - 1meg	½w @ 85°C
412	P	.375 x .375 x .186	.025	.172	100Ω - 1meg	½w @ 85°C

1/4" SQUARE 25 TURN



Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
716	P	.250 x .250 x .190	.016	.172	100Ω - 1meg	¼w @ 85°C
717	W	.250 x .250 x .160	.016	.172	100Ω - 1meg	¼w @ 85°C
718	X	.250 x .250 x .160	.016	.172	100Ω - 1meg	¼w @ 85°C

1/4" SQUARE SINGLE TURN



Model	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
715	P	.250 x .250 x .183	.016	.172	100Ω - 1meg	¼w @ 85°C
719	P	.250 x .250 x .183	.016	.172	100Ω - 1meg	¼w @ 85°C
720		.250 x .250 x .183	.016	.172	100Ω - 1meg	¼w @ 85°C

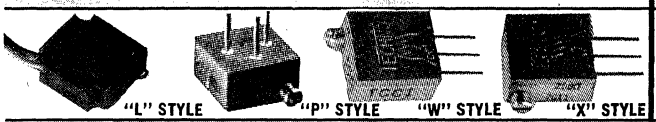
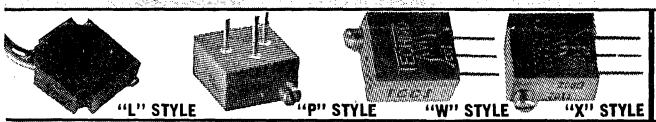
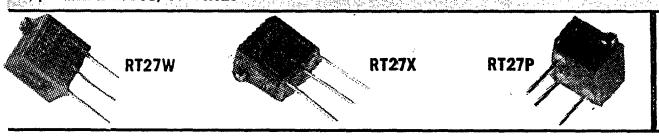
TECHNO

MILITARY / ESTABLISHED RELIABILITY WIREWOUND TRIMMING POTENTIOMETERS

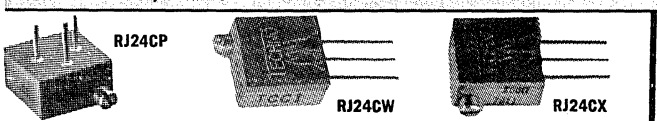
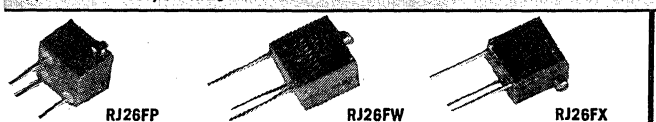
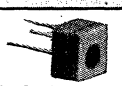
INDUSTRIAL & MILITARY UNITS FEATURE:
CAPABLE OF MEETING OR EXCEEDING MIL-R-39015 OR MIL-R-39035
TEMPERATURE RANGE: −65°C TO +175°C
MOISTURE RESISTANT HIGH TEMPERATURE PLASTIC CASE

WIREWOUND
RTR24, RT24, RT26, RT27
NON-WIREWOUND
RJ24, RJ26, RJ50

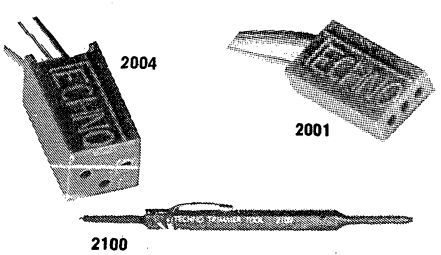
MILITARY WIREWOUND TRIMMERS

	Failure Rate	Style	Size - Inches	Lead D	Lead L	Standard Resistance	Power Watts
⅜" MIL-R-39015/3 RTR24							
 "L" STYLE "P" STYLE "W" STYLE "X" STYLE	M (1.0%)	L	.375 x .375 x .150	30AWG	6"	10Ω - 10K	¾w @ 85°C
	P (0.1%)	P	.375 x .375 x .218	.280	.250	10Ω - 10K	¾w @ 85°C
	P (0.1%)	W	.405 x .375 x .185	.028	.375	10Ω - 10K	¾w @ 85°C
	P (0.1%)	X	.405 x .375 x .203	.028	.375	10Ω - 10K	¾w @ 85°C
⅜" MIL-R-27208/9 RT24							
 "L" STYLE "P" STYLE "W" STYLE "X" STYLE		L	.375 x .375 x .150	30AWG	6"	10Ω - 10K	¾w @ 85°C
		P	.375 x .375 x .218	.028	.250	10Ω - 10K	¾w @ 85°C
		W	.405 x .375 x .185	.028	.375	10Ω - 10K	¾w @ 85°C
		X	.405 x .375 x .203	.028	.375	10Ω - 10K	¾w @ 85°C
¼" MIL-R-27208/10 RT26							
RT26W RT26X		W	.250 x .250 x .156	.016	.172	10Ω - 5K	½w @ 50°C
		X	.250 x .250 x .156	.016	.172	10Ω - 5K	½w @ 50°C
¼" MIL-R-27208/11 RT27							
 RT27W RT27X RT27P		W	.250 x .250 x .156	.013	.300	10Ω - 5K	½w @ 50°C
		X	.250 x .250 x .156	.013	.300	10Ω - 5K	½w @ 50°C
		P	.250 x .250 x .185	.020	.218	10Ω - 5K	½w @ 50°C

NON-WIREWOUND MILITARY TRIMMERS

⅜" MIL-R-22097/4 RJ24							
 RJ24CP RJ24CW RJ24CX		P	.375 x .375 x .218	.028	.250	100Ω - 1meg	½w @ 85°C
		W	.405 x .375 x .185	.028	.375	100Ω - 1meg	½w @ 85°C
		X	.405 x .375 x .185	.028	.375	100Ω - 1meg	½w @ 85°C
¼" MIL-R-22097/5 RJ26							
 RJ26FP RJ26FW RJ26FX		P	.250 x .250 x .190	.016	.172	100Ω - 1meg	¼w @ 85°C
		W	.250 x .250 x .160	.016	.172	100Ω - 1meg	¼w @ 85°C
		X	.250 x .250 x .160	.016	.172	100Ω - 1meg	¼w @ 85°C
¼" MIL-R-22097/6 RJ50							
 RJ50FP		P	.250 x .250 x .183	.016	.172	100Ω - 1meg	¼w @ 85°C

ADJUSTMENT TOOL & TEST CONNECTORS



Model	Pin Pattern	Terminal Pin Sizes Diameter	Length
2001	In-Line	.028" to .031"	x 3/16"
2002	In-Line	.019" to .021"	x 3/16"
2003	In-Line	.013" to .015"	x 3/16"
2004	Triangular	.028" to .031"	x 3/16"
2005	Triangular	.019" to .021"	x 3/16"
2006	Triangular	.013" to .015"	x 3/16"

NOTES:

1. Tolerance: ±5%. Closer tolerance available.
2. Terminal legend: L = stranded insulated leads. P = printed wiring pins, base mounted. W = printed wiring pins, edge mounted 180° from adjustment shaft. X = printed wiring pins edge mounted 90° from adjustment shaft. SH = solder hooks.
3. All models with clutch stop rotation.
4. Standoffs to facilitate printed wiring board washing.
5. Available with Teflon insulated 5-inch leads as Model 11S.
6. Available with Teflon insulated 5-inch leads as Model 13S.
7. Available with .030" printed wiring board standoffs as Model 16S.
8. Resistance value per section.

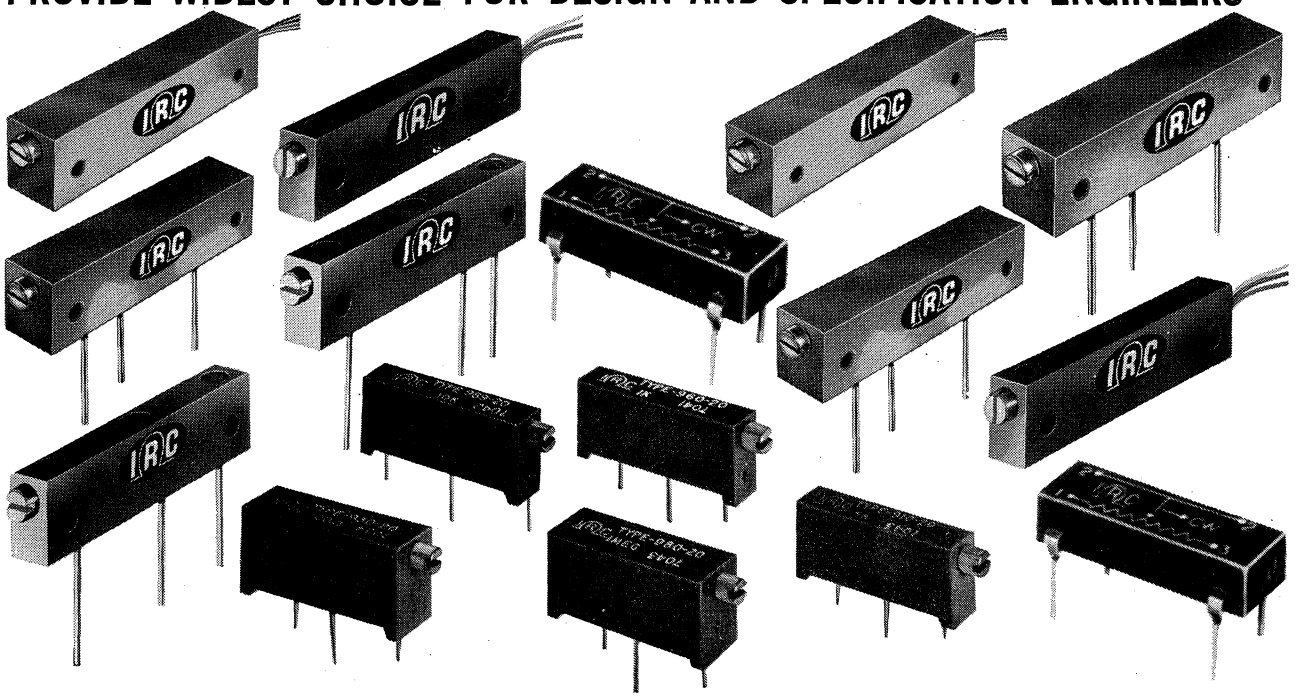
TECHNO COMPONENTS CORP. A Subsidiary of OAK ELECTRO/NETICS CORP.

7803 LEMONA AVENUE • VAN NUYS, CALIFORNIA 91405 • (213) 781-1642 • TWX 910-495-2015

TRW® ELECTRONIC COMPONENTS

CIRCUITRIM® TRIMMER POTENTIOMETERS

TRIMMER POTENTIOMETERS IN MANY MILITARY AND COMMERCIAL STYLES PROVIDE WIDEST CHOICE FOR DESIGN AND SPECIFICATION ENGINEERS



RECTANGULAR NON-WIREWOUND • IRC METAL GLAZE®-CERMET

Package L x W x H	IRC Type	Military Style or Designation	Resistance Ranges ±10% Std.		Terminals	Adjust Turns (Nom)	Power (Watts)
			MIL-Qual.	IRC			
1.25 x .19 x .32	450-00	RJ12L	10Ω-1 Meg Ω	10Ω-1 Meg Ω	Leads	22	.75 @ 85°C
1.25 x .19 x .32	450-10	RJ12P	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins	22	.75 @ 85°C
1.25 x .19 x .32	450-20	RJ12Y	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins	22	.75 @ 85°C
1.25 x .28 x .32	650-00	RJ11L	—	10Ω-1 Meg Ω	Leads	22	.75 @ 85°C
1.25 x .28 x .32	650-20	RJ11P	—	10Ω-1 Meg Ω	P.C. Pins	22	.75 @ 85°C
.75 x .16 x .31	960-20	—	—	10Ω-1 Meg Ω	P.C. Pins	20	.75 @ 25°C
.75 x .27 x .35	980-20	—	—	10Ω-1 Meg Ω	P.C. Pins	20	.75 @ 25°C
.75 x .16 x .31	989-20	(RJ11P Pin Placement)	—	10Ω-1 Meg Ω	P.C. Pins	20	.75 @ 25°C
.76 x .25 x .20 (To-116 Case Size)	990	—	—	10Ω-1 Meg Ω	P.C. Pins	18	.75 @ 40°C

RECTANGULAR WIREWOUND

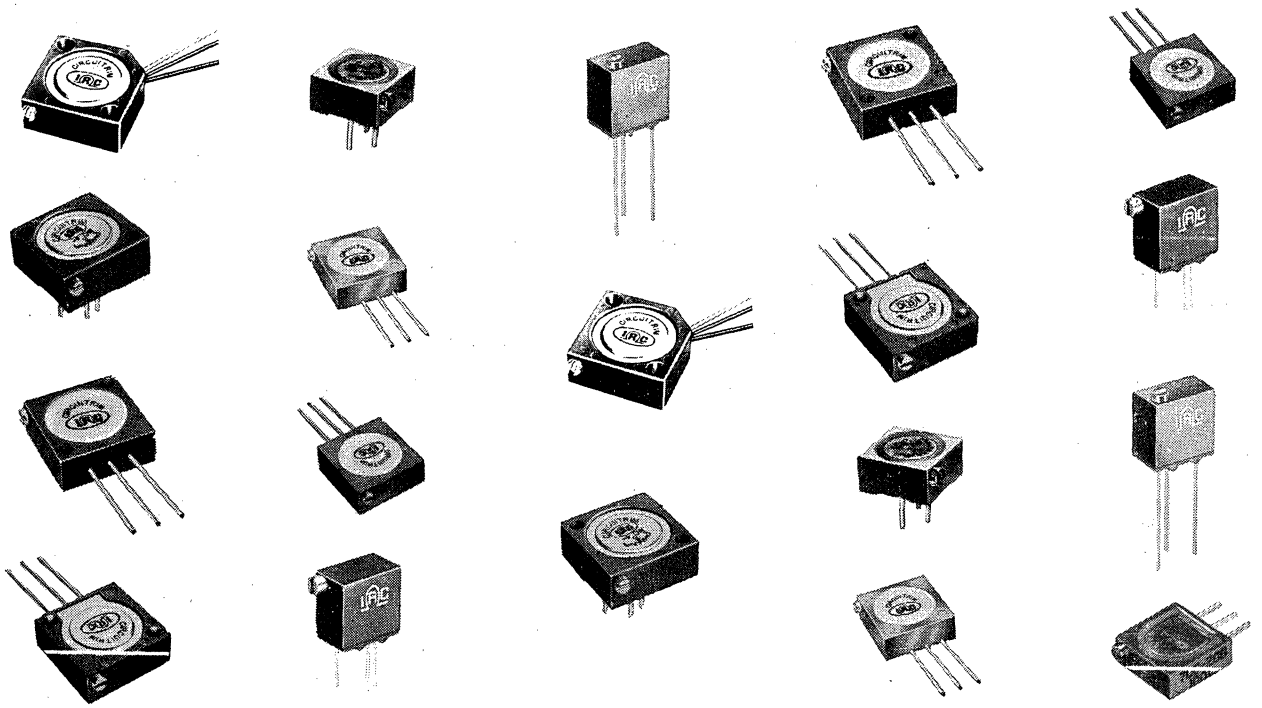
Package L x W x H	IRC Type	Military Style or Designation	Resistance Ranges		Terminals	Adjust Turns (Nom)	Power (Watts)
			MIL-Qual.	IRC			
1.25 x .28 x .32	60-00	RT11C2L	—	10Ω-50K ±10%	Leads	22	1.0 @ 70°C
1.25 x .28 x .32	60-20	RT11C2P	—	10Ω-50K ±10%	P.C. Pins	22	1.0 @ 70°C
1.25 x .19 x .32	400-00	RT12C2L	100Ω-20K	10Ω-50K ±5%	Leads	22	.75 @ 85°C
1.25 x .19 x .32	400-10	RT12C2P	100Ω-20K	10Ω-50K ±5%	P.C. Pins	22	.75 @ 85°C
1.25 x .19 x .32	400-20	RT12C2Y	100Ω-20K	10Ω-50K ±5%	P.C. Pins	22	.75 @ 85°C
1.25 x .28 x .32	600-00	RT11C2P	—	10Ω-50K ±5%	Leads	22	1.0 @ 70°C
1.25 x .28 x .32	600-20	RT11C2P	—	10Ω-50K ±5%	P.C. Pins	22	1.0 @ 70°C
.75 x .16 x .31	910	—	—	10Ω-20K ±10%	P.C. Pins	20	1.0 @ 40°C
.75 x .27 x .35	930	—	—	10Ω-20K ±10%	P.C. Pins	20	1.0 @ 40°C
.76 x .25 x .20 (To-116 Case Size)	940	—	—	10Ω-20K ±10%	P.C. Pins	18	1.0 @ 40°C

Notes: RT11 and RJ11 Mil. Type Trimmers have been removed from Gov't and Mil. Procurement Lists. Future Procurement should call for RT12 and RJ12 Types.
Trimmer Type 989-20 has .7 x .1 Pin Spacing.
#12-28 Bushing Mount Fixture available for all 1.25" rectangulars.

CIRCUITRIM® TRIMMER POTENTIOMETERS

TRW®
ELECTRONIC COMPONENTS

SQUARE AND CUBED TRIMMER POTENTIOMETERS IN ALL POPULAR MIL AND COMMERCIAL STYLES



SQUARE NON-WIREWOUND • IRC METAL GLAZE®-CERMET

Package L x W x H		IRC Type	Military Style or Designation	Resistances Ranges ±5%		Terminals	Adj. Turns (Nom)	Power (Watts)
				MIL-Qual.	IRC			
1/2"	.5 x .5 x .19	255-00	RJ22CL	10Ω-1 Meg Ω	10Ω-1 Meg Ω	Leads	25	.75 @ 70°C
	.5 x .5 x .22	255-10	RJ22CP	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins Bottom	25	.75 @ 70°C
	.5 x .5 x .19	255-207*	RJ22CX	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins Edge	25	.75 @ 70°C
	.5 x .5 x .19	255-208*	RJ22CW	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins Edge	25	.75 @ 70°C
3/8"	.375 x .375 x .195	750-10	RJ24CP	10Ω-1 Meg Ω	10Ω-1 Meg Ω	P.C. Pins Bottom	19	.5 @ 70°C
	.375 x .375 x .21	750-207*	RJ24X	—	10Ω-1 Meg Ω	P.C. Pins Edge	19	.5 @ 70°C
	.375 x .375 x .21	750-208*	RJ24W	—	10Ω-1 Meg Ω	P.C. Pins Edge	19	.5 @ 70°C
	.375 x .375 x .21	750-307*	—	—	10Ω-1 Meg Ω	P.C. Pins Edge	19	.5 @ 70°C
	.375 x .375 x .21	750-308*	—	—	10Ω-1 Meg Ω	P.C. Pins Edge	19	.5 @ 70°C
5/16"	.312 x .312 x .19	850-20	—	—	10Ω-1 Meg Ω	P.C. Pins Edge	13	.3 @ 70°C
	.312 x .312 x .19	850-208	—	—	10Ω-1 Meg Ω	P.C. Pins Edge	13	.3 @ 70°C

SQUARE WIREWOUND

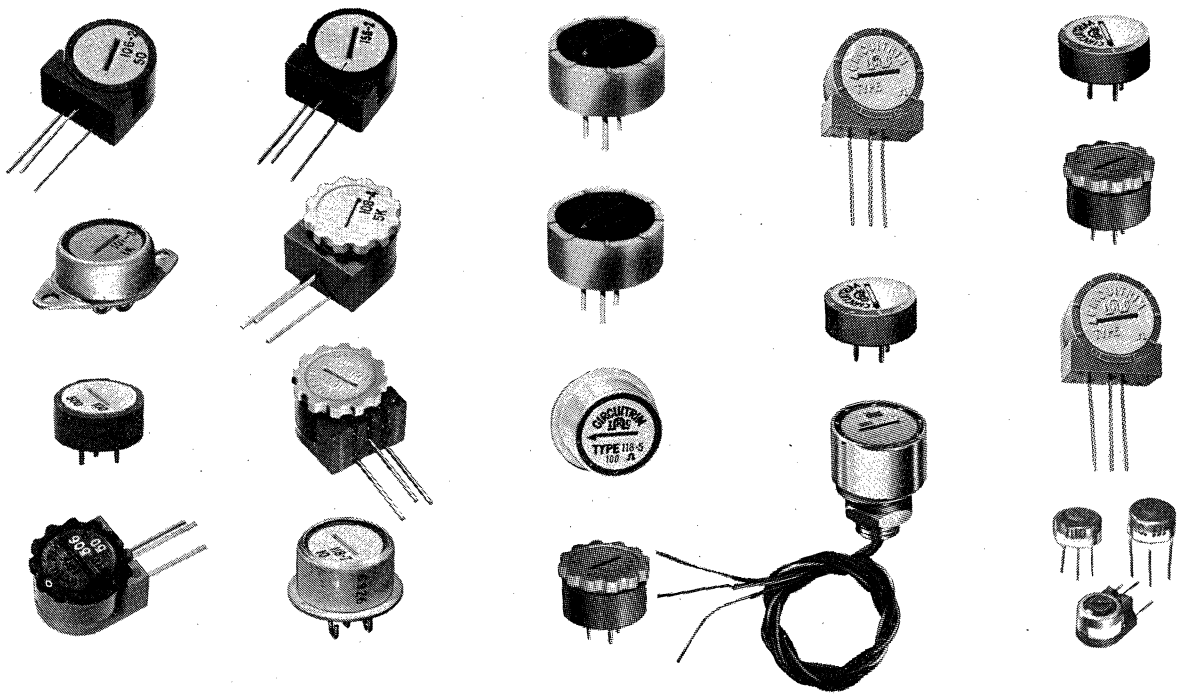
Package L x W x H		IRC Type	Military Style or Designation	Resistance Ranges ±5% Std.		Terminals	Adj. Turns (Nom)	Power (Watts)
				MIL-Qual.	IRC			
1/2"	.5 x .5 x .19	205-00	RT22C2L	50Ω-20K	10Ω-50K	Leads	25	1.0 @ 70°C
	.5 x .5 x .22	205-10	RT22C2P	50Ω-20K	10Ω-50K	P.C. Pins Bottom	25	1.0 @ 70°C
	.5 x .5 x .19	205-207*	RT22C2X	50Ω-20K	10Ω-50K	P.C. Pins Edge	25	1.0 @ 70°C
	.5 x .5 x .19	205-208*	RT22C2W	50Ω-20K	10Ω-50K	P.C. Pins Edge	25	1.0 @ 70°C
3/8"	.375 x .375 x .195	700-10	RT22C2P	10Ω-10K	10Ω-20K	P.C. Pins Bottom	15	.75 @ 70°C
	.375 x .375 x .21	700-207*	RT22X	—	10Ω-20K	P.C. Pins Edge	15	.75 @ 70°C
	.375 x .375 x .21	700-208*	RT22W	—	10Ω-20K	P.C. Pins Edge	15	.75 @ 70°C
	.375 x .375 x .21	700-307*	—	—	10Ω-20K	P.C. Pins Edge	15	.75 @ 70°C
	.375 x .375 x .21	700-308*	—	—	10Ω-20K	P.C. Pins Edge	15	.75 @ 70°C
5/16"	.312 x .312 x .19	800-20	—	—	10Ω-20K	P.C. Pins Edge	15	.6 @ 70°C
	.312 x .312 x .19	800-208*	—	—	10Ω-20K	P.C. Pins Edge	15	.6 @ 70°C

*Suffix 207 denotes Lead Screw Location 90° from Pins.
Suffix 208 denotes Lead Screw Location 180° from Pins.
P.C. Pins on Suffix -307 and -308 are not Mil. Std. Placement. They are 0.4" from rear plate.

TRW® CIRCUITRIM® TRIMMER POTENTIOMETERS AND PANEL CONTROLS

ELECTRONIC COMPONENTS

CIRCUITRIM 100 IS THE WORLD'S MOST EXPERIENCED ½" TRIMMER WITH PC. PINS ITS MANY VARIATIONS ARE UNEQUALLED IN THE INDUSTRY

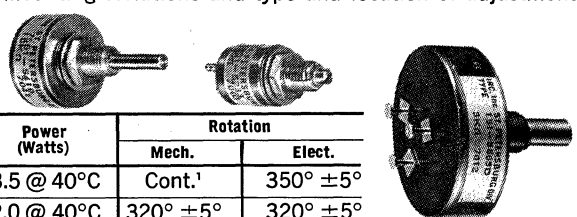


IRC Type	Description	Pin Spacing & Mounting	Adjustment Control	Resistance Range & Tolerance	Power (Watts)
SINGLE TURN — WIREWOUND					
100*	½" Round x .235 High	.1" Radius, Flat	Top S.D. Slot	10Ω-50K ±5%	1.0 @ 70°C
110	½" Round x .325 High	.1" Radius, Flat	Top S.D. & Knob	10Ω-50K ±5%	1.0 @ 70°C
106-2	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. Slot	10Ω-50K ±5%	1.0 @ 70°C
108-4	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. & Knob	10Ω-50K ±5%	1.0 @ 70°C
500	½" Round x .325 High	.1" Radius, Flat	Top S.D. & Knob	10Ω-50K ±10%	1.0 @ 70°C
506	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. & Knob	10Ω-50K ±10%	1.0 @ 70°C
SINGLE TURN — METAL GLAZE®-CERMET					
150*	½" Round x .235 High	.1" Radius, Flat	Top S.D. Slot	10Ω-2 Meg Ω ±10%	.75 @ 70°C
160	½" Round x .325 High	.1" Radius, Flat	Top S.D. & Knob	10Ω-2 Meg Ω ±10%	.75 @ 70°C
156-2	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. Slot	10Ω-2 Meg Ω ±10%	.75 @ 70°C
158-4	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. & Knob	10Ω-2 Meg Ω ±10%	.75 @ 70°C
550	½" Round x .235 High	.1" Radius, Flat	Top S.D. & Knob	10Ω-2 Meg Ω ±30%	.75 @ 70°C
556	½" Wide x .56 High	.1" Radius, Vertical	Side S.D. & Knob	10Ω-2 Meg Ω ±30%	.75 @ 70°C
170*	¼" Round x .17 High	.1" Radius, Flat	Top S.D. Slot	10Ω-1 Meg Ω ±20%	.5 @ 85°C
171	¼" Round x .18 High	.1" Radius, Flat	Top S.D. Slot	10Ω-1 Meg Ω ±20%	.5 @ 85°C
172	¼" Wide x .31 High	.1" Radius, Vertical	Side S.D. Slot	10Ω-1 Meg Ω ±20%	.5 @ 85°C

*Basic Mechanical/Electrical Components for these respective series. Mounting variations and type and location of adjustment controls provide versatility and change in model numbering.

PANEL CONTROLS

BUSHING MOUNT • REAR TERMINALS



IRC Type	Case Diam.	Bushing Dia. x Len.	Shaft Dia. x Len.	Resistance Range	Linearity (Indep.)	Power (Watts)	Rotation	
							Mech.	Elect.
151	1.5"	⅜" x ½"	¼" x ½"	100Ω-100K	±0.5%	3.5 @ 40°C	Cont.[1]	350° ±5°
5001	.5"	¼" x ⅜"	⅛" x ⅛"	10Ω-50K	±5%	2.0 @ 40°C	320° ±5°	320° ±5°
7501*	.75"	¼" x ⅜"	¼" x ½"	50Ω-75K	±1%	2¼ @ 40°C	Cont.[1]	345° ±5°

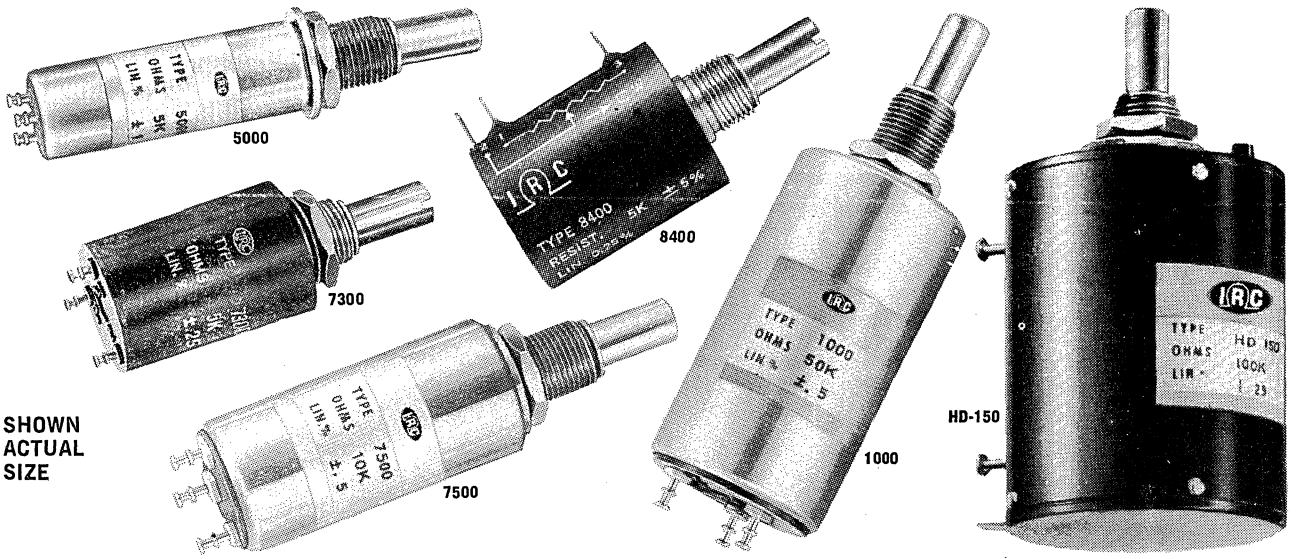
[1]Available: Stops, closer electrical tolerances, changes in shaft and bushing configuration.

IRC ST. PETERSBURG DIVISION OF TRW INC. • 2801 72nd ST., N. • ST. PETERSBURG, FLA. 33733 • (813) 347-2181 • TWX 810-863-0357

PRECISION MULTI-TURN POTENTIOMETERS

TRW®
ELECTRONIC COMPONENTS

WIREWOUND BUSHING MOUNTED CONTROLS IN METAL OR PLASTIC CASES. MANY FEATURE IRC's EXCLUSIVE METAL TO METAL STOP SYSTEM AND REAR TERMINALS FOR CLOSE PACKAGING 3 TO 30 TURNS AVAILABLE



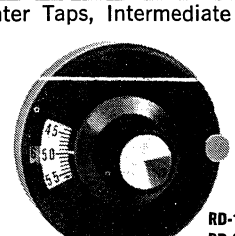
Specifications	Type 5000 ½" Dia. Metal Case	Type 7300 ¾" Plastic Case	Type 7500 ¾" Metal Case
Electrical			
Resistance Range & Tol.	25Ω-100K ±5%	25Ω-100K ±5%	50Ω-250K ±5%
Power Rating	1.5 W. @ 40°C	3.0 W. @ 40°C	3.0 W. @ 40°C
Operating Temp. Range	−55°C to +125°C	−55°C to +105°C	−55°C to +125°C
Linearity (Indep., Std.)	±.5%	±.25%	±.25%
Rotation	3600° +4° −0°	3600° +10° −0°	3600° +4° −0°
Mechanical			
Dimensions (Dia. x L.B.P.)	½" x 1 39/64"	¾" x 1⅛"	¾" x 1 21/32"
Bushing (Dia. x L.)	⅜" x ½"	⅜" x 5/16"	⅜" x ½"
Shaft (Dia. x L.)	¼" x ½"	¼" x ½"	¼" x ½"
Rotation	3600° +4° −0°	3600° +15° −0°	3600° +4° −0°

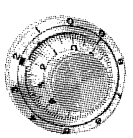
Specifications	Type 1000 1" Diam. Metal Case	Type 8400 ⅞" Plastic Case	Type HD-150 1½" Phenolic Case
Electrical			
Resistance Range & Tol.	500Ω-200K ±5%	25Ω-100K	500Ω-600K
Power Rating	3.0 W. @ 40°C	3.0 W. @ 40°C	5.0 W. @ 40°C
Operating Temp. Range	−55°C to +125°C	−55°C to +105°C	−55°C to +100°C
Linearity (Indep., Std.)	±0.5%	±.25%	±3%
Rotation	3600° +4° −0°	3600° +10° −0°	3600° +4° −0°
Mechanical			
Dimensions (Dia. x L.B.P.)	1" x 1 11/32"	⅞" x 1⅛"	1½" x 2.0"
Bushing (Dia. x L.)	⅜" x ½"	⅜" x 5/16"	⅜" x 5/16"
Shaft (Dia. x L.)	¼" x ½"	¼" x ½"	¼" x ½"
Rotation	3600° +4° −0° Available in 2 to 10 Turns	3600° +15° −0° Available in 3 and 5 Turns	3600° +4° −0° Available in 5 Turns

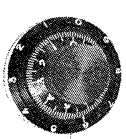
Note: Consult factory for Shaft and Bushing Modifications, Center Taps, Intermediate Turns, best Practical Resistance and Linearity Tolerances and Moisture or Hermetic Sealing.

REVODEX® TURNS COUNTING DIALS

Eliminate reading errors. Revodex® Dials are adaptable to all IRC Precision Potentiometers without need for extra panel holes. Life tested for one quarter million cycles. Available in black or clear anodized finish.


RD-1
RD-6
1⅞" Diam.


RD-400 Series
1" Diam.

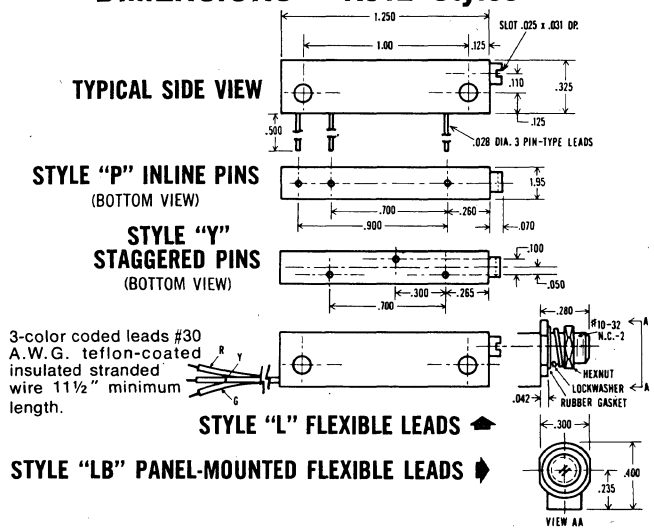

RDK-400 Series
1" Diam.

VISHAY RESISTOR PRODUCTS
A DIVISION OF VISHAY INTERTECHNOLOGY, INC.
63 LINCOLN HIGHWAY ■ MALVERN, PENNA. 19355
TELEPHONE: (215) 644-1300 ■ TWX: 510-668-8944

VISHAY Trimmers Outperform All Others

TRIMMERS WITH TC OF 10 PPM/°C.

DIMENSIONS — RJ12 Styles



ORDERING INFORMATION

Example: Flex leads, panel mtd., 10K, Part No. is 1202 LB-10K.

Model	Style	Resistance Value (ohms)
1202	LB, P, Y, L	2, 5, 10, 20, 50, 100, 200, 250, 500, 1K, 2K, 2.5K, 5K, 10K, 15K, 20K, (2.5K, 15K and 20K Model 1201P only)

1202 — LB — 10K

SPECIFICATIONS

ELECTRICAL

Resistance Range — 2Ω to 20KΩ (over 10K — Model 1201 only)
Resistance Tolerance — ±5% except 2Ω, 5Ω and 10Ω is ±10% ±1% available on request
Power Rating — Model 1202: ½ watt at 85°C — zero at 150°C, Model 1201: ¾ watt at 85°C — zero at 150°C
Temperature Coefficient (−55°C to +150°C) — Element — 10 ppm/°C max., 5 ppm/°C typical Through the wiper — 10 ppm/°C typical
Resolution — "Infinite" (.05% Setability)
End Resistance — 2Ω max.
Insulation Resistance — 1000 Megohms min. — 500V D.C.
D.C. Offset (Contact Resistance) — less than .01Ω
Dielectric Strength — 1000 volts
Frequency Capability — Up to 100 MHz — Rise time 1 nanosecond — Inductance 0.08 μh
Dynamic Noise (ENR) — 10Ω maximum

MECHANICAL

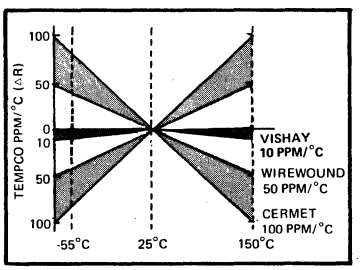
Full Adjustment — 25 turns
Mechanical Stops — Wiper idles — no discontinuity
Shaft Torque — 5 oz. in. max.
Solderability — Per MIL-R-22097
Terminations — All welded — no flux

ENVIRONMENTAL (PER MIL-R-22097)

Operating Temperature Range — −55°C to +150°C
Moisture Resistance — less than 1% ΔR
Thermal Shock — less than 1% ΔR
Shock — Setting stability — **less than .1%**
Vibration — Setting stability — **less than .1%**
Immersion — No leaks
Load Life — **Less than .5% ΔR-2000 hr. (.1% with burn-in)**
Rotational Life — Less than 1% ΔR-200 cyc.
Terminal Strength — Push & Pull — 2 lb.; Bend — 2 Cycles
Salt Spray — No corrosion
High Temperature Operation — Setting Stability .5%, ΔR .5%
Resistance to Solvents — Per MIL-R-39015

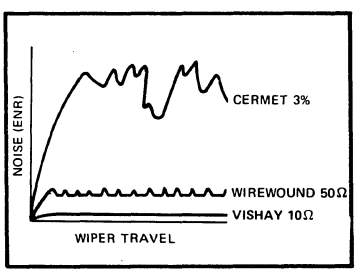
VISHAY TRIMMERS HAVE BETTER TEMPERATURE COEFFICIENT

The Vishay resistor element, a self-compensating combination of a proprietary BULK METAL film set on a glass substrate, produces a dome shaped TC curve with a typical TC of 5ppm/°C (absolute maximum TC of 10ppm/°C for all values).



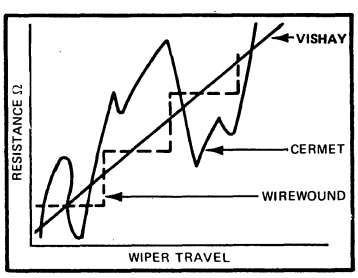
VISHAY TRIMMERS HAVE THE LOWEST NOISE

A multi-fingered precious metal alloy wiper in contact with the highly conductive surface of multiple resistance paths virtually eliminates both dynamic noise and catastrophic failures.



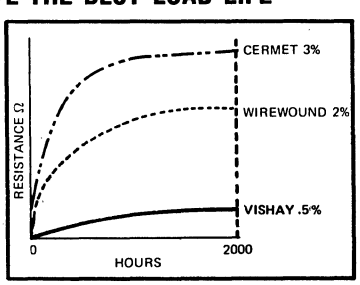
VISHAY TRIMMERS HAVE THE BEST RESOLUTION

The combination of an absolutely uniform resistance material, multiple wiper contact points, and multiple resistance circuit paths, yields a uniquely accurate setability of less than 0.05%.



VISHAY TRIMMERS HAVE THE BEST LOAD LIFE

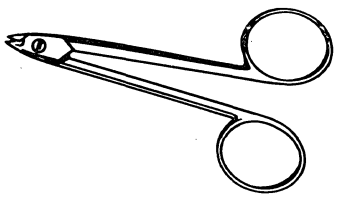
Only the ultra-stable Vishay metal film element can provide a 2,000 hour load life of 0.5% ΔR maximum (0.1% ΔR maximum with burn-in).



Vishay trimmers meet or exceed all requirements of MIL-R-27208 and MIL-R-22097 and additionally meet the requirements of MIL-R-39035 characteristic J. The decreased test time and improved product performance resulting from selection of Vishay trimmers more than offset the slight additional cost for better TC, lower noise, better resolution and best load life.

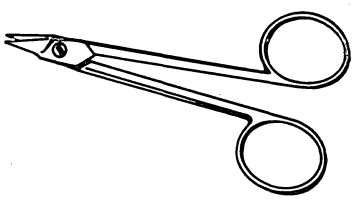
Clauss ELECTRONIC TOOLS

SCISSORS



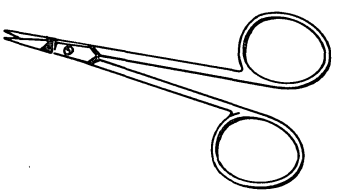
554D – 4″

Same as No. 564 with cut-down blades. 6/Pack.
564D – 4″: Same as above with straight blades. 6/Pack.



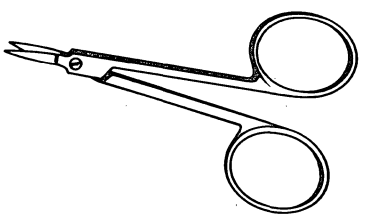
563½ – 3¾″
564½ – 4¼″

High carbon cutlery steel. Nickel plated. Special jaw ground to grip and cut where clearance is limited. 6/Pack.



33¼ – 3¼″

High carbon cutlery steel. Nickel plated. Curved razor sharp blades. 6/Pack.

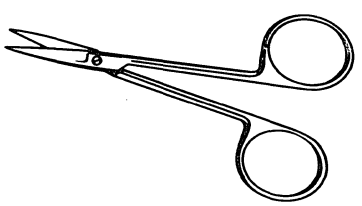


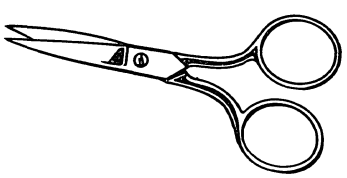
43½ – 3½″

Same as No. 33¼, slightly longer and stronger straight blades. 6/Pack.

IS4¼ – 4¼″

Same as No. 33¼, longer and stronger straight blades. Needle sharp points. 6/Pack.



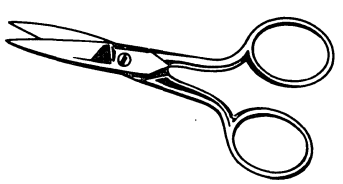


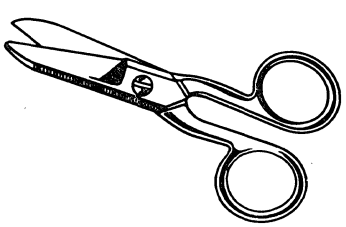
383½ – 3½″
384 – 4″ **385** – 5″
384½ – 4½″ **386** – 6″

DOUBLE SHARP high carbon cutlery steel. Nickel plated. Both points sharp. 6/Pack.

194 – 4″

HEAVY DUTY high carbon cutlery steel. Nickel plated. Double sharp points. 6/Pack.



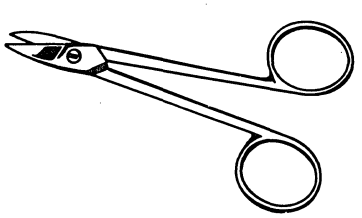


925 – 5″

ELECTRICIANS' high carbon cutlery steel. Nickel plated. 12/Pack.
925C – 5″: Same as above but with two stripping notches for 19 gauge and 23 gauge wires. 12/Pack.

564 – 4″

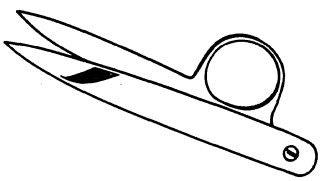
High carbon cutlery steel. Nickel plated. 6/Pack.
564C – 4″: Same as above except serrated blade to prevent slip-out while cutting. 6/Pack.
554 – 4″: Same as No. 564 with curved blades (not serrated). 6/Pack.



FINE CUTLERY SINCE 1877

Clauss ELECTRONIC TOOLS

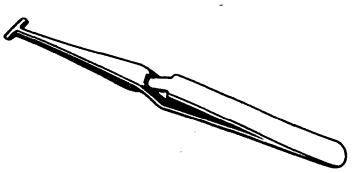
CLIPS



FL4½ – 4½"
"FLIPPER" THREAD/WIRE CLIP. Replaceable blades of sharp, hard steel available. Teflon coated housing rustproof, self-lubricating. Easy to adjust. 6/Pack.
BLS SHARP OR BLR ROUNDED POINT BLADES: Replacement blades 6 pair per pack. Specify sharp or rounded safety points. 6/Pack.

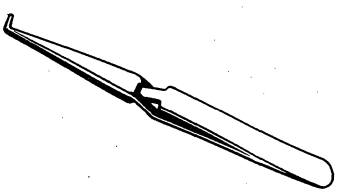
TC4½ – 4½"
THREAD/WIRE CLIP high carbon cutlery steel. Double plated – chrome over nickel – stainless steel screw for maximum rust protection. 6/Pack.

ANTI-WICK



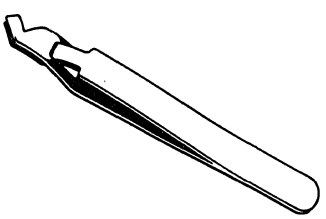
AW 18 – 5"
AW 20 – 5" AW 24 – 5" AW 28 – 5"
AW 22 – 5" AW 26 – 5" AW 30 – 5"

Non-fatiguing beryllium copper alloy, positive contact without corrosive deterioration. Maximum thermal conductivity. Satin chrome finish.
Stock numbers give correct AWG size wire tools are made to fit. For other sizes than shown add 10% to cost and 30 extra days for delivery.
Bullet shaped head grips conductor, supports insulation. Box joint prevents side slippage, perfect conductor contact. 12/Pack.



AWG 18 – 4½"
AWG 20 – 4½"
AWG 22 – 4½"
AWG 24 – 4½" **AWG 28 – 4½"**
AWG 26 – 4½" **AWG 30 – 4½"**

"L" shaped head affords greater visibility. Box joint design prevents side slippage. Perfect conductor contact. Satin chrome finish. Same as above model. 12/Pack.

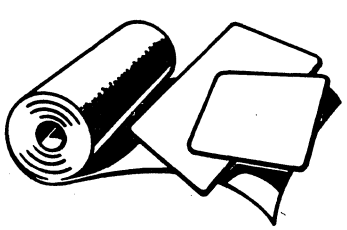


AWS 10 – 3½"
AWS 12 – 3½"
AWS 14 – 3½"
AWS 16 – 3½"

Diagonal head makes positive conductor contact. Same as models above in shorter length. 12/Pack.

"SOFTY" WORK MATS

NON-SKID • SANITARY • RESILIENT • LINT FREE



	NO.	SIZE	STANDARD PACK
WORK MATS	M11	11" x 14"	36 per carton
	M14	14" x 22"	
ROLL GOODS	R22	22" width	360' per roll (approx.)
	R44	44" width	

Make small parts handling quicker, easier. Protect instrumentation.
The working surface is nylon* tricot, bonded permanently to a latex formulation developed especially for work mat. 3/32" thickness compresses to give tweezers, pliers or fingertips sure grip on parts. Cushion surface. Non slip backing.

FINE CUTLERY SINCE 1877

Clauss
ELECTRONIC TOOLS

DOMESTIC TWEEZERS

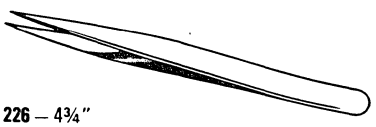
5 – 4¼"

Non-magnetic stainless steel. Satin polish finish. Long, slender, smooth inside points. 12/Pack.

7C – 4½"

Surgical steel. Satin-chrome finish. Curved, smooth inside points. 12/Pack.

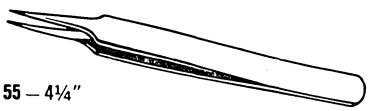
7SS – 4½": Non-magnetic stainless steel. Satin polish finish. Curved, smooth inside points. 12/Pack.



226 – 4¾"

Surgical steel. Satin-chrome finish. Serrated inside points. 12/Pack.

231 – 4¾": Non-magnetic stainless steel. Satin polish finish. Serrated inside points. 12/Pack.



55 – 4¼"

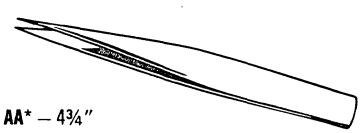
Non-magnetic stainless steel. Satin polish finish. Smooth inside points. 12/Pack.

227 – 4¼": Surgical steel. Satin-chrome finish. Smooth inside points. 12/Pack.

AA – 4⅞"

Stainless steel. Satin polish finish. Smooth inside points. 12/Pack.

IMPORTED TWEEZERS

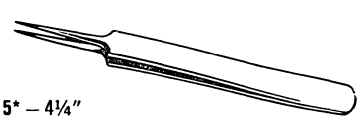


AA* – 4¾"

Carbon steel. Nickel plated. Fine points, beveled edges. 12/Pack.

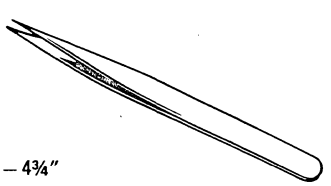
MM* – 5"

Carbon steel. Nickel plated. Extra long, strong blades. 12/Pack.



5* – 4¼"

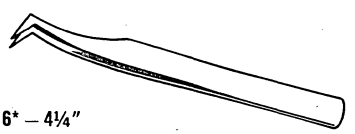
Carbon steel. Brushed satin finish. Extra thin blades, fine points. 12/Pack.



3* – 4¾"

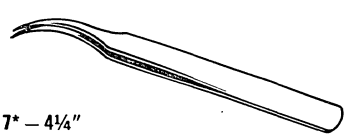
Carbon steel. Brushed satin finish. Fine point. 12/Pack.

3C* – 4¼": Same as above except ½" shorter in length. 12/Pack.



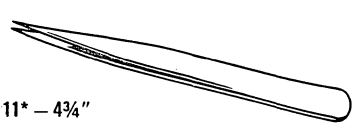
6* – 4¼"

Carbon steel. Brushed satin finish. Sharply angled super fine point. 12/Pack.



7* – 4¼"

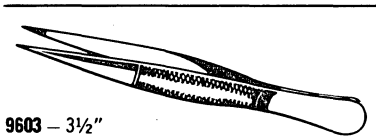
Carbon steel. Brushed satin finish. Curved blades, super fine points. 12/Pack.



11* – 4¾"

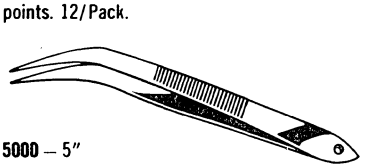
German silver, non-magnetic. Fine points. 12/Pack.

SPECIAL TWEEZERS



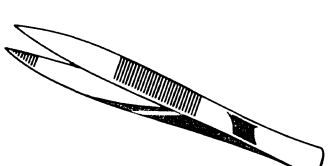
9603 – 3½"

Carbon steel. Nickel plated. Serrated needle points. 12/Pack.



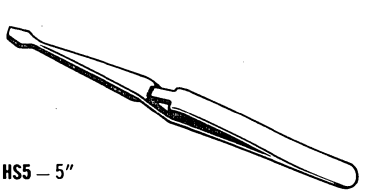
5000 – 5"

Carbon steel. Chrome plated. 12/Pack.



11C – 4½"

Carbon steel. Chrome plated. Serrated points. 12/Pack.



HS5 – 5"

Non-fatiguing beryllium copper alloy. Satin chrome finish. 12/Pack.

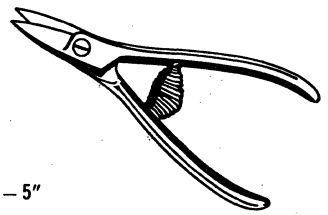
B50 – 4½": Same as above with square points. 12/Pack.

B47 – 4½": Same as above with needle point. 12/Pack.

FINE CUTLERY SINCE 1877

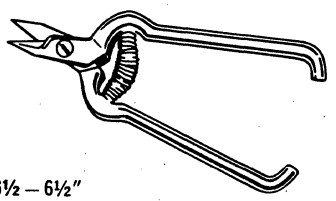
Clauss ELECTRONIC TOOLS

SNIPS



75 – 5″

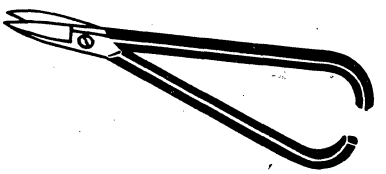
FILAMENT high carbon cutlery steel. Polished jaws and handles. 6/Pack.



76½ – 6½″

FILAMENT high carbon cutlery steel. Polished jaws. 6/Pack.

76½S – 6½″: Same as above except serrated blade to prevent slip-out while cutting. 6/Pack.

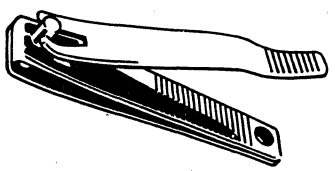


57 – 7″

LIGHT METAL high carbon cutlery steel. Polished blades. Curved blades. 6/Pack.

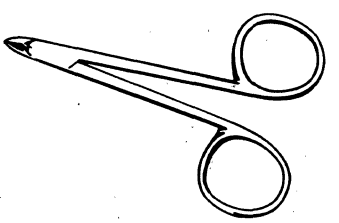
67 – 7″: Same as above except straight blades. 6/Pack.

NIPPERS



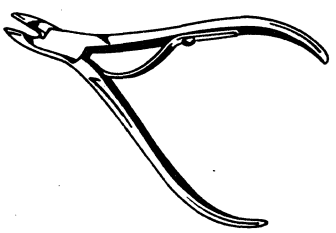
PD1 – 3¼″

◀ Double plated—chrome over nickel—ground jaws and leverage action. 12/Pack.



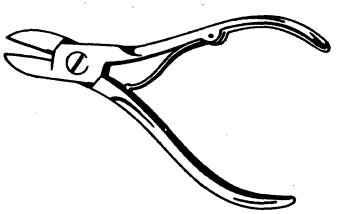
202 – 3½″ ▶

Same as above except scissors handles. 6/Pack.



201 – 4″

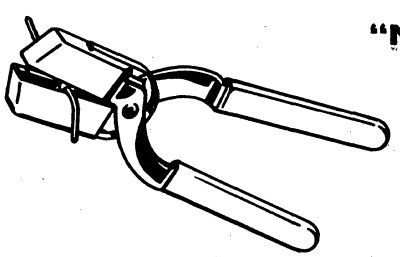
◀ Imported. Completely nickel plated. Box joint. Plier handle nipper thin, precisely ground jaws. 6/Pack.



973 – 4¼″ ▶

Nickel plated. Regular pattern. Imported. 6/Pack.

"NO-NIK" WIRE STRIPPERS



All No-Nik wire strippers are 5½″ overall length. Weight ¼ lb.

Each tool is made to strip one wire size only. Handles are color coded to size of cutter holes marked on centering device.

Blades are finest razor blade steel. No adjustment needed.

*SPECIFY CUTTING BLADE DIAMETER WHEN ORDERING

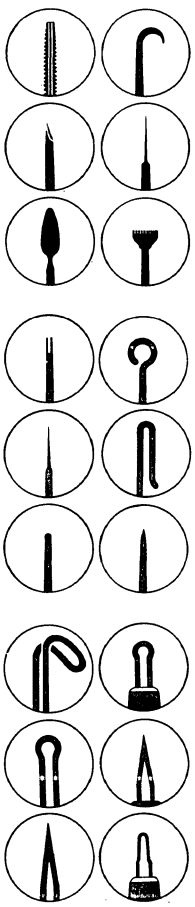
STOCK NO.	CUTTING BLADE DIAMETER*	HANDLE COLOR	STOCK NO.	CUTTING BLADE DIAMETER*	HANDLE COLOR
NN010	.010	Light Blue	**NN025**	.025	Light Green
NN012	.012	White	**NN028**	.028	Black
NN014	.014	Dark Green	**NN031**	.031	Tan
NN016	.016	Orange	**NN034**	.034	Pink
NN018	.018	Yellow	**NN037**	.037	Grey
NN021	.021	Royal Blue	**NN044**	.044	Dark Brown
NN023	.023	Maroon	**NN054**	.054	Clear

WIRE STRIPPER CONDUCTOR DIAMETER CHART

A.W.G.	18	20	22	24	26	28	30	32
SINGLE	.04030	.03196	.02535	.02010	.01594	.01264	.01003	.00795
STRANDED	.048	.038	.030	.024	.019	.015	.012	.009

THE CLAUSS CUTLERY COMPANY • Fremont, Ohio 43420 / *An Alco Standard Company*

CIRCON microTechnology

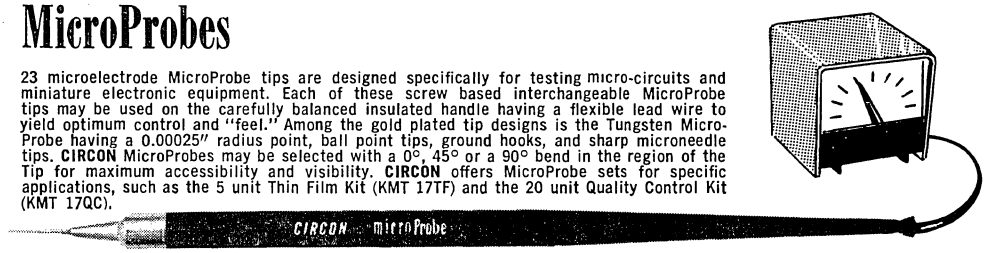


MicroTools

60 screw based tips are precision forged, ground and lapped onto corrosion resistant, stainless steel shafts. Each is designed for use in producing and repairing the smallest electronic and mechanical instruments. The unique features of the **CIRCON** MicroTool line are the micro-size of the working tips, the range of tip designs, and the perfectly balanced interchangeable MicroTool Handle. Tip designs include a MicroScale having divisions of 0.002″, a Tungsten Ultra MicroNeedle with a 0.00025″ radius point, and a MicroKnife sharpened to surgical standards. The 8 piece MTK-11 Project set and the 23 piece MTK-3 Technician's set are each packaged in an attractive, foam lined hardwood case for maximum accessibility and protection.

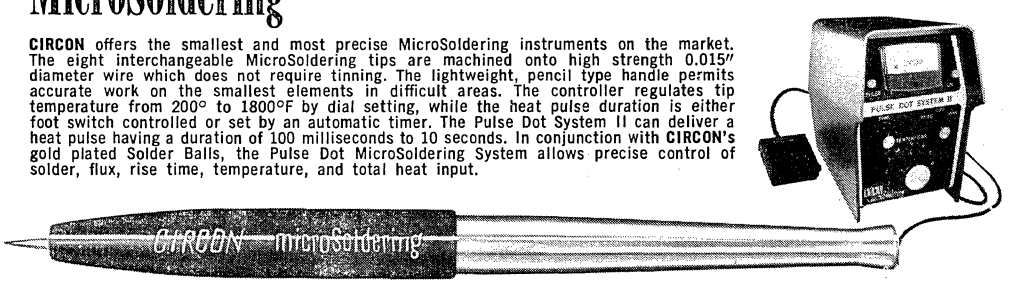
MicroProbes

23 microelectrode MicroProbe tips are designed specifically for testing micro-circuits and miniature electronic equipment. Each of these screw based interchangeable MicroProbe tips may be used on the carefully balanced insulated handle having a flexible lead wire to yield optimum control and "feel." Among the gold plated tip designs is the Tungsten MicroProbe having a 0.00025″ radius point, ball point tips, ground hooks, and sharp microneedle tips. **CIRCON** MicroProbes may be selected with a 0°, 45° or a 90° bend in the region of the Tip for maximum accessibility and visibility. **CIRCON** offers MicroProbe sets for specific applications, such as the 5 unit Thin Film Kit (KMT 17TF) and the 20 unit Quality Control Kit (KMT 17QC).



MicroSoldering

CIRCON offers the smallest and most precise MicroSoldering instruments on the market. The eight interchangeable MicroSoldering tips are machined onto high strength 0.015″ diameter wire which does not require tinning. The lightweight, pencil type handle permits accurate work on the smallest elements in difficult areas. The controller regulates tip temperature from 200° to 1800°F by dial setting, while the heat pulse duration is either foot switch controlled or set by an automatic timer. The Pulse Dot System II can deliver a heat pulse having a duration of 100 milliseconds to 10 seconds. In conjunction with **CIRCON's** gold plated Solder Balls, the Pulse Dot MicroSoldering System allows precise control of solder, flux, rise time, temperature, and total heat input.



Electronic MicroHardware

(Delivery from stock. Minimum order 100 units.)

MicroEyelets — Miniature rolled, flat and funnel flange electronic eyelets from the World's Widest in Stock Selection. Every brass and copper eyelet is a precision product with absolute uniformity from part to part. Shot burnished — Gold Plated eyelets meeting **NASA** and **MIL** Specs are stocked; cadmium, tin, silver, and solder plated upon order. Lengths from 1/64″ to 7/16″ in 1/32″ increments, including the world's smallest eyelets. **CIRCON** has prepared three general purpose kits — the Prototype Kit for designers, a Laboratory Kit with a supply of the most popular sizes, and the Stocking Kit with a total of 40,000 eyelets in 108 sizes.

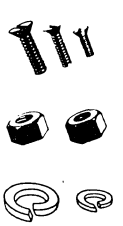
MicroSetting Tools — Superior quality tools designed to provide flexible inexpensive tooling for precision setting of **CIRCON** eyelets. May be used in automatic or manual press equipment.

MicroRivets — For instrument, electronic and printed circuit applications involving space requirements smaller than normal subminiature hardware permits. Sizes from 1/16″ x 1/32″ and up in 1/32″ increments. Shot burnished and 24 carat gold-plated.

MicroScrews — Precision instrument screws of stainless steel or brass, plated with gold, nickel, and cadmium. Instrument head (oval, modified fillister) or flat head (82°). Size from #000 to #4. Lengths from 1/8″ and up in 1/16″ increments. Taps are available for all screw sizes.

MicroNuts — Nickel, gold, and cadmium plated brass instrument nuts in sizes from #000 to #4. Precision manufactured to **NASA** and **MIL** specs.

MicroWashers — Split Lock, Insulating, and Flat instrument washers in sizes #000 to #4. Precision manufactured to be smooth, clean and free from burrs. Suitable for use in vigorous environment, at all frequencies.



A MicroHardware Slide Guide giving detailed specifications for hard to find **MicroHardware** is available free upon request. The 10″ x 4″ slide rule device reads out data on 1300 sizes of **CIRCON's MicroHardware.**

Miniature Indicator Lights

DirectVue

OmniVue

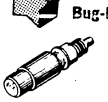
Two unique lines offering unparalleled flexibility for the Panel Designer. **CIRCON's** Micro-Miniature indicators are 0.25″ diameter and may be mounted in densities of 14 per square inch.

The 3/8″ diameter SubMiniature Indicators may be combined into more than 1500 possible configurations due to interchangeable components. Each SubMiniature Indicator may incorporate any of: 5 lens types; neon or incandescent bulbs; 16 to 1 range in brightness; insulated or grounded mounting; 2 standard bases; and 7 colors. Of special interest are **CIRCON's** Pola-Lens variable intensity indicator, and the BugEye 3-D plastic lens available in standard shapes or on a low volume custom basis.

ClearVue

Pola-Lens

Bug-Eye


MicroMiniature

The Panel Designer's Kit (MIK-3) containing CIRCON's complete line is a valuable aid in design and prototype work. Hundreds of configurations possible at a $25 introductory price.

CIRCON CORPORATION

MicroTools — Hardware — Indicator Lights

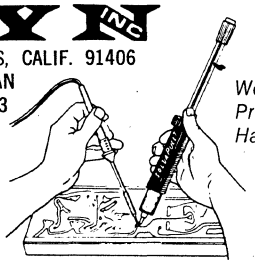
SANTA BARBARA AIRPORT, GOLETA, CALIFORNIA 93017 PHONE: (805) 967-0404

Write for complete catalog. Factory direct service by air. Stocking distributors in principal cities.

EDSYN INC

15954 ARMINTA ST., VAN NUYS, CALIF. 91406
TELEX NO. 65-1469 EDSYNEX VAN
PHONE (213) 989-2324 • EXT. 33

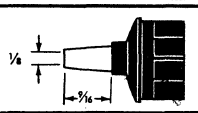
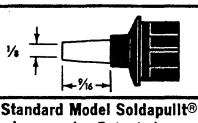
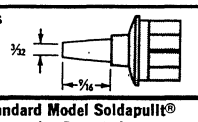
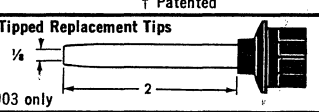
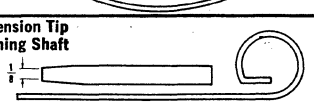
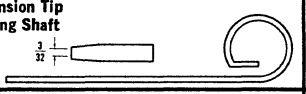
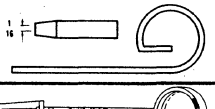
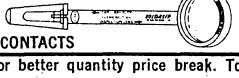
E ENGINEERING D DEDICATED to S SUIT YOUR N NEEDS ®



World's Most Practical Solder Handling Tools.

SOLDERING + DESOLDERING + RESOLDERING = SOLDER (EDSYN®) ABILITY

FOB: Van Nuys, California
TERMS: 1% 10th Prox./Net EOM
DELIVERY: Two weeks ARO

	UNIT Quantity	PRICE Each
DS007-17 Deluxe Model Soldapullt® desoldering tool † Patented wt. 5 oz. △ □	1-25 26-50 51-100	$9.95 $9.20 $8.45
DRT008-18 Deluxe Replacement Tips  fits on Deluxe DS007 only	1-25 26-50 51-100	$1.50 $1.25 $1.00
SS001-11 Standard Model Soldapullt® desoldering tool † Patented wt. 4 oz. △ □	1-25 26-50 51-100	$5.95 $5.50 $5.00
SRT002-12 Standard Replacement Tips  fits Standard Model SS001 and Soldavac Model SV026 only	1-25 26-50 51-100	$1.50 $1.25 $1.00
MMS005-15 Micro Tipped Standard Model Soldapullt® desoldering tool † Patented † Patented wt. 4 oz. △ □	1-25 26-50 51-100	$6.95 $6.50 $6.00
MRT006-16 Micro Replacement Tips  fits Micro tipped Standard Model MMS005 and Soldavac Model SV073 only	1-25 26-50 51-100	$1.50 $1.25 $1.00
LTS003-13 Long Tipped Standard Model Soldapullt® desoldering tool † Patented † Patented wt. 4 oz. △ □	1-25 26-50 51-100	$6.95 $6.50 $6.00
LRT004-14 Long Tipped Replacement Tips  Fits Long tipped Standard Model LTS003 only	1-25 26-50 51-100	$2.00 $1.75 $1.50
SV026 Soldavac™ desoldering tool—Standard tipped Replacement tip Part No. SRT002-12 **SV073** Soldavac™ desoldering tool—Micro tipped Replacement tip Part No. MRT006-16 † U.S. and Foreign Patents applied for. wt. 3 oz. △ □	1-5 6-11 12-25 26-50 51-100	$3.95 $3.50 $2.95 $2.80 $2.65
45ET011-21 45 Degree Extension Tip and Cleaning Shaft fits all models except Micro Tip MMS005 and SV073	1-25 26-50 51-100	$2.75 $2.50 $2.25
LET012-22 Long Extension Tip and Cleaning Shaft  fits all models except Micro Tip MMS005 and SV073	1-25 26-50 51-100	$2.25 $2.00 $1.75
MET013-23 Micro Extension Tip and Cleaning Shaft  fits all models except Micro Tip MMS005 and SV073	1-25 26-50 51-100	$2.00 $1.75 $1.50
MIN014-24 Mini Tip Extension and Cleaning Shaft  fits all models except Micro Tip MMS005 and SV073	1-25 26-50 51-100	$2.00 $1.75 $1.50
BT 028 BURNISHING TOOL  CLEANS SOLDASIP TIP OR RELAY CONTACTS	1-5 6-11 12-25	$1.95 $1.70 $1.50

Tools or tips may be combined for better quantity price break. Tools AND tips may not be combined.

△ 6 month warranty on tools only. Warranty does not include tips.

□ 12 page Solderability manual included with tools.

Prices subject to change without notice. Prices higher outside the continental limits of the U.S.A.

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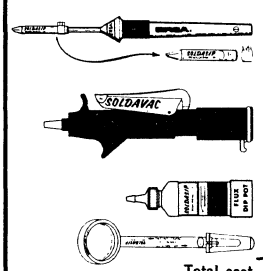
ELEMENTARY TO ELITE

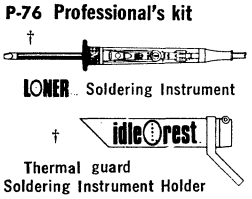
X-34 Experimenter's kit

Available as direct factory offer or from participating distributors.



	5.55
	1.95
	3.95
	1.95
	1.95
Total cost	15.35
you save	3.58
Your cost only	11.77

P-76 Professional's kit



† 37.50

LONER Soldering Instrument

† idle rest 12.50

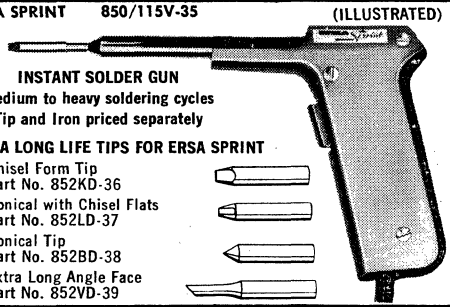
Thermal guard Soldering Instrument Holder

SPARE TIPS

Spade	2.95
Flat point	2.95
† Soldasip	2.95
Total cost	58.85
You save	24.29
Introductory offer	34.56

Limited Direct Factory Offer

ERSA SPRINT 850/115V-35 (ILLUSTRATED) 852KD-36 TIP △



INSTANT SOLDER GUN
Medium to heavy soldering cycles
Tip and Iron priced separately

IRON ONLY

Unit	Price
1-25	$8.55
26-50	$8.25
51-up	$8.00

TIP ONLY

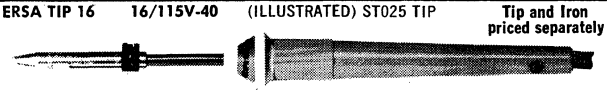
Unit	Price
1-25	$1.95
26-50	$1.75
51-up	$1.50

ERSA LONG LIFE TIPS FOR ERSA SPRINT

- Chisel Form Tip Part No. 852KD-36
- Conical with Chisel Flats Part No. 852LD-37
- Conical Tip Part No. 852BD-38
- Extra Long Angle Face Part No. 852VD-39

ERSA TIP 16 16/115V-40 (ILLUSTRATED) ST025 TIP

Tip and Iron priced separately



Medium soldering cycles △

IRON ONLY

Unit	Price
1-25	$5.55
26-50	$5.25
51-100	$5.00
101-up	$4.75

TIP ONLY

Unit	Price
1-25	$1.95
26-50	$1.75
51-100	$1.50
101-up	$1.25

ERSA LONG LIFE TIPS FOR ERSA TIP 16

- Angle Face Tip Part No. 172/15LD-41
- Chisel Form Tip Part No. 172/15KD-42
- Reinforced Angle Face Part No. 172/15SD-43
- Pencil Form Tip Part No. 172/15BD-44

EDSYN SOLDASIP RESOLDERING TIP

FOR ERSA TIP 16 One tip applies and removes solder.

Part No. ST025

Sips up solder like a sponge or solders like a dream . . . TRY IT!

PT074 SOLDASIP™ PRY TIP RESOLDERING TIP †

Unit	Price
1-25	$2.95
26-50	$2.75
51-up	$2.50

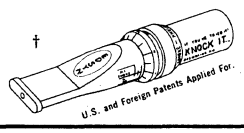
Soldasip Pry Tip is used to sip up solder, or solder, and as an aid for prying up leads. Fits Ersa Multitip 15W and Ersa Tip 16 only.

STE009 FREE SAMPLE FOR EVALUATION

Request for No Charge Sample Must Be On Your Company Stationery.

CHECK ONE ONLY

- Soldasip Resoldering Tip ST025 □ (fits Ersa Tip 16 and Ersa Multitip 15W irons only)
- Soldavac desoldering tool SV026 □
- Burnishing tool BT028 □



† FREE KNOCK-IT desmoking aid includes a KNOCK-IT desmoking cigarette holder with a four-page instruction sheet with five desmoking programs. All you need to do is select one of the five programs and start to knock your smoke inhalation now. Our sales force has dramatic evidence that live customers purchase more of our products than deceased ones. If you've tried it, KNOCK-IT with our free desmoking aid.

† Covered by one or more of the following U.S. and Foreign Patents: U.S. 3,114,026, 3,254,, 3255, Great Britain 995,949, 1,069,720, 1,110,209, 1,111,195, 948,699, 1,261,889, 1,441,716, D 215,216, D 215,197, Argentina 170,878, 170,560, 1,189,965, 1,189,806, 1,209,685, Israel 45/4, Italy 707,811, 744,991, 807,692, Australia 286,159, 404,914, Belgium 687,117, 666,111, 658,167, 658,168, 807,691, 840,490, 855,497, 855,498, Japan 474,814, 510,038, 511,917, 511,918, 727,781, 722,112, 727,280, Canada 746,275, 710,450, 800,801, 822,264, Luxembourg 54,252, 54,251, 58,178, 57,111, 58,179, New Zealand 142,911, 250,11,484, Costa Rica 1577, Denmark 41,612, France 1,478,066, 1,522,810, 149,086, 149,087, 151,432, Sweden 218,619, Switzerland 456,111, 458,024, 1,525,615, 1,570,179, 1,589,816, 1,596,138, Germany 1,259,682, 1,291,191, 458,886, 490,151, 486,948. Other U.S. and Foreign Patents Pending.

SOLDERING IRONS

Irons up to 1250 watts are available

PENLINE-120 SOLDERING IRONS — 120 VOLTS; 25, 30, 40 AND 45 WATTS

Lowest cost GE iron; ideally suited for light to medium production in electronics, communications, and allied industries, for repair and maintenance operations, and by the "do-it-yourself" electronics kit builder.

Description	Cat. No.
Handle and Cordset	
Two-conductor*	6D400
Three-conductor, with NEMA standard plug	6D400G2
Heater Units for Threaded Tips	
25W, 6D415; 30W, 6D414; 40W, 6D413*	

Description		Cat. No.
Tip and Heater Units-Ironclad		
1/16" Chisel Tip	30 watts	6D410*
5/32" Chisel Tip	30 watts	6D411*
5/32" Chisel Tip	45 watts	6D412*

Use interchangeable threaded tips.

* U.L. listed.

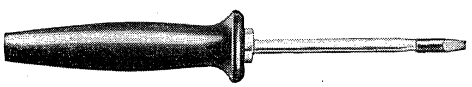
INTERCHANGEABLE THREADED TIPS

For Penline-120, Pistol-Grip, Midget, and Lightweight Heater Units

Description	Cat. No.
Chisel Tips	
1/16" Dia—Copper	6D4P5
3/32" Dia—Ironclad	6D4P6
1/8" Dia—Copper	6D4P7
5/32" Dia—Ironclad	6D4P8
3/16" Dia—Copper	6D4P9
7/32" Dia—Ironclad	6D4P10
3/32" Dia—Copper	6D4P11
3/16" Dia—Ironclad	6D4P12
Pyramid Tips	
1/8" Dia—Copper	6D4P15
3/32" Dia—Ironclad	6D4P16
11/32" Dia—Copper	6D4P17
3/8" Dia—Ironclad	6D4P18

Description	Cat. No.
Spade Tips	
1/16" Dia—Copper	6D4P1
1/16" Dia—Ironclad	6D4P21
3/32" Dia—Ironclad	6D4P2
1/8" Dia—Ironclad	6D4P22
1/8" Dia—Copper	6D4P3
5/32" Dia—Ironclad	6D4P4
Long Chisel Tips	
3/16" Dia—Copper	6D4P13
7/32" Dia—Ironclad	6D4P14
Cone Tips	
1/8" Dia—Copper	6D4P19
5/32" Dia—Ironclad	6D4P20

LIGHTWEIGHT SOLDERING IRONS — 120 VOLTS; 40 AND 60 WATTS



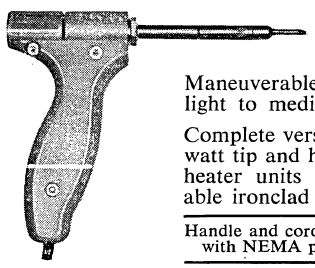
Ideal for light and medium production-line soldering and maintenance and repair operations in electronics and communications industries. Tip and heater units can be changed in seconds.

* U.L. listed.

Complete Iron - Includes handle and 6-foot cordset, and 60-watt tip and heater unit	
7/32" Ironclad Chisel Tip*	6A273
3/16" Ironclad Pyramid Tip*	6A283
3/16" Ironclad Chisel Tip	6A283G23
Handle and Cordset	
Two conductor	6A273G62
Three-conductor with NEMA standard plug	6A273G63

Tip and Heater Units - 60 watts	
7/32" Ironclad Chisel Tip	6A300
3/16" Ironclad Pyramid Tip	6A301
3/16" Ironclad Chisel Tip	6A301G4
Heater Units for Threaded Tips (Use Interchangeable Tips listed above)	
40 watts	6A304
60 watts	6A301G7

PISTOL-GRIP SOLDERING IRONS - 120V; 40, 60W



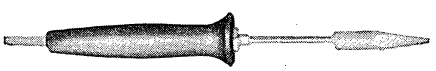
Maneuverable and comfortable, excellent for light to medium production.

Complete versatility with choice of three 60-watt tip and heater units; or 40- and 60-watt heater units with 20 different interchangeable ironclad or copper threaded tips.

Handle and cordset, three-wire with NEMA plug	6A303

Can be used with Lightweight tip and heater units or with Lightweight heater units and interchangeable tips.

MIGHTY MIDGET SOLDERING IRON - 12V; 100W

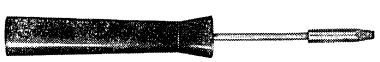


A lightweight iron with high heat capacity for heavy soldering where larger irons, up to 200 watts, prove unwieldly for rapid repetitive soldering.

Tip and Heater Unit
1/2" Ironclad Chisel Tip — for 60 w, 6A211G54; 80 w, 6A211G50; 100 w, 6A211G33.

Handle and Cordset	
Two-conductor	6A210G61
Transformer - 115-volt primary	
Four Tap — for 55/70/85/100 watts	6A364G7

MIDGET SOLDERING IRONS — 6 VOLTS; 25 and 45 WATTS (Also tapped transformers)



A versatile iron for light production in electronics, and communication industries — handles like a pencil, weighs but 1¾ oz. Tip renewal is easy and fast — complete tip and heater unit can be changed in a few seconds.

Handle and Cord Set			
For single-and 4-tap transformers	6A203	For transformer with 3-heat switch	6A203G2

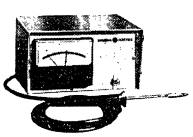
Tip and Heater Units All ironclad tips		
5/32" Chisel Tip	25 watts	6A211
1/8" Cone Tip	25 watts	6A213
3/16" Pyramid Tip	25 watts	6A215
1/8" Chisel Tip	25 watts	6A217
3/16" Chisel Tip	45 watts	6A211G31

Heater Unit for Threaded Tips (Use Interchangeable Tips)	
25 watts	6A221
Transformers - 115-volt Primary ¶	
Single Tap 35 watts	6A362G2
Four Tap —for 26/29/32/35 watts	6A364G2
With Three-heat Switch† —18 to 35 watts	6A434

¶Single- and four-tap transformers are available with 240-volt primary in quantities of 36 or more.

†Suitable for use only with Handle and Cordset 6A203G2.

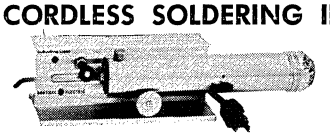
TEMPERATURE CONTROLLED SOLDERING IRON 120V; UP TO 135W



2½-ounce iron maintains selected temperature; is variable for microminiature jobs to high-mass joints. Ideal for high production and high quality work, laboratory use, service shops, and wherever temperature limits are specified.

Complete Iron — Includes Control Box, Handle and 5-foot Cordset, and 1/8-inch and 3/16-inch Chisel Tip and Heater Units	6A490

CORDLESS SOLDERING IRON



New soldering tool, powered by rechargeable batteries, is cordless — making it easier to use in remote and inaccessible areas. 18-watt tip unit attains 800 F in 15 seconds. Battery charging stand, with 6-foot 3-wire cordset, restores batteries to peak power; operates from 110 VAC.

Handle and Battery Holder, including Tip Unit	6A298G2
Charging Stand	6A299
Battery Stack	6A672

GENERAL ELECTRIC SALES REPRESENTATIVES

Ala.: see Tenn. or Fla.
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Ark.: see Texas
Calif.: Oakland (415) 658-9011
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Soldering Irons and Tips from Hexacon

VOLTAGE RANGE: 6 to 240 • OPERATE IDENTICALLY ON A.C. OR D.C., ANY CYCLE
STANDARD VOLTAGES 110/120, 121/130, 220/240 • SPECIFY VOLTAGE ON ORDER

Equipped with flexible 5 and 6-ft. approved Neoprene rubber heater cord, which is water-proof, kink-free and resistant to oil, abrasion and heat. Nickel chromium replaceable heating elements, insulated with finest mica, protected by rugged outer housing. Replaceable tips.

HEXACON MINIRONS

WITH ALL THE EXTRA FEATURES

- Rugged quality construction that will withstand production line conditions
- Slim-line case promotes maximum visibility
- Long life and non-freezing Durotherm tips

SLIM LINE CASE — SLIM LINE HANDLE

No. 21A	tip diameter	1/8"
No. 22A	tip diameter	3/16"
No. 23A	tip diameter	1/4"

DEPENDABLE PERFORMANCE • UP TO 60 WATTS

HEXACON HORNET Model, H10

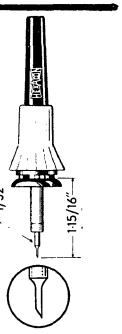
World's Smallest Industrial Soldering Iron for Micro-Electronic Soldering. Plastic handle, cooled thru ventilated design and stainless steel mirror, reflects heat away from hand.

Cat. No. H10K Kit (H10 Iron, 2 Tips and Sponge*)
Cat. No. H11K Kit (H11 Iron, 2 Tips and Sponge*)
Cat. No. H14K Kit (H14 Iron, 2 Tips and Sponge*)
*Tip Cleaning Sponge in Container

Cat. No. H10 Iron less tip, 12 Watts
Cat. No. H11 Iron less tip, 17 Watts
Cat. No. H14 Iron less tip, 20 Watts
Iron with 3-wire cord and Nema plug available

Cat. No. 91 Package of 12 tip cleaning sponges in container

DUROTHERM and XTRADUR Tips. Sizes 1/32" to 3/16"



PLUG-TIP IRONS

Cat. No.	Watts	Tip Dia.	Ship. Wt.
P70	100	3/8"	1 1/8 lbs.
P100	110	3/8"	1 3/8 lbs.
P111	125	3/8"	1 3/8 lbs.
P115	150	3/8"	1 1/2 lbs.
P150	150	3/8"	1 1/2 lbs.
P153	175	3/8"	1 1/2 lbs.
P155	190	3/8"	1 1/2 lbs.
P151	175	1/2"	1 5/8 lbs.
P152	200	1/2"	1 5/8 lbs.
P200	200	5/8"	2 3/8 lbs.
P250	250	5/8"	2 3/8 lbs.
P300	300	7/8"	3 lbs.
P550	550	1 1/8"	4 3/8 lbs.

SUPER-PENCIL IRONS

FASTEST AND MOST DURABLE PENCIL IRON.

All the advantages of a Soldering Pencil, but a full-fledged industrial soldering iron with nickel-chromium mica-wound element. Tiny tips outperform irons with larger tips and higher wattages.

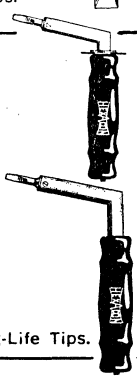
Cat. No.	Watts	Tip Dia.	Ship. Wt.	Cat. No.	Watts	Tip Dia.	Ship. Wt.
25S	25	1/8"	1/2 lb.	26S40	40	3/16"	1/2 lb.
25S20	20	1/8"	1/2 lb.	*26S50	50	3/16"	1/2 lb.
25S30	30	1/8"	1/2 lb.	*24S	50	1/4"	1/2 lb.
25S35	35	1/8"	1/2 lb.	*24S35	35	1/4"	1/2 lb.
*25S50	50	1/8"	1/2 lb.	*24S40	40	1/4"	1/2 lb.
26S	30	3/16"	1/2 lb.	*24S60	60	1/4"	1/2 lb.
26S35	35	3/16"	1/2 lb.				

Weighs only 2 oz.

*Standard Equipment DUROTHERM Non Sticking Long-Life Tips.

BANTAM HATCHET IRONS

PERFECT BALANCE FOR INACCESSIBLE PLACES



Cat. No.	Watts	Tip Dia.	Ship. Wt.
25H	25	1/8"	1/2 lb.
25H35	35	1/8"	1/2 lb.
*25H50	50	1/8"	1/2 lb.
26H	30	3/16"	1/2 lb.
26H35	35	3/16"	1/2 lb.
30H	60	1/4"	7/8 lb.
30H40	40	1/4"	7/8 lb.
30H50	50	1/4"	7/8 lb.

Cat. No.	Watts	Tip Dia.	Ship. Wt.
*26H50	50	3/16"	1/2 lb.
24H	50	1/4"	1/2 lb.
24H40	40	1/4"	1/2 lb.
*24H60	60	1/4"	1/2 lb.

Weighs only 3 oz.

Cat. No.	Watts	Tip Dia.	Ship. Wt.
30H70	70	1/4"	7/8 lb.
30H75	75	1/4"	7/8 lb.

Weighs only 5 oz.

*Standard Equipment DUROTHERM Non-Sticking Long-Life Tips.

PINPOINT SOLDERING IRONS

FOR PINPOINT ACCURACY ON PRECISION SOLDERING

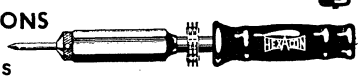
Cat. No.	Watts	Tip Dia.	Ship. Wt.
P25	25	1/8"	1/2 lb.
P2530	30	1/8"	1/2 lb.
P2535	35	1/8"	1/2 lb.
*P2550	50	1/8"	1/2 lb.
P26	30	3/16"	1/2 lb.
P2635	35	3/16"	1/2 lb.
P2640	40	3/16"	1/2 lb.
*P2650	50	3/16"	1/2 lb.
*P24	50	1/4"	1/2 lb.

Cat. No.	Watts	Tip Dia.	Ship. Wt.
*P2440	40	1/4"	1/2 lb.
*P2460	60	1/4"	1/2 lb.
P30	60	1/4"	7/8 lb.
P3040	40	1/4"	7/8 lb.
P3050	50	1/4"	7/8 lb.
P3070	70	1/4"	7/8 lb.
P3075	75	1/4"	7/8 lb.

Weighs Only 3 oz.

*Standard Equipment DUROTHERM Non-Sticking Long-Life Tips.

SUPER-POWERED IRONS

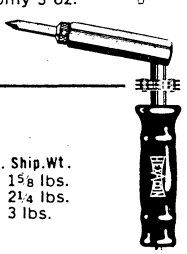


HIGHER SPEED SMALLER TIPS

Cat. No.	Watts	Tip Dia.	Ship. Wt.
P114	100	1/4"	1 3/8 lbs.
P154	150	1/4"	1 1/2 lbs.
P238	200	3/8"	2 1/4 lbs.

Cat. No.	Watts	Tip Dia.	Ship. Wt.
P212	200	1/2"	2 1/4 lbs.
P338	300	3/8"	2 3/4 lbs.

HATCHET TYPE IRONS



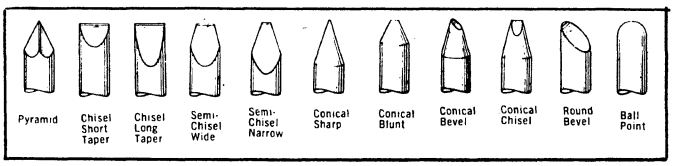
	Perfect Balance			Less Fatigue			
Cat. No.	Watts	Tip Dia.	Ship. Wt.	Cat. No.	Watts	Tip Dia.	Ship. Wt.
70H	100	3/8"	1 3/8 lbs.	151H	175	1/2"	1 5/8 lbs.
100H	110	3/8"	1 1/2 lbs.	200H	200	5/8"	2 1/4 lbs.
150H	150	3/8"	1 5/8 lbs.	300H	300	7/8"	3 lbs.
153H	175	3/8"	1 5/8 lbs.				

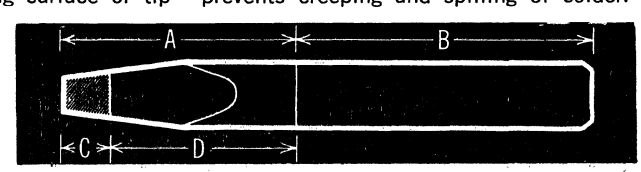
LONG-LIFE SOLDERING TIPS OUTLAST COPPER TIPS UP TO 20 TO 1

DUROTHERM NON-FREEZING TIPS: Iron coated and immunized. Absolutely prevents tips from sticking. Minimum loss of heat delivery. **YOUR SPECIAL TIPS QUOTED ON REQUEST FIT ALL MAKES**

Note: Also available; XTRADUR Iron-coated Pretinned Tips. Multi-coated for extra long wear which immunizes shank of tip from solder, thus preventing adhering of solder, except on working surface of tip — prevents creeping and spilling of solder.

LONGEST WEARING AND BEST PERFORMING TIP EVER PRODUCED





DUROTHERM COATING Bonded to Base Copper **A**—Heavy Iron Coating **B**-Scale-Resistant **C**-Pretinned Section **D**-Multi-coated and immunized

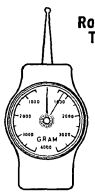
HEXACON ELECTRIC COMPANY ▪ 621 CLAY AVE., ROSELLE PARK, N. J. 07204

PRECISION TOOLS

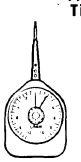
FOR PRODUCTION, SERVICE & MAINTENANCE

PRECISION DYNAMOMETER TENSION GAUGES

LARGE — Round Tip



SMALL — Flat Tip



Accurately measure forces required to actuate all sensitive mechanisms . . .

Available in two sizes and a total of thirteen ranges. Measure in both directions. Equipped with maximum reading pointer that retains reading.

LARGE GAUGES

Type	Range In Grams	Conversion In Ounces
GD-50	60-500	18 $32.70
GD-100	100-1000	32 $32.70
GD-200	200-2000	70 $32.70
GD-400	400-4000	140 $36.60

SMALL GAUGES

Type	Range In Grams	Conversion In Ounces
GD-1	0-10	3/8 $14.20
GD-2	2-20	3/4 $14.20
GD-3	4-35	1 5/16 $14.20
GD-5	6-50	1 3/4 $14.20
GD-10	10-100	3 1/2 $14.20
GD-15	15-150	5 1/4 $14.20
GD-20	20-200	7 $14.20
GD-25	30-250	9 $14.20
GD-30	40-350	12 $16.00

CONTACT INSERTION / REMOVAL TOOLS AND KITS

Just 2 tools insert and remove contacts on all types of connectors . . .

A12, 16, 20

R12, 16, 20

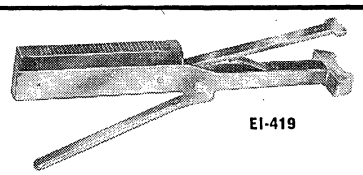
AMPHENOL, CINCH, BENDIX, CANNON, PYLE, etc. . . .

INSERTION				REMOVAL			
Type	Color	Size	Price Ea.	Type	Color	Size	Price Ea.
A-12	Yellow	12	$12.50	R-12	Yellow	12	$16.00
A-16	Blue	16	12.50	R-16	Blue	16	16.00
A-20	Red	20	12.50	R-20	Red	20	16.00

KITS

KA-260 — 3 PIECE CONTACT INSERTION TOOL KIT
Consists of one each A-12, A-16, A-20 .....Price **$36.00**

KR-260 — 3 PIECE CONTACT REMOVAL TOOL KIT
Consists of one each R-12, R-16, R-20 .....Price **$45.00**



EI-419

EI-419 INSERTING AND EXTRACTING TOOL

For printed circuit boards, connector assemblies, telephone-cord stoppers, flat-packs, IC's and many other applications.

Precision made, with leaf spring to remain in open position. Made of special alloy, molded finger-grip type handle for easy gripping. Fully nickel-chrome plated. Overall length 6½". .....Price **$8.90**

INNOVATIONS IN SERVICE, PRODUCTION & LAB TOOLS

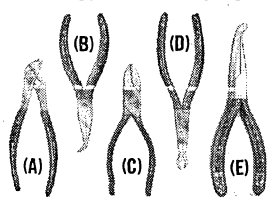
WASH AND LUBE SPRAYS

24 oz.

8 oz.

JIC-22 ELECTRO-WASH
Degrease, eliminate grease, dirt, oil. No carbon-tet, safe, no residue, non-flammable. Std. pkg: 12 pcs. **$3.25 ea.** 6 pcs. **$3.50 ea.** Sample order **$4.00 ea.**

JIC-33 ELECTRO LUBRI-FOAM
Cleans, lubricates, protects, polishes. Exclusive foam action. Eliminates noise, non-flammable. Std. pkg: 24 pcs. **$2.25 ea.** 12 pcs. **$2.50 ea.** Sample order **$3.00 ea.**



(A) **PL-4** — MIDGET "GROOVE-GRIP" PLIERS. 5" **$3.00**

(B) **PLS-1** — DUCK BILL, PARALLEL, BENT NOSE PLIER. 5".. **$5.82**

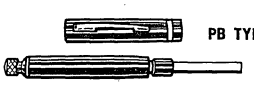
(C) **PLS-2** — DIAGONAL ANGLE, FLUSH CUTTING AND STRIPPING PLIER. 5" **$6.46**

(D) **PLS-5** — HEAT COIL PLIER. 6" **$6.24**

(E) **PLS-9** — DUCK BILL, BENT NOSE, 90°, PLIER. **$6.60**

ECONOMY AND POCKET TYPE BURNISHERS

OB TYPE



PB TYPE

ECONOMY BURNISHERS — Leave no grit or dust and will not affect contact points. Plastic handles for working on live contacts.

OB-1 — For fine contacts. Abrasive coated, 3½" long, 3/16" wide, .007" thick.
Pkg. 12 pcs. Price **$5.20** Pkg. 48 pcs. Price **$18.80**

OB-2 — For extra-fine contacts. 3½" long, ¼" wide, .010" thick.
Pkg. 12 pcs. Price **$7.20** Pkg. 48 pcs. Price **$25.80**

OB-3 — General purpose type. Abrasive-coated. Hard molded handle. 3½" long, ¼" wide, .010" thick.
Pkg. 12 pcs. Price **$9.80** Pkg. 24 pcs. Price **$17.60**

OB-4 — For industrial use. Abrasive-coated. Hard molded handle. 3½" long, ¼" wide, .020" thick.
Pkg. 12 pcs. Price **$12.00** Pkg. 24 pcs. Price **$21.60**

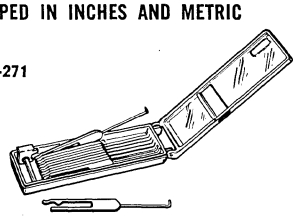
POCKET-TYPE BURNISHERS — Used for cleaning general type contacts. Supplied with 6 non-residual abrasive replaceable blades and/or 6 rods stored in pen barrel, as noted. Pen made of sturdy plastic for dielectric work. Length 4½". Diameter 3/8". Blades 3/16" wide, 1¾" long, .007" or .0035" thick.

		Price
PB-3	Pen with 6 blades .0035" thick	$4.90
PB-3R	Same as PB-3 plus 6 abrasive rods	5.80
PB-7	Pen with 6 blades .007" thick	4.80
B-3	Pkg. 25 Repl. blades for PB-3 (.0035")	4.80
B-3R	Pkg. 50 Repl. rods for PB-3	12.50
B-7	Pkg. 25 Repl. blades for PB-7 (.007")	4.50

UNIQUE GAUGE SET

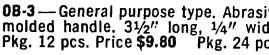
STAMPED IN INCHES AND METRIC

T-271

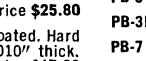


T-271 — WIRE THICKNESS GAUGE SET. Extremely versatile. Designed for use in restricted places. Gauges can be used in or out of case. 9 round blades, .006", .008", .016", .020", .028", .031", .039", .046", .059" and one flat blade .004" thick. Blades 3" long, tips bent 90° x 3/16" high. Overall case size: 1¼" wide x ½" high x 4" long. .....Price **$19.40**

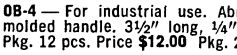
SPECIALIZED TOOLS



C-356

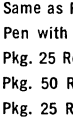


M-117



S-391

S-340



E-421

C-356 — CONNECTOR TOOL. Serves as terminal winding device, pull strength tester and spring hook. Insulated, 7" long. .....Price **$7.90**

S-391 — SPRING REMOVER. Adjusts, inserts and removes relay springs in tight spaces or hard to reach places. 6½" long. Tips bent 90° angle with .042" slots each end.....Price **$3.46**

M-117 — SPIN-TYPE SPANNER WRENCH. For use on odd shaped or extremely thin nuts and where regular nut driver cannot be used. Swivel head. 4" long. .....Price **$4.20**

S-340 — EXTRACTOR, TWEEZER TYPE. Extracts miniature, lamps, caps, readouts, flatpacks, IC's, p.c. components, etc. ½" normal opening closes to 1/16" with stop guide. 3½" long. Price **$3.20**

E-421 — EXTRACTOR, TERMINAL. Will extract terminals of most types. Finger-grip "T" type handle. Tip bent to 90° angle and tapered to fine point with center notch. Overall length 3". Price **$3.60**

CONTACT OUR CUSTOM-MADE TOOL DEPARTMENT FOR SPECIAL REQUIREMENTS

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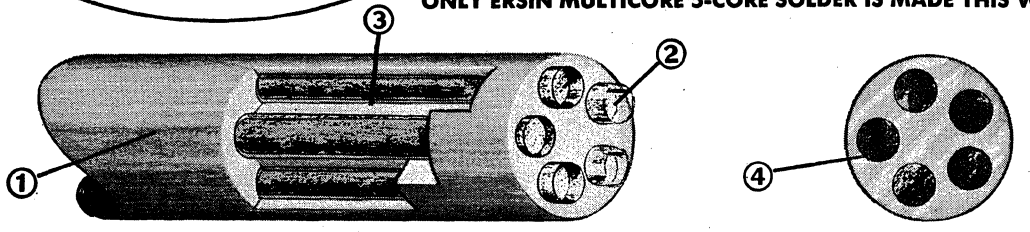
ERSIN Multicore

5-core wire rosin solder
Available in 1-lb. and 7-lb. reels

This is no ordinary solder!

ONLY ERSIN MULTICORE 5-CORE SOLDER IS MADE THIS WAY



These illustrations show the construction of ERSIN Multicore 5-Core Solder. Multicore solder is made only from pure virgin metals (1) with 5 cores of exclusive extra-active, non-corrosive ERSIN Flux (2). Multicore's special manufacturing process locates the 5 cores of ERSIN Flux close to each other and at the perimeter, so that there is only an ultra-thin wall of solder between the cores of flux and the work (3). This unique core configuration (4) also keeps the flux near the heat source, to melt faster—wet the metal more effectively. This enables ERSIN Multicore solder to produce the consistently reliable joints for which it is known.

Conforms to Federal Specification QQ-S-571

INDIVIDUAL REEL-SKIN WRAPPED FOR UTMOST PROTECTION IN SHIPPING AND STORAGE

STANDARD TIN/LEAD ALLOYS AND GAUGES

Available from stock: 63/37; 60/40; 50/50; 40/60; Savbit; Special Alloys—H.M.P. (High Melting Point, 565° F.); L.M.P. (Low Melting Point, 354° F.). Other alloys upon request.

Gauges: 14 s.w.g. (.080") through 24 s.w.g. (.022"). NOTE: Soldering iron tips should always be 108° F. above melting point of alloy.

NEEDLE FINE GAUGES

For microminiaturization, integrated circuits and other similar requirements. Off-the-shelf delivery in alloys 63/37 and 60/40, in even gauges from 28 s.w.g. (.014") through 34 s.w.g. (.009").

COPPER LOADED SAVBIT ALLOY

Copper-loaded SAVBIT stops the wear and erosion of copper soldering iron tips...increases tip life by 1,000%.

Characteristics and specifications: Savbit Alloy is available in Ersin Multicore 5-core solder containing non-corrosive extra-fast Ersin Flux in 14, 16, 18, 20, 22 and 24 gauge. Melting point: Virtually the same as standard tin/lead alloys. Excellent conductivity, tensile and shear strength.

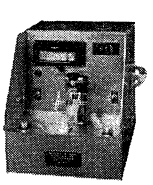
EXTRUSOL—HIGH PURITY BAR SOLDER

The same superior quality solder as in Multicore 5-Core Wire Rosin solder. Highest purity is achieved by advanced quality control, possible only with the Extrusion process. Extreme uniformity and smooth texture, without the cross-graining of cast bars. Virgin metals. Conforms to Federal Specification QQ-S-571d with respect to alloy composition in Sn60 (60/40), Sn63 (63/37), and Sn50 (50/50). Skin wrapped for distributors; bulk-packed for manufacturers. Also, low antimony "EXTRUSOL" Commercial Bar Solder—bulk packed.

ERSIN LIQUID FLUXES

Made to the high quality standards of Ersin Multicore. Three formulas. No. 5380 meets Military Specification MIL-F-14256C, Type A (Activated). No. 0360 meets Military Specification MIL-F-14256C, Type W (Non-activated). Other commercial liquid fluxes available such as: No. 4370 highly activated commercial flux. Foam, water soluble, protective coatings and cleaners upon request.

NEW SOLDERABILITY TEST MACHINE



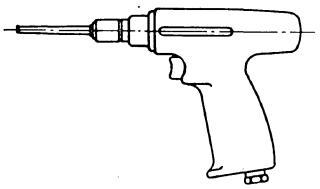
A precision instrument to determine the solderability of component termination wires that operates on a principle entirely different from, and superior to, the immersion method—electronic digital timing. Accurate, positive, totally reliable, yet economical because no technician is needed to operate it, and tests are run with great rapidity. Developed in association with I.E.C. Built in England by Multicore Solders, Ltd. Complies with I.E.C. Publication 68-2 Test T. Descriptive literature available on request.

FREE evaluation test samples, to qualified manufacturers, "Modern Solders" technical booklet, and fully detailed information on any of these products will be sent promptly. Address request, on company letterhead, to: Multicore Sales Corp., Dept. RY399, Westbury, N.Y. 11590.

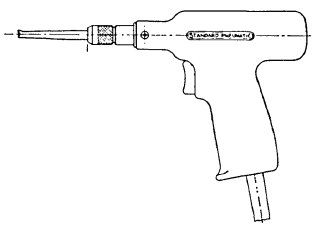
MULTICORE SALES CORP., WESTBURY, N.Y. 11590, Div. British Industries Co.

AIR TOOLS

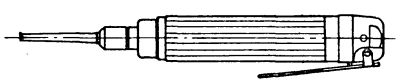
Wire Wrapping Tools



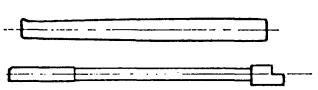
Model 663 — Comfortable pistol grip, lightweight, low air consumption and noise level, fast operating cycle.



ELECTRIC WIRE WRAPPING TOOL — For operating where commercial air is not available. Speeds over 3000 rpm, weight 10 oz., 20 to 32 AWG wire.

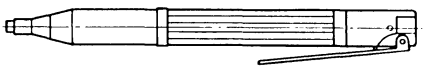


Model 662 — Fluted-grip, straight type tool, for wiring horizontal panels.

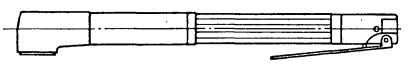


Bits and Sleeves—Available for 20 to 32 ga. wire for both regular and modified connections. Different models and accessories described in catalog.

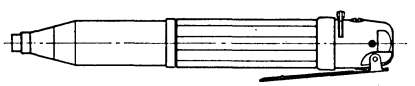
Screwdrivers Nutsetters



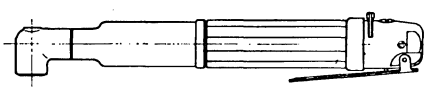
Model 263 — Ideal for electronic assembly, small, lightweight, quiet . . . for screw and nut sizes #00 to #6.



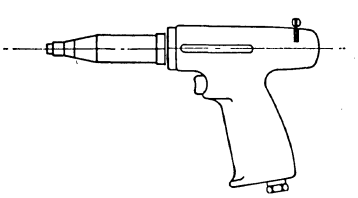
Model 263 — With right angle attachment for nutsetting or screwdriving in closely confined areas.



Model 863 — Straight type with comfortable fluted grip and precise torque control, for screw sizes #4 to #10.



Model 863 — With right angle attachment with plenty of power and still able to get into closely confined areas.

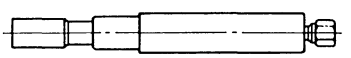


Model 266 — Pistol grip type that balances nicely in the hand. Air exhausts through the handle.

Miniature Grinders

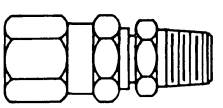
Ideal for finishing operations and precision grinding, 22,000 RPM, reversible, 3/32″ or 1/8″ collet.

Collet Spindles



Self contained spindles are ideal for small hole drilling on close centers.

Accessories



Model 463 — Hose swivel that eliminates twisting in air lines and makes tools easier to handle.

CATALOGS AVAILABLE ON ALL TOOLS

SPECIFY TOOLS DESIRED

STANDARD PNEUMATIC

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Setting new Standards in Pneumatics

VACO® Hand Tools & Solderless Terminals

Unconditionally Guaranteed

ROUND BLADE SCREW DRIVERS — Regular Slot

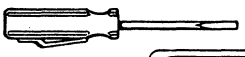


Fig. A

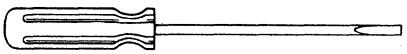


Fig. B

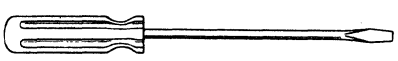


Fig. C

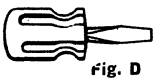


Fig. D

Stock No.	Blade Diam. and Length	Overall Length	Fig.
Pocket Clip Styles			
A 010	3/32" x 1 3/8"	3 1/8"	A
A 230-2	1/8" x 2"	3 3/4"	A
A 130-2	1/8" x 2"	3 7/8"	A
A 130-3	1/8" x 3"	4 7/8"	A
A 116-2	3/32" x 2"	4 1/2"	A
A 116-3	3/32" x 3"	5 1/2"	A
A 116-4	3/32" x 4"	6 1/2"	A
A 131-2	1/8" x 2"	4 1/2"	A
A 131-3	1/8" x 3"	5 1/2"	A
Electrical & Cabinet Styles			
A 216-2	1/8" x 2"	4 3/4"	A
A 216-3	1/8" x 3"	5 3/4"	A
A 216-4	1/8" x 4"	6 3/4"	A
A 216-6	1/8" x 6"	8 3/4"	A
A 216-8	1/8" x 8"	10 3/4"	A
A 216-10	1/8" x 10"	12 3/4"	A
Stubby Styles			
A 132	1/4" x 1 1/4"	3"	D
A 135	5/16" x 1 3/4"	3 7/8"	D

Stock No.	Blade Diam. and Length	Overall Length	Fig.
General Service Styles			
A 316-3	3/16" x 3"	6 1/2"	B
A 316-4	3/16" x 4"	7 1/2"	B
A 316-6	3/16" x 6"	9 1/2"	B
A 316-8	3/16" x 8"	11 1/2"	B
A 316-10	3/16" x 10"	13 1/2"	B
A 416-3	1/4" x 3"	6 5/8"	B
A 416-4	1/4" x 4"	7 5/8"	B
A 416-6	1/4" x 6"	9 5/8"	B
A 416-8	1/4" x 8"	11 5/8"	B
A 416-10	1/4" x 10"	13 5/8"	B
Heavy Duty Styles (Keystone)			
A 516-4	5/16" x 4"	8"	B
A 516-6	5/16" x 6"	10"	B
A 516-8	5/16" x 8"	12"	B
Extra Heavy Duty Styles (Keystone)			
A 616-6	3/8" x 6"	10 1/4"	C
A 616-8	3/8" x 8"	12 1/4"	C
A 616-10	3/8" x 10"	14 1/2"	C

PHILLIPS SCREW DRIVERS

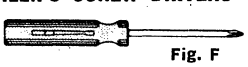


Fig. F

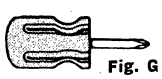


Fig. G

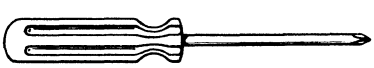
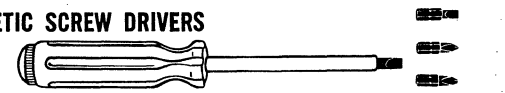


Fig. E

Stock No.	Handle Diam. & Lgth. (Inches)	Point No.	Overall Length (Inches)	Fig.
P 01	5/8x2 3/4	0	5 1/4	E
P 1	7/8x3 1/2	1	6 1/2	E
P 2	1 x3 5/8	2	7 7/8	E
P 3	1 1/16x4	3	10	E
P 4	1 3/16x4 1/2	4	12 1/2	E
P 5	1 1/4x2 1/8	2	3 7/8	G
P 6	1 1/8x1 3/4	1	3	G

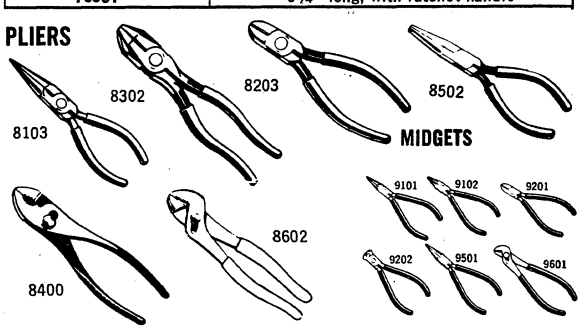
Stock No.	Handle Diam. & Lgth. (Inches)	Point No.	Overall Length (Inches)	Fig.
Pocket Clip Type				
P 12	1/2x2 1/2	0	5	F
Extra Long Blade				
P 18	7/8x3 1/2	1	11 1/2	E
P 28	1 x3 5/8	2	11 5/8	E
P 212	1 x3 5/8	2	15 5/8	E
P 202	1 3/16x4 1/2	2	24 1/2	E

MAGNETIC SCREW DRIVERS



Stock No.	Description
70035	9" long
70080	13" long
70081	9 1/4" long, with ratchet handle

PLIERS



Stock No.	Description
8103	Long Needle Nose w/cutter 7"
8203	Diagonal Cutter 6"
8302	Lineman's Side Cut 7 1/2"
8400	Slip Joint Plier
8502	Flat Nose 6"
8602	Vacgruv Plier Wrench 6"

Stock No.	Description
9101	Long Nose 4 1/2"
9102	Round Nose 4 1/2"
9201	Diagonal 4 1/2"
9202	End Cutter 4 1/2"
9501	Flat Nose 4 1/2"
9601	Vacgruv 5"

Many Other Sizes and Styles are Available.

HOLLOW SHAFT NUT DRIVERS

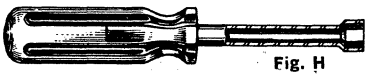


Fig. H

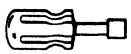
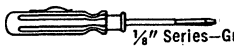
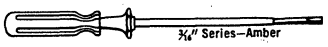


Fig. I

Stock No.	Handle Dia. & Length	Hex Size	Overall Length	Handle Color	Fig.
Extra Small Hex Size					
S 4	7/8"x3 1/2"	1/8"	6 1/2"	Amber	H
S 5	7/8"x3 1/2"	5/32"	6 1/2"	Amber	H
3" Shaft Length					
S 6	1"x3 5/8"	3/16"	6 5/8"	Black	H
S 7	1"x3 5/8"	7/32"	6 5/8"	Amber	H
S 8	1"x3 5/8"	1/4"	6 5/8"	Red	H
S 9	1"x3 5/8"	9/32"	6 5/8"	Amber	H
S 10	1"x3 5/8"	5/16"	6 5/8"	Amber	H
S 11	1"x3 5/8"	11/32"	6 5/8"	Green	H
S 12	1"x3 5/8"	3/8"	6 5/8"	Blue	H
S 14	1 1/16"x4"	7/16"	7"	Brown	H
S 16	1 1/16"x4"	1/2"	7"	Orange	H
Extra Large Hex Size 4" Shaft Length					
S 18	1 1/16"x4"	9/16"	8"	Amber	H
S 20	1 1/16"x4"	5/8"	8"	Amber	H
Extra Long 6" Shaft Length					
S 66	1"x3 5/8"	3/16"	9 5/8"	Black	H
S 86	1"x3 5/8"	1/4"	9 5/8"	Red	H
S 106	1"x3 5/8"	5/16"	9 5/8"	Amber	H
S 116	1"x3 5/8"	11/32"	9 5/8"	Green	H
S 126	1"x3 5/8"	3/8"	9 5/8"	Blue	H
S 146	1 1/16"x4"	7/16"	10"	Brown	H
S 166	1 1/16"x4"	1/2"	10"	Orange	H
Stubby Style 1 1/4" Shaft Length					
SS 8	1 1/4"x2 1/8"	1/4"	3 1/2"	Amber	I
SS 10	1 1/4"x2 1/8"	5/16"	3 1/2"	Amber	I
SS 12	1 1/4"x2 1/8"	3/8"	3 1/2"	Amber	I

SCREW LAUNCHERS


1/8" Series—Green


3/4" Series—Amber

hold . . . start . . . drive screws with power and comfort

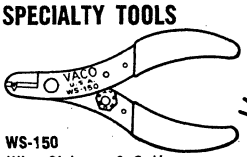
Stock No.	Blade Size	Handle Size	Overall Length
K-21*	Mini Tip	5/8" x 2 3/4"	5 3/4"
K-23*	1/8" x 3"	5/8" x 2 3/4"	5 3/4"
K-28	1/8" x 8"	5/8" x 2 3/4"	10 3/4"
K-34	3/16" x 4"	7/8" x 3 1/2"	7 1/2"
K-36	3/16" x 6"	7/8" x 3 1/2"	9 1/2"
K-38	3/16" x 8"	7/8" x 3 1/2"	11 1/2"
K-44	1/4" x 4"	1" x 3 5/8"	7 5/8"
K-46	1/4" x 6"	1" x 3 5/8"	9 5/8"
K-48	1/4" x 8"	1" x 3 5/8"	11 5/8"

PHILLIPS SCREW LAUNCHERS

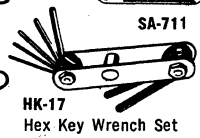
Stock No.	Length	Stock No.	Length
K-13	3"	K-16	7"
K-14*	5"	K-19	9"
K-15	5"		

*Pocket Clip Style

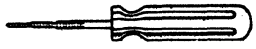
SPECIALTY TOOLS

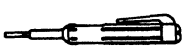


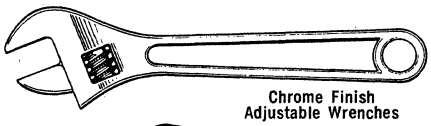
WS-150 Wire Stripper & Cutter


HK-17 Hex Key Wrench Set

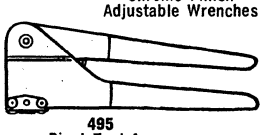
SA-711 Adjustable Nut Driver

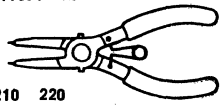

TT-31 3-in-1 Tapping Tool

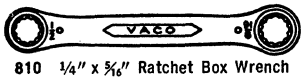

TK-500 100-500V Circuit Tester


Chrome Finish Adjustable Wrenches

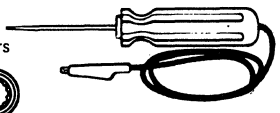
111001 Ratchet Drivers


495 Rivet Tool for 1/8", 5/32", Rivets


210 220 Internal & External Snap Ring Pliers



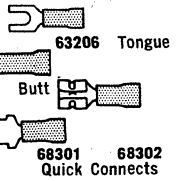
810 1/4" x 5/16" Ratchet Box Wrench


70008 Continuity Tester

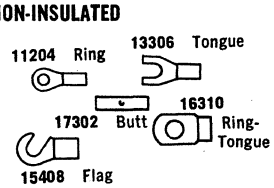
ML-7 Magnetic Level & Protractor

SOLDERLESS TERMINALS & CRIMPING TOOLS

INSULATED

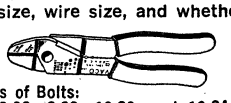


NON-INSULATED



To Order: Specify by tongue style, stud size, wire size, and whether insulated or non-insulated.

New all-purpose No. 1963 Tool cuts and strips wire 22 to 10 gauge and crimps both insulated and non-insulated style terminals.

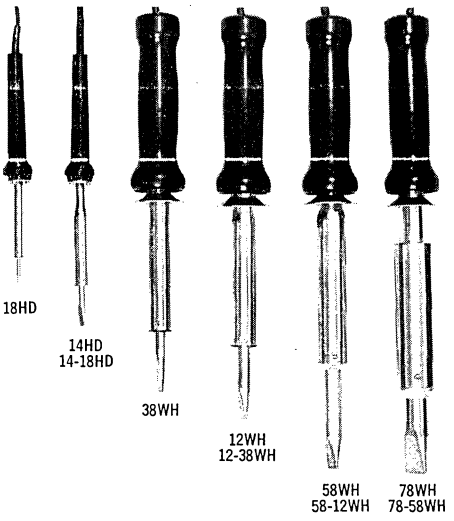

No. 1963 Slices 6 Sizes of Bolts: 4,40, 5-40, 6-32, 8-32, 10-32, and 10-24.

VACO PRODUCTS COMPANY • 510 North Dearborn Street • Chicago, Illinois 60610 • Phone: (312) 467-0123

WALL BRAND SINCE 1864
MADE IN USA

SOLDERING PRODUCTS

HOT AIR GUNS AND TIPS



HD Type and WH Type Heavy-duty Irons

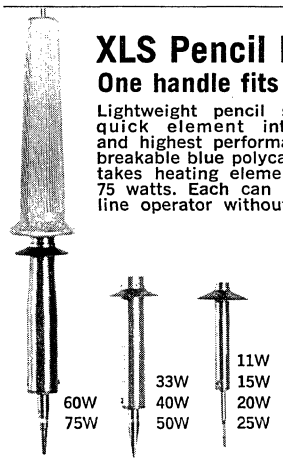
Wallbrand heavy-duty irons are engineered for highest efficiency performance. Rugged construction assures long-life for demanding production line needs. No radionic interference. Triple-life resistance wire wound on pure mica and constant tip temperature with extra fast recovery permits continuous heavy-duty use. 120 volts AC or DC. Other voltages available on request. Handles remain cool after long hours of operation. Tips are easily changed. Special irons customized to particular requirements.

Model	Watt Input	Tip Dia.	Length W/O Tip	Thermo/ Gram Value
18HD	25	1/8″	6⅝″	300
14HD	40	1/4″	7½″	900
38WH	80	3/8″	10¼″	1500
12WH	125	1/2″	10¼″	2000
12-38WH	125	3/8″	10¼″	2000
12-38HC	155	3/8″	10¼″	3500
58WH	200	5/8″	12¼″	3500
58-12WH	200	3/8″	12¼″	3500
78WH	300	7/8″	12⅜″	5400
78-58WH	300	5/8″	12⅜″	5400

XLS Pencil Iron

One handle fits 9 elements

Lightweight pencil series features quick element interchangeability and highest performance. Cool, unbreakable blue polycarbonate handle takes heating elements from 11 to 75 watts. Each can be changed by line operator without special tools. Available with either 2 or 3 wire cord. Uses regular or iron plated tips. Elements encased in long-life stainless steel jackets.



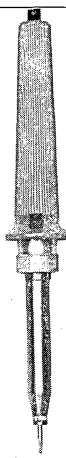
DH (DUO HEAT) Pencil

Pat. Pending

Developed for use in intermittent soldering operations

Revolutionary lightweight pencil operates continuously at low heat, but has higher heat available when needed. Constant low heat is adequate for light to medium jobs, get high heat instantly by pressing handle switch; tip and element life infinitely increased. Indestructible molded handle stays cool and comfortable. Wide variety of plug-in tips easily interchangeable.

Model	Continuous Low Heat	High Heat
DH-1	15W 520°F	47W 920°F
DH-2	20W 630°F	53W 975°F

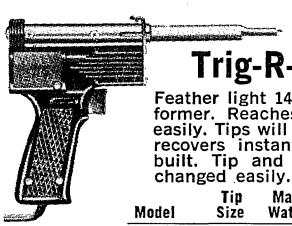


IDL INSTANT DEPENDABLE LASTING IRON

Pat. Pending

3 oz. pencil controlled by thermal time delay relay

Heats in seconds. No transformer. When handle button is depressed 180W element heats initially until soldering temperature is reached. Thermal time delay relay then cuts in 40W element automatically. Pencil cannot overheat. Interchangeable plug-in 1/8″ tips need no special tools to change. Unbreakable handle stays cool. Especially good for diversified light to medium jobs.

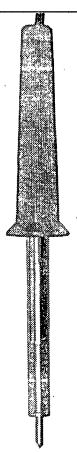


Trig-R-Heat Gun

Feather light 14 oz. gun has no transformer. Reaches hard-to-get at spots easily. Tips will not deform. Heats and recovers instantly. Rugged, precision built. Tip and element assemblies changed easily.

214LT

Model	Tip Size	Max. Watts	Min. Watts	AC/DC Volts	Weight W/O Cord
214LT	1/4″	400	150	120	14 oz.
212LT	1/2″	500	300	120	24 oz.
TIP AND ELEMENT ASSEMBLY					
214TE	1/4″	400	150	120	6 oz.
212TE	1/2″	500	300	120	16 oz.



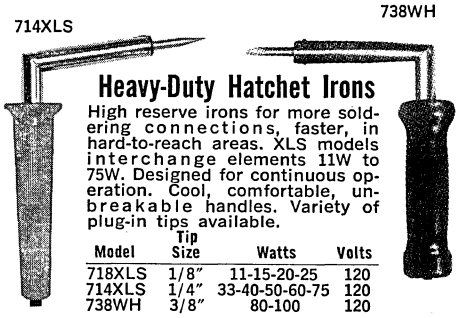
864 Commercial Duty Iron

Pencil iron has cool, molded plastic handle, balanced for comfort. Triple-life resistance wound. Copper tip maintains constant temperature.

Tip Size	Watts	Volts
3/16″	30	120
3/16″	40	120

714XLS

738WH



Heavy-Duty Hatchet Irons

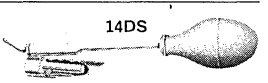
High reserve irons for more soldering connections, faster, in hard-to-reach areas. XLS models interchange elements 11W to 75W. Designed for continuous operation. Cool, comfortable, unbreakable handles. Variety of plug-in tips available.

Model	Tip Size	Watts	Volts
718XLS	1/8″	11-15-20-25	120
714XLS	1/4″	33-40-50-60-75	120
738WH	3/8″	80-100	120

SPH
(SIH not shown)

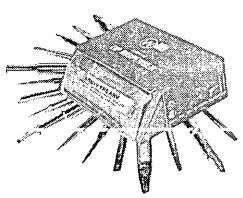
Soldering Pencil Holder

Can be mounted on top, in front or below bench. Adjusts to any angle. Bench model includes tip cleaning sponge and tray. SPH for up to 5/8″ shaft. Model SIH for up to 1″ shafts.



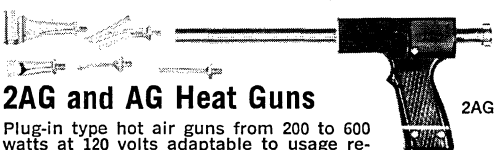
Desoldering Tool

Keeps solder in molten state in reservoir. Operated with one hand. Tip replaceable with two openings — .080″ dia. and .064″ dia. Fits 614, 14HD, 714XLS and XLS 33W to 75W series.



Tips and Tip Dispenser

Tip sizes from 1/8″ through 7/8″ in wide variety of configurations for specific industrial and commercial needs. Three grades — **Anniversary type:** Super finished, iron and chrome plated. **Wallkiad:** Iron coated and chrome plated. For production and critical lab use. **Wallbrand:** Commercial, copper, nickel plated. Wall's own iron plating facilities produce high quality long-life tips. 1/8″ through 3/8″ iron plated or copper tips available in handy tip dispenser. Tips individually sealed in color-coded continuous belting, plastic envelope.



2AG and AG Heat Guns

Plug-in type hot air guns from 200 to 600 watts at 120 volts adaptable to usage requiring up to 1000°F. One heating element fits both models. Pistol grip available with trigger (extra cost), opens air and heat at same time. Five tip styles interchangeable. Special tips on request. 3-wire cord assembly. Guns include neoprene air hose, hose fittings, pressure regulator and gauge. Send for Bulletin HG-1265.

WALL MANUFACTURING CO.

BOX 3349 KINSTON, N. C. 28501 TEL. 919/527-4186

Write Dept. EEM-71 for illustrated catalog I-669B

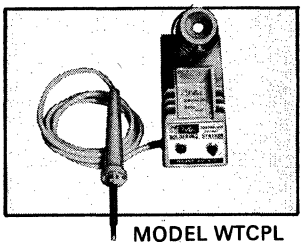
Industrial soldering irons and pencils are built to exceed Federal specification W-S-570. Wallbrand soldering products are UL and CSA listed.

Weller industrial soldering tools

for greater efficiency... lower operating costs and maximum safety

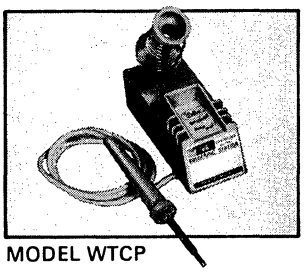
CONTROLLED OUTPUT SOLDERING TOOLS...

Automatically controls output and temperature independent of line voltage.



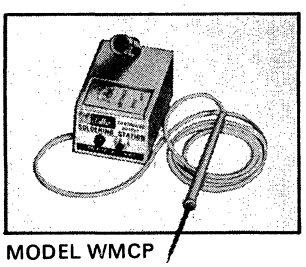
MODEL WTCPL

MODEL WTCPL. Controlled output low voltage soldering with power unit isolated for protection of sensitive devices.Temperatures of 500°F., 600°F. and 700°F. are predetermined by tip selection. Cord set will not burn. Stand will not heat sink. Built-in on/off switch and pilot light. 60W, 120V, 3 wire cord. Comes with 3/16", 700°F. screwdriver tip. New cool blue color. Also available without built-in on/off switch and pilot light as MODEL WTCP.



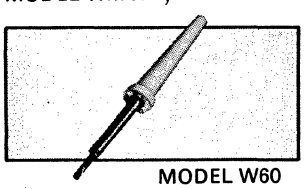
MODEL WTCP

MODEL WTCP. Weller's new miniature tool for micro-soldering, automatically controls output and temperature with power unit isolated and shielded for protection of sensitive devices. Has fixed temperature, interchangeable tips, low voltage operation, built-in on/off switch and pilot light. Available in 3 temperature ranges: 550°F.,...650°F., and 750°F. control 20W, 120V, 50/400 Hz. 3 wire cord. Comes with 5/64" chisel tip. New cool blue color.



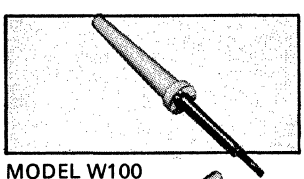
MODEL WMCP

MODEL W60. Low cost, portable, line voltage operation. Automatic control of output and temperature 60W, 2 wire cord. Comes with 700°F., 1/4" screwdriver tip. Model W60-3, 3 wire cord set. New cool blue color. For complete station order PH60 stand.



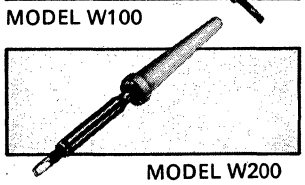
MODEL W60

MODEL W100. Low cost, portable, line voltage operation. Automatic control of output and temperature. 100W, 2 wire cord. Comes with 700°F., 3/8" screwdriver tip. Model W100-3, 3 wire cord set. New cool blue color. For complete station order PH100 stand.



MODEL W100

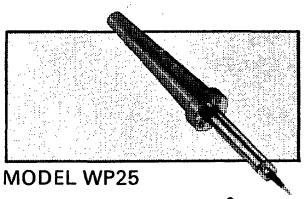
MODEL W200. Low cost, portable, line voltage operation. Automatic control of output and temperature. 200W, 2 wire cord. Comes with 700°F., 1/2" chisel tip. Model W200-3, 3 wire cord set. New cool blue color.



MODEL W200

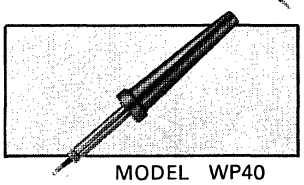
UNCONTROLLED SOLDERING TOOLS...

For lowest cost soldering operations not requiring high efficiency tool.



MODEL WP25

MODEL WP25. Uncontrolled line voltage soldering tool. All stainless steel construction, 25W, 120V, 2 wire cord, with 1/16" screwdriver tip. New cool blue color. Model WP25-3, 3 wire cord set.



MODEL WP40

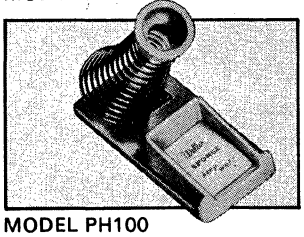
MODEL WP40. Uncontrolled line voltage soldering tool. All stainless steel construction. 40W. 120V, 2 wire cord, with 1/8" screwdriver tip. New cool blue color. Model WP40-3, 3 wire cord set.

SOLDERING TOOLS STANDS...

Have heavy cast iron bases and built-in sponge holders. Design precludes any possible heat sinking of Weller controlled tools. New cool blue color.

MODEL PH60

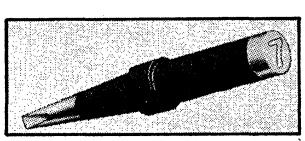
MODEL PH60. Accommodates Weller Models WP25, WP40, W60, and any soldering tool with a barrel diameter up to 15/32".



MODEL PH100

MODEL PH100. Accommodates Weller Model W100 and any soldering tool with a barrel diameter up to 19/32"

TIPS AND ACCESSORIES



All Weller Industrial Soldering Tips have unique heavy iron plating with anti-oxidation coating thereby eliminating freezing... No other tip offers these features!

A complete line of Weller Accessories is available to greatly extend the effectiveness of Weller Soldering Tools.

FOR COMPLETE INFORMATION, WRITE OR CALL FOR WELLER'S LATEST INDUSTRIAL SOLDERING TOOLS CATALOG.

All Weller products are available in Canada.

Weller

INDUSTRIAL SOLDERING TOOLS

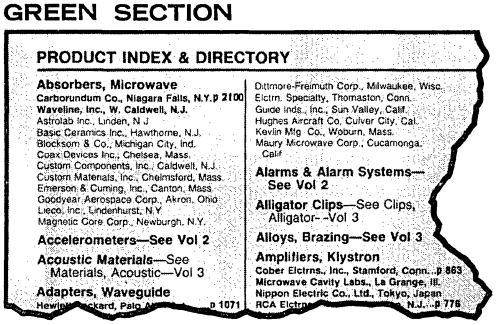
A DIVISION OF COOPER INDUSTRIES, INC.

100 WELLCO ROAD, EASTON, PA. 18042 • 215 • 258-5371

How to use eem

to find manufacturers of a specific product

GREEN SECTION



PRODUCT INDEX & DIRECTORY

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Custom Materials, Inc., Chelmsford, Mass.
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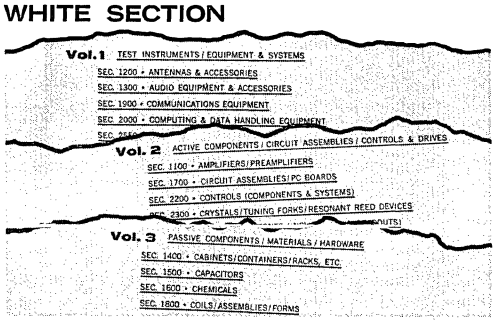
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION



Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2[illegible]

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES
[illegible]NUTS)

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

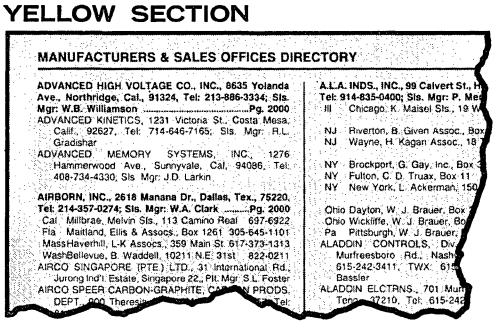
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION



MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3394; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal., 94086, Tel: 408-734-4330; Sls Mgr: J.D. Larkin

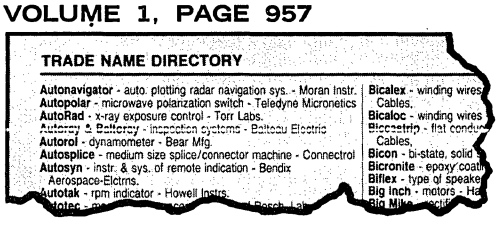
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22, Plt. Mgr. S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA[illegible]N PRODS. DEPT., 800 Theresia[illegible] Tel:

A.L.A. INDS., INC., 99 Calvert St., H[illegible] Tel: 914-835-0400; Sls. Mgr: P. Me[illegible]
Ill Chicago, K. Malsel Sls., 19 W[illegible]
NJ Riverton, B. Given Assoc., Box[illegible]
NJ Wayne, H. Kagan Assoc., 18[illegible]
NY Brockport, G. Gay, Inc., Box [illegible]
NY Fulton, C. D. Truax, Box 11
NY New York, L. Ackerman, 150[illegible]
Ohio Dayton, W. J. Brauer, Box[illegible]
Ohio Wickliffe, W. J. Brauer, Bo[illegible]
Pa Pittsburgh, W. J. Brauer, [illegible]
ALADDIN CONTROLS, Div. Murfreesboro Rd., Nash[illegible] 615-242-3411, TWX: 615[illegible] Bassler
ALADDIN ELCTRNS., 701 Murf[illegible] Tenn. 37210, Tel: 615-242[illegible]

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957



TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Batteray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Electrns.
Autotak - rpm indicator - Howell Instrs.
Autotec - [illegible] Posch Lab[illegible]

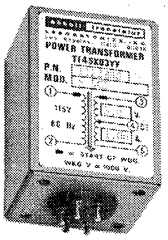
Bicalex - winding wires Cables,
Bicaloc - winding wires
Bicostrip - flat conduc Cables,
Bicon - bi-state, solid
Bicronite - epoxy coati
Biflex - type of speake
Big Inch - motors - Ha
Big Mike - [illegible]

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

abbott 60 transformers



features

- Quality MIL-spec 60 Hz power transformers
- Hermetically sealed
- to meet MIL-T-27C
- 105°C ambient operation
- 5 to 5000 volts
- 5 to 300 watts

DELIVERY IS FROM STOCK

specifications

INPUT PRIMARY: 115 VRMS, 60 Hz ±5 Hz, 1 phase

INSULATION TEST: 1750 VRMS or 150% of secondary voltage (whichever is higher)

CONSTRUCTION: To MIL-T-27C, grade: 4, class: "S", life: "X" (10,000 hrs.) case: smaller

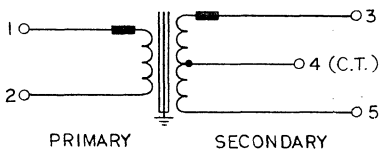
ENVIRONMENT: 105°C maximum ambient temperature. Encapsulated to meet MIL-E-5272C and MIL-E-5400K for vibration, shock, acceleration, sand, dust, humidity, salt spray, fungus, shunshine, rain, explosion and altitude (to a vacuum)

WORKING VOLTAGE: 1000 VAC for all transformers with secondary voltages up to and including 1200 VAC; 80% of rated secondary voltage for all others

SECONDARY VOLTAGE TOLERANCE: Within 3% of listed output voltage when measured at full load and 115 VAC input

OUTPUT SECONDARY: See voltage and current of specific models listed. Standard models with outputs from 63 to 5,000 VAC are also available from stock. Contact our nearest office for your free copy of our complete brochure.

TYPICAL CIRCUIT DIAGRAM



refers to in-phase points

SIZE CHART

Case Size	Width (in.)	Depth (in.)	Height (in.)
A1	1½	1¾	2⅜
A2	1¾	2 1/16	2¾
A3	1⅞	2⅜	3⅛
A4	2	2⅜	3⅛
A5	2⅛	2 1/16	3½
A6	2¼	2 1/16	3½
A7	2⅝	3⅛	4⅛
A8	2⅞	3 1/16	4½
A9	3⅛	3¾	4⅞
A10	3⅞	4 1/16	5¼
A11	3⅞	4 1/16	6

Complete size chart and dimensional drawing are shown in our six page brochure.

Output Volt	Output Current (Amps)	Size	Wt. lbs.	Model Number	Price 1 pc.	Price 2-4 pcs.
5.0	1.00	A1	1.0	5P5CT	$34.50	$28.80
	2.00	A2	1.5	10P5CT	31.60	26.40
	3.00	A3	2.0	15P5CT	28.80	24.00
	4.00	A4	2.5	20P5CT	31.60	26.40
	6.00	A5	3.0	30P5CT	37.40	31.20
	8.00	A6	3.3	40P5CT	39.20	32.70
	16.00	A7	5.0	80P5CT	46.10	38.40
6.3	0.79	A1	1.0	5P6.3CT	33.70	28.10
	1.58	A2	1.5	10P6.3CT	31.10	25.90
	2.38	A3	2.0	15P6.3CT	28.20	23.50
	3.16	A4	2.5	20P6.3CT	31.00	25.80
	4.76	A5	3.0	30P6.3CT	36.60	30.50
	6.35	A6	3.3	40P6.3CT	38.40	32.00
	12.70	A7	5.0	80P6.3CT	45.60	38.00
	19.00	A8	6.5	120P6.3CT	52.70	43.90
8.0	0.67	A1	1.0	5P8CT	33.10	27.60
	1.25	A2	1.5	10P8CT	30.30	25.20
	1.88	A3	2.0	15P8CT	27.60	23.00
	2.50	A4	2.5	20P8CT	30.40	25.30
	3.76	A5	3.0	30P8CT	36.00	30.00
	5.00	A6	3.3	40P8CT	37.70	31.40
	10.00	A7	5.0	80P8CT	44.60	37.20
	15.00	A8	6.5	120P8CT	51.60	43.00
	20.00	A9	8.2	160P8CT	58.50	48.80
10.0	0.50	A1	1.0	5P10CT	32.50	27.10
	1.00	A2	1.5	10P10CT	29.70	24.80
	1.50	A3	2.0	15P10CT	27.00	22.50
	2.00	A4	2.5	20P10CT	29.70	24.80
	3.00	A5	3.0	30P10CT	35.10	29.20
	4.00	A6	3.3	40P10CT	36.80	30.70
	8.00	A7	5.0	80P10CT	43.60	36.40
	12.00	A8	6.5	120P10CT	54.30	45.20
	16.00	A9	8.2	160P10CT	57.30	47.70
	20.00	A10	10.5	200P10CT	64.10	53.40
12.6	0.40	A1	1.0	5P12.6CT	31.70	26.40
	0.79	A2	1.5	10P12.6CT	29.00	24.20
	1.19	A3	2.0	15P12.6CT	26.40	22.00
	1.59	A4	2.5	20P12.6CT	29.00	24.20
	2.38	A5	3.0	30P12.6CT	34.30	28.60
	3.18	A6	3.3	40P12.6CT	36.00	30.00
	6.35	A7	5.0	80P12.6CT	42.70	35.60
	9.53	A8	6.5	120P12.6CT	49.40	41.20
	12.70	A9	8.2	160P12.6CT	56.00	46.70
	15.90	A10	10.5	200P12.6CT	62.70	52.30
14	0.36	A1	1.0	5P14CT	31.10	25.90
	0.72	A2	1.5	10P14CT	28.50	23.70
	1.07	A3	2.0	15P14CT	25.90	21.60
	1.43	A4	2.5	20P14CT	28.50	23.70
	2.15	A5	3.0	30P14CT	33.60	28.00
	2.86	A6	3.3	40P14CT	35.30	29.40
	5.72	A7	5.0	80P14CT	41.80	34.80
	8.59	A8	6.5	120P14CT	48.30	40.30
	11.40	A9	8.2	160P14CT	54.90	45.70
	14.30	A10	10.5	200P14CT	61.40	51.20
16	0.34	A1	1.0	5P16CT	30.30	25.20
	0.68	A2	1.5	10P16CT	27.90	23.20
	0.94	A3	2.0	15P16CT	25.30	21.10
	1.25	A4	2.5	20P16CT	27.80	23.20
	1.87	A5	3.0	30P16CT	32.90	27.40
	2.50	A6	3.3	40P16CT	34.50	28.80
	5.00	A7	5.0	80P16CT	40.80	34.00
	7.50	A8	6.5	120P16CT	47.30	39.40
	10.00	A9	8.2	160P16CT	53.60	44.70
	12.50	A10	10.5	200P16CT	60.00	50.00
	18.70	A11	17.0	300P16CT	76.00	63.30
18	0.28	A1	1.0	5P18CT	29.60	24.70
	0.56	A2	1.5	10P18CT	27.10	22.60
	0.83	A3	2.0	15P18CT	24.70	20.60
	1.11	A4	2.5	20P18CT	27.20	22.70
	1.67	A5	3.0	30P18CT	32.20	26.80
	2.21	A6	3.3	40P18CT	33.70	28.10
	4.44	A7	5.0	80P18CT	40.00	33.30
	6.68	A8	6.5	120P18CT	46.20	38.50
	8.89	A9	8.2	160P18CT	52.40	43.60
	11.10	A10	10.5	200P18CT	58.60	48.80
	16.70	A11	17.0	300P18CT	74.30	61.90
20	0.25	A1	1.0	5P20CT	29.00	24.20
	0.50	A2	1.5	10P20CT	26.50	22.10
	0.75	A3	2.0	15P20CT	24.10	20.10
	1.00	A4	2.5	20P20CT	26.50	22.10
	1.50	A5	3.0	30P20CT	31.30	26.10
	2.00	A6	3.3	40P20CT	32.90	27.40
	4.00	A7	5.0	80P20CT	38.90	32.40
	6.00	A8	6.5	120P20CT	45.10	37.60
	8.00	A9	8.2	160P20CT	51.10	42.60
	10.00	A10	10.5	200P20CT	57.30	47.70
	15.00	A11	17.0	300P20CT	72.50	60.40
22	0.23	A1	1.0	5P22CT	28.30	23.60
	0.45	A2	1.5	10P22CT	25.90	21.60
	0.68	A3	2.0	15P22CT	23.60	19.60
	0.91	A4	2.5	20P22CT	25.90	21.60
	1.36	A5	3.0	30P22CT	30.60	25.50
	1.82	A6	3.3	40P22CT	32.10	26.80
	3.64	A7	5.3	80P22CT	38.10	31.70
	5.45	A8	6.5	120P22CT	44.00	36.70
	7.27	A9	8.2	160P22CT	$ 50.00	$41.60
	9.10	A10	10.5	200P22CT	55.90	46.60
	13.60	A11	17.0	300P22CT	70.80	59.00
25	0.20	A1	1.0	5P25CT	27.60	23.00
	0.40	A2	1.5	10P25CT	25.30	21.10
	0.60	A3	2.0	15P25CT	23.00	19.20
	0.80	A4	2.5	20P25CT	25.30	21.10
	1.20	A5	3.0	30P25CT	29.90	24.90
	1.60	A6	3.3	40P25CT	31.30	26.10
	3.20	A7	5.0	80P25CT	37.10	30.90
	4.80	A8	6.5	120P25CT	43.00	35.80
	6.40	A9	8.2	160P25CT	48.70	40.60
	8.00	A10	10.5	200P25CT	54.50	45.40
	12.00	A11	17.0	300P25CT	69.10	57.60
28	0.18	A1	1.0	5P28CT	26.80	22.40
	0.36	A2	1.5	10P28CT	24.70	20.60
	0.54	A3	2.0	15P28CT	22.40	18.70
	0.71	A4	2.5	20P28CT	24.60	20.50
	1.07	A5	3.0	30P28CT	29.10	24.30
	1.43	A6	3.3	40P28CT	30.60	25.50
	2.86	A7	5.0	80P28CT	36.20	30.20
	4.29	A8	6.5	120P28CT	41.90	34.90
	5.72	A9	8.2	160P28CT	47.50	39.60
	7.10	A10	10.5	200P28CT	53.10	44.30
	10.70	A11	17.0	300P28CT	67.30	56.10
31	0.16	A1	1.0	5P31CT	26.20	21.80
	0.32	A2	1.5	10P31CT	24.00	20.00
	0.48	A3	2.0	15P31CT	21.80	18.20
	0.64	A4	2.5	20P31CT	24.00	20.00
	0.97	A5	3.0	30P31CT	28.50	23.70
	1.29	A6	3.3	40P31CT	29.80	24.80
	2.58	A7	5.0	80P31CT	35.30	29.40
	3.87	A8	6.5	120P31CT	40.80	34.00
	5.17	A9	8.2	160P31CT	46.30	38.60
	6.40	A10	10.5	200P31CT	51.80	43.20
	9.67	A11	17.0	300P31CT	65.60	54.70
35	0.14	A1	1.0	5P35CT	25.60	21.30
	0.29	A2	1.5	10P35CT	23.40	19.50
	0.43	A3	2.0	15P35CT	21.30	17.70
	0.57	A4	2.5	20P35CT	23.40	19.50
	0.86	A5	3.0	30P35CT	27.60	23.00
	1.14	A6	3.3	40P35CT	28.90	24.10
	2.28	A7	5.0	80P35CT	34.30	28.60
	3.43	A8	6.5	120P35CT	39.70	33.10
	4.57	A9	8.2	160P35CT	45.10	37.60
	5.71	A10	10.5	200P35CT	50.40	42.00
	8.59	A11	17.0	300P35CT	63.90	53.20
39	0.13	A1	1.0	5P39CT	24.80	20.70
	0.26	A2	1.5	10P39CT	22.70	18.90
	0.38	A3	2.0	15P39CT	20.70	17.20
	0.51	A4	2.5	20P39CT	22.70	18.90
	0.77	A5	3.0	30P39CT	26.80	22.40
	1.03	A6	3.3	40P39CT	28.20	23.50
	2.05	A7	5.0	80P39CT	33.40	27.80
	3.07	A8	6.5	120P39CT	38.60	32.20
	4.10	A9	8.2	160P39CT	43.80	36.50
	5.12	A10	10.5	200P39CT	49.00	40.80
	7.69	A11	17.0	300P39CT	62.20	51.80
43	0.12	A1	1.0	5P43CT	24.10	20.10
	0.23	A2	1.5	10P43CT	22.10	18.40
	0.35	A3	2.0	15P43CT	20.10	16.80
	0.46	A4	2.5	20P43CT	22.10	18.40
	0.70	A5	3.0	30P43CT	26.20	21.80
	0.93	A6	3.3	40P43CT	27.40	22.80
	1.85	A7	5.0	80P43CT	32.50	27.10
	2.79	A8	6.5	120P43CT	37.60	31.30
	3.70	A9	8.2	160P43CT	42.60	35.50
	4.64	A10	10.5	200P43CT	47.70	39.70
	6.95	A11	17.0	300P43CT	60.40	50.40
48	0.10	A1	1.0	5P48CT	23.40	19.50
	0.21	A2	1.5	10P48CT	21.60	18.00
	0.31	A3	2.0	15P48CT	19.50	16.30
	0.42	A4	2.5	20P48CT	21.50	17.90
	0.63	A5	3.0	30P48CT	25.40	21.20
	0.83	A6	3.3	40P48CT	26.60	22.20
	1.63	A7	5.0	80P48CT	31.50	26.30
	2.50	A8	6.5	120P48CT	36.40	30.40
	3.33	A9	8.2	160P48CT	41.40	34.50
	4.17	A10	10.5	200P48CT	46.30	38.60
	6.26	A11	17.0	300P48CT	58.70	48.90
55	0.09	A1	1.0	5P55CT	22.70	18.90
	0.18	A2	1.5	10P55CT	20.80	17.30
	0.27	A3	2.0	15P55CT	19.00	15.80
	0.36	A4	2.5	20P55CT	20.90	17.40
	0.55	A5	3.0	30P55CT	24.70	20.60
	0.73	A6	3.3	40P55CT	25.90	21.60
	1.46	A7	5.0	80P55CT	30.70	25.60
	2.18	A8	6.5	120P55CT	35.40	29.50
	2.91	A9	8.2	160P55CT	40.20	33.50
	3.64	A10	10.5	200P55CT	45.00	37.50
	5.46	A11	17.0	300P55CT	57.00	47.50

Standard models with outputs from 63 to 5,000 VAC are also available from stock. Contact our nearest office for your free copy of our complete brochure.

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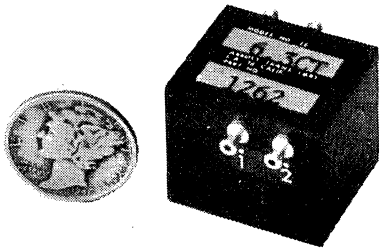
(213) WEbster 6-8185 Cable: ABTLABS

abbott 400 transformers



features

- Hermetically sealed
- 105°C operation
- To meet MIL-T-27C
- Designed exclusively for 400 Hz
- For aerospace application
- Molded diallyl phthalate

DELIVERY IS FROM STOCK

specifications

Input Primary
115V, 400 Hz ±20 Hz, 1 phase

Regulation
10% no load to full load

Secondary Voltage Tolerance
Within 5% when measured at full load and 115 VAC input

Insulation Test
2500 VDC or 150% of secondary voltage (whichever is higher)

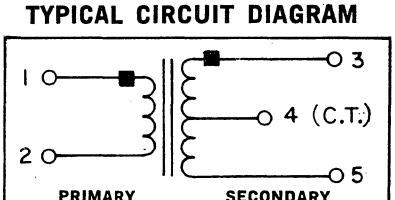
Construction
To MIL-T-27C, grade: 5, class: "S", life: "X" (10,000 hrs.) case: smaller

Environment
Encapsulated to meet MIL-E-5272C, including vibration to Proc. XII, temperature to 105°C, shock, sand, dust, humidity, saltspray, fungus, sunshine, rain, explosion, and altitude (to a vacuum)

Output Secondary
See voltage and current of specific models listed

Standard models with outputs from 350 to 5,000 VAC are also available from stock. Contact our nearest office for your free copy of our complete brochure.

TYPICAL CIRCUIT DIAGRAM



"■" refers to in-phase points

Case Size	Width (in.)	Depth (in.)	Height (in.)	Weight (lbs.)
A	0.87	0.74	0.78	0.06
B	1.25	1.19	0.88	0.12
C	1.43	1.24	1.27	0.26
D	1.47	1.28	1.40	0.29
E	2.31	1.52	1.75	0.75
F	2.75	2.71	2.31	1.84

Output Volt	Output Current (Amps)	Size	Sec. DCR (ohms)	Model Number	Price 1 Pc.	Price 2-4 Pcs.
5.0	0.400	A	0.60	2E5CT	$28.80	$24.00
	1.200	B	0.144	6E5CT	26.40	22.00
	3.000	C	0.046	15E5CT	24.00	20.00
	4.800	D	0.040	24E5CT	31.20	26.00
	16.000	E	0.009	80E5CT	33.60	28.00
	35.000	F	0.012	175E5CT	72.00	60.00
6.3	0.317	A	1.06	2E6.3CT	28.20	23.50
	0.950	B	0.24	6E6.3CT	25.90	21.60
	2.380	C	0.088	15E6.3CT	23.50	19.60
	3.800	D	0.107	24E6.3CT	30.60	25.50
	12.800	E	0.016	80E6.3CT	32.90	27.40
	27.800	F	0.019	175E6.3CT	70.60	58.80
8.0	0.250	A	1.63	2E8CT	27.60	23.00
	0.750	B	0.396	6E8CT	25.30	21.10
	1.880	C	0.135	15E8CT	23.00	19.20
	3.000	D	0.140	24E8CT	30.00	25.00
	10.000	E	0.017	80E8CT	32.30	26.90
	22.000	F	0.010	175E8CT	69.10	57.60
10	0.200	A	2.50	2E10CT	27.10	22.60
	0.600	B	0.587	6E10CT	24.80	20.70
	1.500	C	0.27	15E10CT	22.60	18.80
	2.400	D	0.180	24E10CT	29.30	24.40
	8.000	E	7.2	80E10CT	31.60	26.30
	17.500	F	0.020	175E10CT	67.70	56.40
12.6	0.158	A	4.10	2E12.6CT	26.50	22.10
	0.475	B	0.99	6E12.6CT	24.20	20.20
	1.180	C	0.32	15E12.6CT	22.10	18.40
	1.900	D	0.225	24E12.6CT	28.70	23.90
	6.350	E	0.030	80E12.6CT	31.00	25.80
	13.900	F	0.021	175E12.6CT	66.20	55.20
14	0.142	A	5.59	2E14CT	25.90	21.60
	0.428	B	1.11	6E14CT	23.80	19.80
	1.070	C	0.35	15E14CT	21.60	18.00
	1.720	D	0.32	24E14CT	28.10	23.40
	5.600	E	0.04	80E14CT	30.20	25.20
	12.500	F	0.022	175E14CT	64.80	54.00
16	0.125	A	6.63	2E16CT	25.30	21.10
	0.375	B	1.58	6E16CT	23.30	19.40
	0.940	C	0.54	15E16CT	21.10	17.60
	1.500	D	0.35	24E16CT	27.50	22.90
	5.000	E	0.05	80E16CT	29.50	24.60
	10.900	F	0.025	175E16CT	63.40	52.80
18	0.111	A	9.00	2E18CT	24.70	20.60
	0.333	B	2.21	6E18CT	22.70	18.90
	0.832	C	0.74	15E18CT	20.60	17.20
	1.330	D	0.40	24E18CT	26.90	22.40
	4.450	E	0.08	80E18CT	28.90	24.10
	9.700	F	0.027	175E18CT	61.90	51.60
20	0.100	A	10.9	2E20CT	24.20	20.20
	0.300	B	2.78	6E20CT	22.20	18.50
	0.750	C	1.4	15E20CT	20.20	16.80
	1.200	D	0.48	24E20CT	26.20	21.80
	4.000	E	0.09	80E20CT	28.20	23.50
	8.750	F	0.020	175E20CT	60.50	50.40
22	0.091	A	14.6	2E22CT	23.60	19.70
	0.273	B	2.80	6E22CT	21.60	18.00
	0.680	C	0.92	15E22CT	19.70	16.40
	1.090	D	0.63	24E22CT	25.60	21.30
	3.630	E	0.12	80E22CT	27.60	23.00
	7.900	F	0.020	175E22CT	59.00	49.20
25	0.080	A	20.4	2E25CT	23.00	19.20
	0.240	B	3.60	6E25CT	21.10	17.60
	0.600	C	1.3	15E25CT	19.20	16.00
	0.900	D	0.68	24E25CT	25.00	20.80
	3.200	E	0.13	80E25CT	26.90	22.40
	7.000	F	0.042	175E25CT	57.60	48.00
28	0.071	A	30.0	2E28CT	22.40	18.70
	0.214	B	4.20	6E28CT	20.60	17.20
	0.535	C	1.83	15E28CT	18.70	15.60
	0.855	D	0.98	24E28CT	24.40	20.30
	2.850	E	0.14	80E28CT	26.20	21.80
	6.250	F	0.043	175E28CT	56.20	46.80
31	0.064	A	25.6	2E31CT	21.80	18.20
	0.192	B	5.71	6E31CT	20.00	16.70
	0.485	C	1.62	15E31CT	18.20	15.20
	0.772	D	1.27	24E31CT	23.80	19.80
	2.470	E	0.18	80E31CT	25.60	21.30
	5.650	F	0.061	175E31CT	54.70	45.60
35	0.057	A	29.5	2E35CT	21.40	17.80
	0.171	B	6.89	6E35CT	19.60	16.30
	0.428	C	2.28	15E35CT	17.80	14.80
	0.685	D	1.70	24E35CT	23.00	19.20
	2.280	E	0.28	80E35CT	24.80	20.70
	5.000	F	0.098	175E35CT	53.30	44.40
39	0.051	A	38.6	2E39CT	20.80	17.30
	0.154	B	9.39	6E39CT	19.00	15.80
	0.384	C	2.54	15E39CT	17.30	14.40
	0.615	D	2.20	24E39CT	22.40	18.70
	2.050	E	0.32	80E39CT	24.20	20.20
	4.480	F	0.110	175E39CT	51.80	43.20
43	0.046	A	44.3	2E43CT	20.20	16.80
	0.139	B	10.25	6E43CT	18.50	15.40
	0.348	C	2.85	15E43CT	16.80	14.00
	0.556	D	2.42	24E43CT	21.80	18.20
	1.860	E	0.35	80E43CT	23.50	19.60
	4.060	F	0.114	175E43CT	50.40	42.00
48	0.041	A	57.	2E48CT	$19.60	$16.30
	0.125	B	15.30	6E48CT	18.00	15.00
	0.312	C	4.05	15E48CT	16.30	13.60
	0.500	D	3.27	24E48CT	21.20	17.70
	1.660	E	0.40	80E48CT	22.80	19.00
	3.650	F	0.160	175E48CT	49.00	40.80
55	0.036	A	89.	2E55CT	19.00	15.80
	0.109	B	17.30	6E55CT	17.40	14.50
	0.262	C	7.2	15E55CT	15.80	13.20
	0.435	D	3.83	24E55CT	20.60	17.20
	1.450	E	0.67	80E55CT	22.20	18.50
	3.170	F	0.196	175E55CT	47.50	39.60
63	0.031	A	100.	2E63CT	18.40	15.30
	0.095	B	24.9	6E63CT	16.90	14.10
	0.238	C	6.51	15E63CT	15.40	12.80
	0.380	D	5.35	24E63CT	19.90	16.60
	1.270	E	0.71	80E63CT	21.50	17.90
	2.770	F	0.20	175E63CT	46.10	38.40
70	0.028	A	139	2E70CT	17.90	14.90
	0.085	B	27.1	6E70CT	16.30	13.60
	0.214	C	9.4	15E70CT	14.90	12.40
	0.342	D	8.10	24E70CT	19.30	16.10
	1.140	E	0.80	80E70CT	20.90	17.40
	2.500	F	0.25	175E70CT	44.60	37.20
80	0.025	A	163.	2E80CT	17.30	14.40
	0.075	B	39.0	6E80CT	15.80	13.20
	0.198	C	13.4	15E80CT	14.40	12.00
	0.300	D	9.0	24E80CT	18.70	15.60
	1.000	E	0.92	80E80CT	20.20	16.80
	2.180	F	0.34	175E80CT	43.20	36.00
90	0.022	A	218.	2E90CT	16.70	13.90
	0.067	B	41.0	6E90CT	15.40	12.80
	0.166	C	15.9	15E90CT	13.90	11.60
	0.267	D	12.5	24E90CT	18.10	15.10
	0.890	E	1.08	80E90CT	19.40	16.20
	1.940	F	0.38	175E90CT	41.80	34.80
100	0.020	A	283.	2E100CT	16.10	13.40
	0.060	B	59.5	6E100CT	14.80	12.30
	0.150	C	16.8	15E100CT	13.40	11.20
	0.240	D	14.4	24E100CT	17.50	14.60
	0.800	E	1.64	80E100CT	18.80	15.70
	1.750	F	0.52	175E100CT	40.30	33.60
110	0.018	A	392.	2E110CT	15.60	13.00
	0.054	B	62.3	6E110CT	14.30	11.90
	0.136	C	22.1	15E110CT	13.00	10.80
	0.218	D	19.5	24E110CT	16.80	14.00
	0.728	E	2.03	80E110CT	18.10	15.10
	1.590	F	0.72	175E110CT	38.90	32.40
123	0.016	A	495.	2E123CT	15.00	12.50
	0.048	B	96.0	6E123CT	13.70	11.40
	0.122	C	30.7	15E123CT	12.50	10.40
	0.195	D	21.9	24E123CT	16.20	13.50
	0.650	E	2.35	80E123CT	17.50	14.60
	1.420	F	0.81	175E123CT	37.40	31.20
138	0.014	A	550.	2E138CT	14.40	12.00
	0.043	B	133.0	6E138CT	13.20	11.00
	0.108	C	36.0	15E138CT	12.00	10.00
	0.174	D	30.3	24E138CT	15.60	13.00
	0.580	E	3.17	80E138CT	16.80	14.00
	1.260	F	1.14	175E138CT	36.00	30.00
157	0.038	B	153.0	6E157CT	14.50	12.10
	0.095	C	53.	15E157CT	13.20	10.50
	0.152	D	36.1	24E157CT	16.40	13.70
	0.508	E	3.60	80E157CT	17.60	14.70
	1.100	F	1.31	175E157CT	37.80	31.50
175	0.034	B	168.0	6E175CT	14.50	12.10
	0.085	C	56.	15E175CT	13.20	11.00
	0.136	D	49.5	24E175CT	17.20	14.30
	0.455	E	5.50	80E175CT	18.50	15.40
	1.000	F	1.87	175E175CT	39.60	33.00
200	0.030	B	248.0	6E200CT	15.20	12.70
	0.071	C	65.	15E200CT	13.80	11.50
	0.120	D	57.	24E200CT	18.00	15.00
	0.400	E	5.60	80E200CT	19.30	16.10
	0.875	F	2.65	175E200CT	41.40	34.50
220	0.027	B	278.	6E220CT	15.80	13.20
	0.068	C	91.5	15E220CT	14.40	12.00
	0.109	D	79.	24E220CT	18.70	15.60
	0.364	E	8.1	80E220CT	20.20	16.80
	0.790	F	2.92	175E220CT	43.20	36.00
250	0.024	B	407.	6E250CT	16.60	13.80
	0.060	C	141.	15E250CT	15.00	12.50
	0.096	D	114.	24E250CT	19.60	16.30
	0.320	E	11.2	80E250CT	21.00	17.50
	0.700	F	3.95	175E250CT	45.00	37.50
275	0.021	B	417.	6E275CT	17.20	14.30
	0.054	C	146.	15E275CT	15.60	13.00
	0.087	D	120.	24E275CT	20.30	16.90
	0.290	E	13.6	80E275CT	21.80	18.20
	0.635	F	4.65	175E275CT	46.80	39.00
310	0.019	B	592.	6E310CT	17.90	14.90
	0.048	C	160.	15E310CT	16.20	13.50
	0.077	D	180.	24E310CT	21.10	17.60
	0.266	E	14.1	80E310CT	22.70	18.90
	0.565	F	6.80	175E310CT	48.60	40.50

Standard models with outputs from 350 to 5,000 VAC are also available from stock. Contact our nearest office for your free copy of our complete brochure.

Electro Cube Foil Wound Transformers

are available in standard models listed and also to customer requirements. Units may be isolation or auto transformers for frequencies from 25 cycles into the kilocycle range, single or multi-phase, open frame, shell enclosure or hermetically sealed.

Advantages of these aluminum foil wound transformers over conventional wire wound units include: ■ higher operating efficiency ■ reduced weight ■ improved thermal efficiency ■ higher temperature operation ■ improved regulation ■ lower internal losses ■ improved volume efficiency.

A transformer's ability to dissipate heat affects its maximum rating. Electro Cube foil wound coils have the ability to dissipate large amounts of heat because there is a direct metallic path to each end of the coil from any point within the coil. Special end treatment of the coil including attachment to a heat sink, can significantly reduce operating temperatures.

Wire wound coils, by comparison, are more difficult to cool. As a result of a limited heat path a lower coefficient of heat transfer and increased resistance due to heat and vice versa, the heat is greatest in that part of the coil least capable of dissipating it. Heat generated by conductors deep within the coil must pass through many thermal barriers of the insulation between the wires. Materials in Electro Cube foil transformers permit higher operating temperatures than are possible with wire coils with equivalent insulation ratings.

Figure 1 shows the relative difference in volume required for a 100 turn wire coil and an equivalent foil coil, and shows voltage stress and insulation requirements. At 1 volt per turn there would be 20 volts between the 20th and first turn of the wire coil. When the top layer is finished, the last turn may lay against one of the first, resulting in a voltage difference of up to 100 volts. The foil coil never has more than 1 volt between any two conductors, or a 100 to 1 advantage over the wire coil, in this example.

The physical arrangement of the foil windings promotes a lower leakage reactance or power loss in the transformer, which contributes to efficiency and regulation. Together with the lower I^2R loss of the windings, this allows the use of fewer circular mils of conductor area to meet required efficiency and regulation requirements.

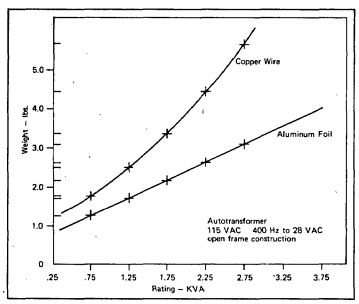
Electro Cube transformer design allows a smaller core volume to support the flux density required for any given load. The smaller core and lighter weight of the aluminum foil contribute to a reduction in weight and volume.

Electro Cube also manufactures wire and foil wound transformers, toroids and special inductors, aluminum foil chokes, film capacitors, EMI filters and RC networks. See pages 2378, 2379 for data.

Auto transformer Specifications									Hermetically sealed aluminum case, tin plated, painted black		
Style		Open coil & core (conformal coated)									
Model		FT1004	FT1006	FT1002	FT1005	FT1003	FT1013	FT1001	FT1007	FT1008	FT1009
Rating		350 VA	500 VA	750 VA	750 VA	1.75 KVA	1.75 KVA	2.5 KVA	150 VA	350 VA	750 VA
Input voltage (@ 400 Hz)		110/114/118	110/114/118	115	110/114/118	115	115	115	110/114/118	110/114/118	90/95/110
Output voltage (@ 400 Hz)		28	57 & 97	28	28	200/280/350	230	29	28	28	28
Efficiency (%)		96	95	95	95	95	95	92	90	90	90
Regulation (%)		5	5	4	5	3	3	4	5	5	5
No. terminals		5	6	3	5	5	3	3			
Terminal stud size		10-32	10-32	10-32	10-32	10-32	10-32	10-32			
Weight (lbs max)		.83	.73	1.2	1.32	2.3	2.2	2.7	0.7	1.0	1.99
Size	W	2.25	2.25	2.25	2.25	3.50	3.50	3.5	2.30	2.70	3.05
	L	3.0	3.0	3.00	3.0	3.60	3.60	3.75	3.05	3.05	3.26
	H	3.0	2.75	3.37	3.37	3.75	3.75	4.0	3.12	3.12	3.65

Construction: aluminum foil/Mylar insulation, epoxy impregnated.

Figure 1.



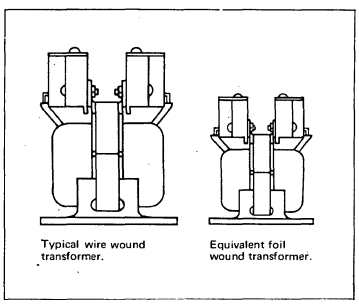


Figure 2. Weight comparison – copper wire vs aluminum foil transformers.

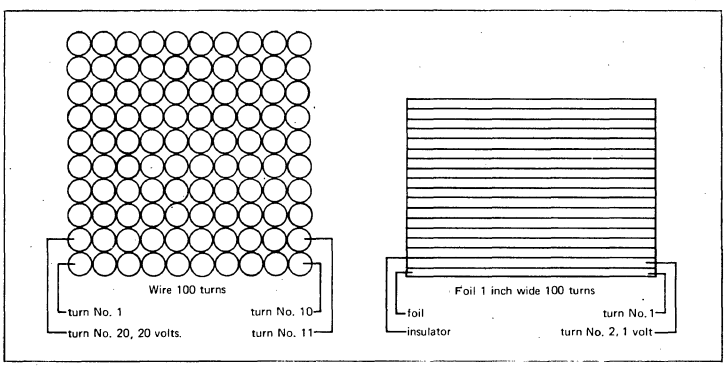
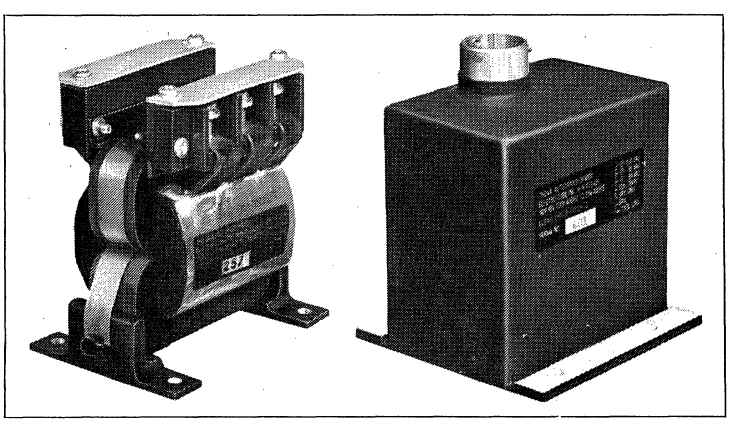


Figure 3. Typical coil sections with 100 volts excitation.



electro cube, inc.
1710 South Del Mar Avenue, San Gabriel, California
Telephone: (213) 283-0511 / TWX: 910-589-1609

FERRODYNE . . . ADVANCED STATE OF THE ART

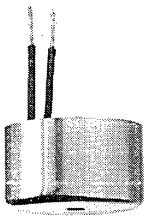
Highly sophisticated specialty Transformers, Inductors, and Associated Magnetic Components.

FERRODYNE products are keyed to those segments of the electronics industry that are primarily concerned with high quality, strict specifications, and advanced state of the art products.

Since 1961, the FERRODYNE CORPORATION has been an industry leader in the development of micro-miniature, low profile, and high frequency transformers and inductors for the Computer, Communications, and Electronic Instrument Industries. FERRODYNE products range from highly sophisticated micro-miniature transformers and inductors to ten (10) kilowatt components; frequencies to 50 megahertz; construction categories cover the entire range from open type to hermetically sealed; quality assurance is in accordance with Mil-Q-9858A. The FERRODYNE CORPORATION manufactures magnetic components in compliance with U.L. standards for computer and instrument manufacturers and is also Q.P.L. listed.

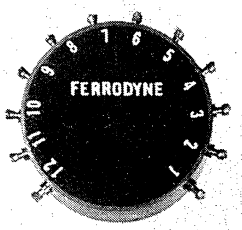
Contact FERRODYNE for prompt and efficient engineering assistance with your specialty transformer requirement. FERRODYNE provides quick service on special prototype units. We welcome your inquiries.

- Box Shielded Instrument Transformers
- Constant Voltage Transformers
- Hybrid Transformers
- Inverter/Converter Transformers
- Power Transformers
- Toroids
- Pulse Transformers
- Precision Scott-T Transformers
- Wide-Band Transformers
- Magnetic Amplifiers
- Saturable Reactors
- Swinging Filter Chokes



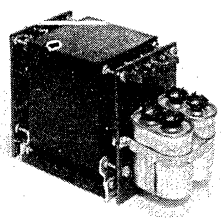
FSI Series Switching Regulator Inductors

This Series is specifically designed for application in switching regulated power supplies operating at frequencies above 10 KHz, constructed to meet high "Q" requirements with a minimum of R.F.I. and flux radiation. The F.S.I. Series uses cold rolled steel cases with fused tin plating. Mounting is provided by through hole in the center.



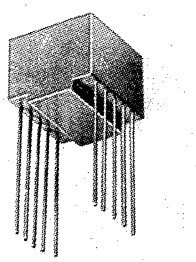
FIC Series Inverter/Converter Transformers

The Ferrodyne inverter and converter toroidal transformers are ideal for use where low voltage DC power must be converted to high efficiency, high voltage DC. The Transformers are epoxy molded under vacuum to eliminate moisture and increase unit ruggedness. The FIC Series exceed Mil-T-27C, grade 5, class R specifications. Frequencies to 10 KHz. Inverter circuit information can also be supplied by Ferrodyne Engineering. For specific application please contact the factory. Units are available upon request in metal enclosures to minimize flux radiation.



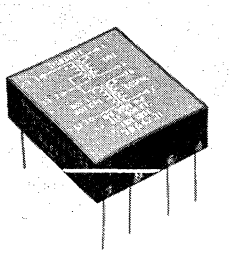
FCV-200 Series Constant Voltage Transformers

Combines both low profile advantages and standard multi-selectable output features to provide the user the optimum application advantages at competitive prices. 70% of the ampere capacity of each unit is available at either plus or minus 5VDC. The 30% balance of power available can be supplied at either plus or minus 12, 15, or 24 VDC. Primary voltage is 95-130V, 1 phase, 60 Hz.



FMC Series Miniature Transformers And Inductors

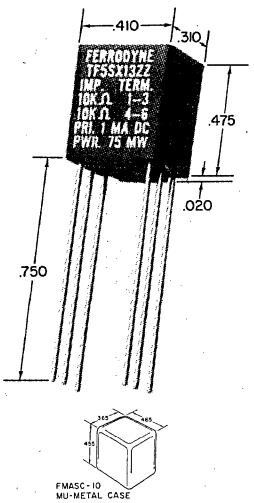
- 2-4 weeks delivery
- Size .630" x .530" x .52" high
- Weight 7 grams
- Frequency range 300 Hz to 50 KHz
- Mil-T-27C, Grade 5, Class S
- All leads separated in increments of 1/10"
- Complete circuit data on each unit
- 500 RMS test voltage
- Ten lead capacity
- MIL-T-27C, Open Construction Grade 6, Class S available



FST Series Precision Scott-T Transformers

For applications from resolver to syncro; or from syncro to resolver. Mil-T-27C, grades 5 and 6, class S. Designed to meet the most stringent requirements such as:

- D.C. resistance balance to within 5%.
- Minimum phase shift down to ½ min.
- Transformation accuracy with .05%.
- Input impedance up to 1 megohm.
- Frequencies from 60 Hz to 1 KHz.



FMA Series Micro-miniature Transformers and Inductors

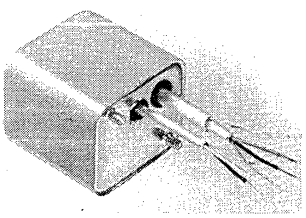
- Size .475" high x .310" wide x .410" long
- Weight 1/10 oz.
- Frequency range 300 HZ to 120 KHZ
- Mil-T-27C, Grade 5, Class S
- All leads separated in increments of 1/10"
- Complete circuit data on each unit
- 500 RMS test voltage

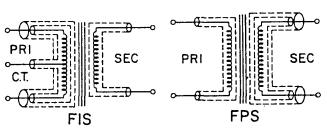
FMA-1 Series Micro-miniature Low Profile, Open Type Version of FMA Units

- 2-4 weeks delivery
- Size .25" high x .35" wide x .375" long
- Mil-T-27C, Grade 6, Class S
- No. 28 leads (Max. number of leads 6) for Printed Circuit application

FMA-2 Series Micro-miniature Low Profile, Solid Epoxy Molded Version of FMA Units

- 2-4 weeks delivery
- Size .30" high x .40" wide x .40" long
- Mil-T-27C, Grade 5, Class S
- 12 Pin capacity





FIS/FPS Series Box Shielded Instrument and Power Transformers

FIS Box Shielded Instrument Transformers are designed for two distinctly different application requirements. The Ferrodyne FIS Series units are designed primarily for use in the instrumentation field, and have many outstanding features generally considered difficult to meet by most competitors. Some of these features are:

- Double box shielded primary and single box shielded secondary windings result in a low winding to winding capacitance or .03PF max.
- Encased in three high permeability cans, shielding is a minimum of 90DB.
- Low microphonic construction.
- Common mode reduction will exceed 140DB.
- Low thermal noise construction.
- Frequency response = 5 Hz to 8 KHz @ 25 mv level.
- Insulation resistance is 10,000 Meg. ohms @ 500VDC.

FPS—The Ferrodyne FPS Series is designed for application where a high degree of isolation is required from the noise generated in the line. Some of the outstanding features are:

- Single box shielded primary and double box shielded secondary result in a primary to secondary winding capacitance of .03PF max.
- Common mode rejection will exceed 140DB.
- Operating frequency is 50/60 Hz.
- Insulation resistance is 10,000 Meg ohms min.
- Designed at low operating flux density with grain oriented silicon steel to reduce the magnetic flux radiation.
- Open construction with shield cable leads, treated and coated with epoxy.

Ferrodyne Corporation
FERRODYNE CORPORATION
A Subsidiary of Dressen/Barnes Electronics Corporation
4240 GLENCOE AVENUE / VENICE, CA 90291 / (213) 391-5233 TWX: 910-588-3780

FREED TRANSFORMER CO., INC.

MIL-T-27 COMPONENTS

TRANSISTOR SUPPLY TRANSFORMERS
TST SERIES

Manufactured and Guaranteed to Specifications MIL-T-27

TST-6 — Frequency 57 Hz to 63 Hz — Primary 115 volts units with * primary 115 and/or 230 volts

TST-4 — Frequency 380 Hz to 1000 Hz — Primary 115 volts

TST units can be supplied in commercial type construction (channel or shell type with leads).

**When ordering specify (6) for 57 to 63 Hz and (4) for 380 to 1000 Hz

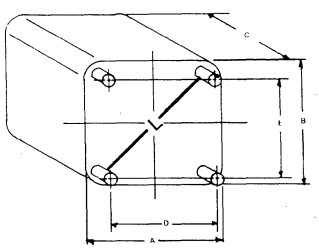
D.C. to RMS Conversion Chart

Resistive or Inductive Loads		Capacitive Loads	
Full Wave Center Tapped	Full Wave Bridge	Full Wave Center Tapped	Full Wave Bridge
E_{RMS} = 2.22 Edc	E_{RMS} = 1.11 Edc	E_{RMS} = 1.6 Edc	E_{RMS} = .8 Edc
I_{RMS} = .75 Idc	I_{RMS} = 1.05 Idc	I_{RMS} = 1.1 Idc	I_{RMS} = 1.55 Idc

Edc – should include voltage drop across reactor and voltage drop across one diode for F.W.C.T. and voltage drop across two diodes for F.W. Bridge.

Part No.	R.M.S. Output Volt	Amp	Case —4	Case —6
TST(**)-1	6.3 CT	.30	AH	AH
TST(**)-2	6.3 CT	.60	AH	AJ
TST(**)-3	12.6 Split	.80	AJ	EB
TST(**)-4	12.6 Split	1.5	AJ	FA
TST(**)-5	12.6 Split	2.0	AJ	GB*
TST(**)-6	25.2 Split	1.5	EB	GA*
TST(**)-7	25.2 Split	4.0	GB	JA*
TST(**)-8	30 Split	.50	AJ	FA
TST(**)-9	30 Split	1.0	AJ	GB*
TST(**)-10	30 Split	1.5	EB	GA*
TST(**)-11	30 Split	2.0	FA	HA*
TST(**)-12	40 Split	.50	AJ	FA
TST(**)-13	40 Split	1.0	EB	GA*
TST(**)-14	40 Split	1.5	FA	HA*
TST(**)-15	40 Split	2.0	FA	JB*
TST(**)-16	50 Split	.50	AJ	GB*
TST(**)-17	50 Split	1.0	FA	GA*
TST(**)-18	50 Split	1.5	FA	JB*
TST(**)-19	50 Split	2.0	GB	JA*
TST(**)-20	60 Split	.50	AJ	GB*
TST(**)-21	60 Split	1.0	FA	HA*
TST(**)-22	60 Split	1.5	FA	JA*
TST(**)-23	70 Split	.50	EB	GA*
TST(**)-24	70 Split	1.0	FA	JB*
TST(**)-25	70 Split	1.5	GB	JA*
TST(**)-26	80 Split	.25	AJ	FA
TST(**)-27	80 Split	.50	EB	GA*
TST(**)-28	80 Split	1.0	FA	JB*
TST(**)-29	90 Split	.25	AJ	GB*
TST(**)-30	90 Split	.50	EB	GA*
TST(**)-31	90 Split	1.0	FA	JA*
TST(**)-32	100 Split	.25	AJ	GB*
TST(**)-33	100 Split	.50	FA	GA*
TST(**)-34	100 Split	1.20	GA	KB*

MIL CASES, NOMINAL DIMENSIONS, INCHES



Mil Case	A	B	C	D	L	E	Mtg. Studs	Wt. Lbs.
AH	1 5/16	1 5/16	1 3/4		1 1/4		6-32 x 3/8	3/8
AJ	1 5/8	1 5/8	2 3/8	1 3/16		1 3/16	6-32 x 3/8	2/3
EA	1 15/16	1 13/16	2 3/4	1 3/8		1 1/4	6-32 x 3/8	1
EB	1 15/16	1 13/16	2 7/16	1 1/8		1 1/4	6-32 x 3/8	7/8
FA	2 5/16	2 1/16	3 1/8	1 11/16		1 7/16	6-32 x 3/8	1 3/4
FB	2 5/16	2 1/16	2 1/2	1 11/16		1 7/16	6-32 x 3/8	1 1/2
GA	2 3/4	2 3/8	3 13/16	2 1/8		1 3/4	6-23 x 3/8	3 1/2
GB	2 3/4	2 3/8	2 13/16	2 1/8		1 3/4	6-32 x 3/8	2 1/2
HA	3 1/16	2 5/8	4 1/4	2 19/64		1 55/64	8-32 x 3/8	4 1/2
HB	3 1/16	2 5/8	3 3/16	2 19/64		1 55/64	8-32 x 3/8	3 1/2
JA	3 9/16	3 1/16	4 7/8	2 5/8		2 1/8	8-32 x 3/8	6
JB	3 9/16	3 1/16	3 7/8	2 5/8		2 1/8	8-32 x 3/8	5
KA	3 15/16	3 3/8	5 1/4	3		2 7/16	10-32 x 1/2	8 1/2
KB	3 15/16	3 3/8	4 5/16	3		2 7/16	10-32 x 1/2	7

See our complete listing in Radio Electronic MASTER.

STANDARD MILITARY AUDIO TRANSFORMERS
Frequency Response 300-10,000 Hz ±2 DB

Catalog No.	Application	Type Designation	Impedance Level in Ohms Primary	Secondary	Ratio	Max. Power Level DBM	Pri. D.C. Per Side in Ma	Max. D.C. unbalance	Case
MGA 1	Transformer; interstage, single or P.P. plates to single or P.P. grid	TF4RX15AJ	10,000 C.T.	90,000 split and C.T.	1:3 overall	+15	10	10	AJ
MGA 2	Transformer; matching 600 ohm line to voice coil.	TF4RX16AJ	600 split	4, 8, 16	6.12:1 overall	+33	0	0	AJ
MGA 3	Transformer; input, 600 ohm line to single or P.P. grids.		600 split	135,000 C.T.	1:15	+15	0	0	AJ
MGA 4	Transformer; matching, 600 ohm line to 600 ohm line.	TF4RX16AJ	600 split	600 split	1:1	+15	0	0	AJ
MGA 5	Transformer; output, single plate 7,600 ohm, 4,800 ohm to 600 ohm line.	TF4RX13AJ	7,600 tap @ 4,800	600 split	3.56:1	+33	40	40	AJ
MGA 6	Transformer; output, single plate 7,600 ohm, 4,800 ohm to voice coil.	TF4RX13AJ	7,600 tap @ 4,800	4, 8, 16	21.8:1	+33	40	40	AJ
MGA 7	Transformer; output, single or P.P. plates to 600 ohm line.	TF4RX13AJ	15,000 C.T.	600 split	5:1	+33	10	10	AJ
MGA 8	Transformer; output, P.P. plates to 600 ohm line.	TF4RX13AJ	24,000 C.T.	600 split	6.32:1	+30	10	1	AJ
MGA 9	Transformer; output, P.P. plates to 600 ohm line.	TF4RX13AJ	60,000 C.T.	600 split	10:1	+27	10	1	AJ

STANDARD MILITARY POWER AND FILAMENT TRANSFORMERS
Primary 105/115/125V 60~

SINGLE PHASE 400 Hz, AND THREE PHASE 60 AND 400 Hz TRANSFORMERS CAN BE SUPPLIED ON SPECIAL ORDER.

Catalog No.	MIL-T-27 Type Designation	Hi Volt	D.C. Volts	D.C. Amps	Fil. No. 1	Fil. No. 2	Case
MGP 1	TF4RX03HA001	200/100/0/100/200	185	.070	5/6.3V @ 2A	6.3V @ 3A	HA
MGP 2	TF4RX03JB002	650 C.T.	260	.070	5/6.3V @ 2A	6.3V @ 4A	JB
MGP 3	TF4RX03KB006	650 C.T.	245	.150	6.3V @ 5A	5V @ 3A	KB
MGP 4	TF4RX03LB003	800 C.T.	318	.175	5V @ 3A	6.3V @ 8A	LB
MGP 5	TF4RX03MB004	900 C.T.	345	.250	5V @ 3A	6.3V @ 8A	MB
MGP 6	TF4RX02KB001	700 C.T.	255	.250			KB
MGP 7	TF4RX02LB002	1100 C.T.	419	.250			LB
MGP 8	TF4RX02NB003	1600 C.T.	640	.250			NB

Catalog No.	MIL-T-27 Type Designation	Secondary Volts	Secondary Current Amps	Secondary Test Volts RMS	Case
MGF 1	TF4RX01EB002	2.5	3.0	2,500	EB
MGF 2	TF4RX01GB003	2.5	10.0	2,500	GB
MGF 3	TF4RX01FB004	5.0	3.0	2,500	FB
MGF 4	TF4RX01HB005	5.0	10.0	2,500	HB
MGF 5	TF4RX01FB006	6.3	2.0	2,500	FB
MGF 6	TF4RX01GB007	6.3	5.0	2,500	GB
MGF 7	TF4RX01JB008	6.3	10.0	2,500	JB
MGF 8	TF4RX01KB009	6.3	20.0	2,500	KB
MGF 9	TF4RX01JB012	2.5	10.0	10,000	JB
MGF 10	TF4RX01KB013	5.0	10.0	10,000	KB

MIL-FILTER REACTORS

Catalog No.	MIL Type	Inductance Henry	Rat. Current DC Ma.	DC Res. Ohms	Test Volt Kilovolts	Case No.
MGC 1	TF4RX04AJ	100	10	3,500	1.	AJ
MGC 2	TF4RX04AJ	4	50	230	1.	AJ
MGC 3	TF4RX04EB	10	50	325	1.	EB
MGC 4	TF4RX04FA	20	50	475	1.5	FA
MGC 5	TF4RX04FA	30	50	650	1.5	FA
MGC 6	TF4RX04AJ	3	75	175	1.	AJ
MGC 7	TF4RX04EB	6	75	235	1.5	EB
MGC 8	TF4RX04FA	12	75	265	1.5	FA
MGC 9	TF4RX04EB	3.5	100	145	1.	EB
MGC 10	TF4RX04FA	8	100	180	1.5	FA
MGC 11	TF4RX04GA	12	100	190	2.	GA
MGC 12	TF4RX04EB	2	150	92	1.5	EB
MGC 13	TF4RX04FA	4	150	115	1.5	FA
MGC 14	TF4RX04GA	8	150	125	2.	GA
MGC 15	TF4RX04JB	11	150	120	2.5	JB
MGC 16	TF4RX04FA	2.5	200	70	1.5	FA
MGC 17	TF4RX04GA	4	200	80	2.	GA
MGC 18	TF4RX04HB	7	200	135	2.	HB
MGC 19	TF4RX04JA	10	200	125	2.5	JA
MGC 20	TF4RX04GA	2.5	300	50	2.	GA
MGC 21*	TF4RX04HB	4	300	62	2.5	HB
MGC 22	TF4RX04JB	6	300	85	2.5	JB
MGC 23*	TF4RX04KB	8	300	65	2.5	KB
MGC 24	TF4RX04LA	10	300	100	2.5	LA
MGC 25*	TF4RX04HB	2	400	37	2.5	HB
MGC 26	TF4RX04KB	6	400	60	2.5	KB
MGC 27*	TF4RX04JA	2	500	35	2.5	JA
MGC 28	TF4RX04KB	4	500	45	2.5	KB
MGC 29*	TF4RX04MB	7	500	50	2.5	MB
MGC 30*	TF4RX04LB	2	700	20	2.5	LB
MGC 31*	TF4RX04MB	1.75	1,000	12.5	2.5	MB

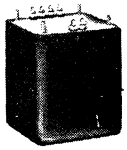
*Not stocked, available on short delivery. Above units available in Grade 4. Class S-T-U, grade 4 or 5, can be supplied on special order

FREED TRANSFORMER CO., INC.

TRANSISTORIZED CONVERTERS—TDC LINE

For DC/DC conversion from low voltage DC sources to high voltage DC output. Stock units are available in power capabilities to 45 watts, with input voltages of 6, 12, 24, 28, and 48 volts.

All TDC converters are hermetically sealed and oil filled. Outputs are filtered with ripple less than .1%. Operating temperatures from −55°C to +70°C. They are ruggedly built to withstand shock and vibration.



CAT. #	NOM. VDC INPUT	VDC OUT	MAX 1 OUT MA	CASE SIZE
TDC 6-15-05	6	150	50	
TDC 12-30-15	12	300	150	2⅝ x 2½ x 3½
TDC 12-25-12	12	250	120	2⅝ x 2¼ x 3½
TDC 12-30-05	12	300	50	2 x 2¼ x 3½
TDC 12-20-05	12	200	50	2 x 2¼ x 3⅛
TDC 12-12-12	12	120	120	2 x 2¼ x 3
TDC 12-2.4-100	12	24	1000	2¼ x 2⅝ x 3½
TDC 28-30-15	28	300	150	2⅝ x 2¼ x 3½
TDC 28-25-12	28	250	120	2⅝ x 2¼ x 3½
TDC 28-30-05	28	300	50	2 x 2¼ x 3⅛
TDC 28-30-05	28	200	50	2 x 2¼ x 3⅛
TDC 48-20-15	48	200	150	2⅝ x 2¼ x 3½
TDC 48-30-15	48	300	150	2⅝ x 2¼ x 3½

DC TO AC TRANSISTOR INVERTERS—TAC LINE

115 volt outputs at 60 Hz at powers ranging from 50 VA to 350 VA.

Output wave form-square wave; Output frequency – 60 Hz ±1 Hz;

Hermetically sealed-oil filled; Maximum operating temperature – 70°C.

AVAILABLE TYPES:

CAT. #	NOM. VDC IN	OUTPUT VA	SIZE
TAC 6-50	6	50	4⅛ x 3½ x 4½
TAC 12-50	12	50	4⅛ x 3½ x 4½
TAC 12-90	12	90	4⅛ x 3½ x 4⅞
TAC 12-175	12	175	5 x 4⅛ x 6
TAC 28-50	28	50	4⅛ x 3½ x 4½
TAC 28-100	28	100	4⅛ x 3½ x 4⅞
TAC 28-175	28	175	5 x 4⅛ x 6
TAC 28-250	28	250	5½ x 5 x 6¾
TAC 28-350	28	350	5½ x 5 x 6¾
TAC converters are also available with 400 Hz outputs in three models:			
TAC 12-100-4	12	100	4½ x 3½ x 4½
TAC 28-150-4	28	150	4⅛ x 3½ x 4½
TAC 28-250-4	28	250	5 x 4⅛ x 6

DC TO AC TRANSISTOR INVERTERS—PTC LINE

A new line of DC/AC inverters for operation from a 12 volt D.C. source. Output is square wave, 115 volts RMS at 60 Hz. Regulated to ±2 Hz over an input voltage range of 10.5 to 13.5 VDC.

Efficiency on all units is 80% min. at full load. Ambient temperature to 55°C.

Available models listed below:

CAT. #	VA OUT	SIZE	MTG.
PTC 12-15	15	3 x 2½ x 4	1⁹⁄₁₆ x 1¹³⁄₁₆
PTC 12-50	50	3½ x 3 x 4¹³⁄₁₆	2 x 2¾
PTC 12-100	100	5⅞ x 4 x 5¼ HI	3¼ x 3⅛
PTC 12-175	175	7⅞ x 4¹³⁄₁₆ x 5¼ HI	6 x 3½

PTC 12-15 and PTC 12-50 are supplied with 4-terminal headers for input and output connections.

PTC 12-100 and PTC 12-175 use barrier strip terminals and in addition have an auxiliary output receptacle.

DC TO AC TRANSISTOR INVERTERS — VC LINE

A low priced efficient transistor inverter for applications not requiring frequency regulation closer than ±5 Hz is available in 15 VA and 100 VA output capabilities. Input nominal 12 V.D.C. Output square wave 115 volt.

Cat. #	Power	Freq.	Size
VC 12-15	15 watt	55-65 Hz	3 x 3⅛ x 3¾ Hi.
VC 12-100	100 watt	55-65 Hz	4½ x 3½ x 4½ Hi.

MCV – CONSTANT VOLTAGE TRANSFORMERS – MCV
(FERRO-RESONANT TRANSFORMERS)

The MCV line of constant voltage transformers provides accurate regulation against line and/or load variations, without the use of tubes or moving parts.

Input Voltage Range
95 to 130

Rated output within ± 2% of nominal value. Regulation automatically maintained within ± 1%. Regulation from 25% to full load ± 2%.

- MILITARY SPECIFICATIONS
- NO TUBES
- COMMERCIAL
- NO MOVING PARTS
- ACCURATE REGULATIONS
- FAST RESPONSE
- FULLY AUTOMATIC
- SUPPLIED WITH CONDENSERS

Reg. Output in R.M.S. Volts	Output in V.A. P.F-1	CATALOG NUMBERS			
		60 Cycles		400 Cycles	
		Comm.	Military*	Comm.*	Military*
115	5	MCV65LC	MCV65LM	MCV45LC	MCV45LM
115	25	MCV625LC	MCV625LM	MCV425LC	MCV425LM
115	75	MCV675LC	MCV675LM	MCV475LC	MCV475LM
115	125	MCV6125LC	MCV6125LM	MCV4125LC	MCV4125LM
115	175	MCV6175LC	MCV6175LM	MCV4175LC	MCV4175LM
115	250	MCV6250LC	MCV6250LM	MCV4250LC	MCV4250LM
115	375	MCV6375LC	MCV6375LM	MCV4375LC	MCV4375LM
115	500	MCV6500LC	MCV6500LM	MCV4500LC	MCV4500LM
115	750	MCV6750LC	MCV6750LM	MCV4750LC	MCV4750LM
115	1000	MCV61000LC	MCV61000LM	MCV41000LC	MCV41000LM
26	5	MCV654FC	MCV654FM	MCV454FC	MCV454FM
26	25	MCV6254FC	MCV6254FM	MCV4254FC	MCV4254FM
26	75	MCV6754FC	MCV6754FM	MCV4754FC	MCV4754FM
26	125	MCV61254FC	MCV61254FM	MCV41254FC	MCV41254FM
6.4	5	MCV65FC	MCV65FM	MCV45FC	MCV45FM
6.4	25	MCV625FC	MCV625FM	MCV425FC	MCV425FM
6.4	75	MCV675FC	MCV675FM	MCV475FC	MCV475FM
6.4	125	MCV6125FC	MCV6125FM	MCV4125FC	MCV4125FM

*Condensers are not provided with units. Where condensers are provided they are external to units.

AVAILABLE UPON REQUEST
MAGNETIC AMPLIFIERS AND SATURABLE TRANSFORMERS

FERROTRAN ELECTRONICS CO., INC.

MINIATURE TRANSFORMERS

Extremely small rectifier transformers with single or duel secondary winding for electronic designers who wish to design their own solid state power supplies. 115 volt A.C. input, 55-450 cycles ratings below give D.C. outputs for rectifier circuits with condenser input.

SUBMINIATURE UNITS

Channel-frame (1⅜"x1⅛"x1"W).

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
SM-1	10	80ma	$ 9.00
SM-2	15	60	9.00
SM-3	20	50	9.50
SM-4	30	30	9.50
SM-5	12, 12	30	13.00
SM-6	15, 15	25	13.00
SM-7	40	25	9.50
SM-8	50	20	9.50
SM-9	60	17	10.00
SM-10	70	15	10.00

MINIATURE UNITS

Channel-frame (1⅝"Lx1⅜"Hx1⅛"W).

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
R-1	40	35ma	$ 8.50
R-2	30	50	8.50
R-3	20	75	8.00
R-4	10	160	8.00
R-5	20, 20	50	11.00
R-6	15, 15	50	11.00
R-7	10, 10	75	11.00
R-8	6, 6	100	11.00
R-9	50	30	8.50
R-10	60	27	9.00
R-11	70	22	9.00
R-12	80	20	9.00
R-13	90	18	9.00
R-14	100	18	9.50
R-15	120	15	9.50
R-16	150	15	10.00
R-17	180	10	10.00
R-18	200	10	10.00

The R Series also available in epoxy case for printed circuit boards.

INTERMEDIATE UNITS

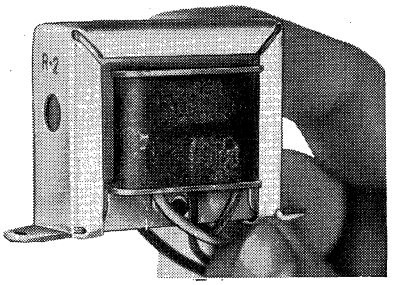
Channel-frame (2"Lx1⅝"Hx1¼"W).

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
I-1	10	300ma	$ 7.00
I-2	15	250	7.00
I-3	20	200	7.00
I-4	25	175	7.50
I-5	30	140	7.50
I-6	40	125	7.50
I-7	20, 20	125	10.00
I-8	15, 15	125	10.00
I-9	10, 10	150	10.00
I-10	50	80	8.00
I-11	75	60	8.50
I-12	100	35	8.50
I-13	150	30	9.00
I-14	180	30	9.50
I-15	200	25	9.50

SUBMINIATURE PC UNITS

Epoxy encapsulated transformers mounted on rigid epoxy forms; incorporates pins for direct soldering to printed circuit boards. (1⅝"x1¼"x1¼").

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
SM-1A	10	80ma	$11.00
SM-2A	15	60	11.00
SM-3A	20	50	11.50
SM-4A	30	30	11.50
SM-5A	12, 12	30	14.00
SM-6A	15, 15	25	14.00



R-2 TRANSFORMER (CHANNEL-FRAME)

STANDARD UNITS

Channel-frame (2¼"x2"x1⅝"W).

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
S-1	10	670ma	$ 7.50
S-2	15	500	7.50
S-3	20	300	8.00
S-4	30	225	8.00
S-5	50	125	8.50
S-6	20, 20	150	11.00
S-7	15, 15	200	11.00
S-8	10, 10	300	11.00
S-9	75	120	9.00
S-10	100	70	9.00
S-11	120	60	9.00
S-12	150	45	9.00
S-13	200	35	9.00

CM SERIES

Channel-frame (2⅝"x2 3/16"x1¾").

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
CM-1	10	1.0a	$ 8.00
CM-2	15	.75	8.00
CM-3	20	.60	8.00
CM-4	30	.40	8.00
CM-5	40	.3a	8.00
CM-6	80	.14	9.00
CM-7	100	.12	9.00
CM-8	120	.10	9.00
CM-9	150	.07	9.50
CM-10	175	.06	9.50
CM-11	200	.05	9.50

DESIGN INFORMATION

CENTER TAP — All units are center tapped. The ratings, therefore, are for a full-wave circuit. SM-7 thru 10, R-9 thru R-18, I-10 thru I-15, S-9 thru S-13, CM-6 thru CM-11, H-9 thru H-20, RT-6 thru RT-10 are not center tapped and are designed for a bridge circuit.

TEST VOLTAGE — 1000 V., D.C. between primary and secondary, and between secondary windings.

INSULATION — Nylon bobbin; insulating paper between each layer.

LEADS — Flexible leads rated for 105°C.

DUAL SECONDARIES — Transformers shown with two output units give indicated current from each tap.

All transformers listed may be wound for 220 v.a.c. input.

ALL TRANSFORMERS MAY BE WOUND WITH ELECTRO STATIC SHIELDS.

SEE SECTION 4000 FOR COMPLETE LIST OF FERROTRAN SOLID STATE POWER SUPPLIES

HIGH CURRENT UNITS

Channel-frame (3"Lx2½"Hx2"W).

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
H-1	10	1.3amp	$ 9.00
H-2	15	1.3	9.00
H-3	20	1.0	9.00
H-4	30	0.7	9.00
H-5	40	0.4	9.00
H-6	20, 20	0.5	11.00
H-7	15, 15	0.7	11.00
H-8	10, 10	1.0	11.00
H-9	80	.225	9.00
H-10	100	.180	9.00
H-11	120	.150	9.50
H-12	150	.130	9.50
H-13	175	.110	10.00
H-14	200	.100	10.00
H-15	225	90ma	10.00
H-16	250	80	10.50
H-17	275	70	10.50
H-18	300	65	10.50
H-19	400	50	11.00
H-20	500	40	11.00

RT SERIES

3¾" x 2⅝" x 3".

Model	Sec. D.C., Volts	Sec. D.C., Current	Price
RT-1	10	5amp	$15.00
RT-2	15	3.5	15.00
RT-3	20	2.5	15.00
RT-4	30	1.7	15.50
RT-5	40	1.3	16.00
RT-6	50	1.0	16.50
RT-7	75	.7	17.00
RT-8	100	.5	17.00
RT-9	120	.5	17.25
RT-10	150	.4	17.50
RT-11	180	.4	17.50
RT-12	200	.35	17.50

ISOLATION TRANSFORMERS

Model	Sec. Volts	Sec. Current	Price
IH	115v.	170ma	$9.00
ICM	115	100	8.00
IS	115	60	8.00
II	115	25	8.00
IR	115	14	9.00

ENCASED TRANSFORMERS

All listed transformers are available fully encapsulated in a MIL-T-27 can.

The cost of such units is an additional $11.00 for single secondary transformers and $13.00 additional for dual secondary units.

Standard connectors are of the hooked solder pin type (0.900" in dia.), mounted dead center on the stud side of the case.

Case types are as follows:

Series	Case	Size
SM	AH	1 5/16"x1 5/16"x1¼"
R	AJ	1⅝"x1 5/8"x2⅜"
I	AJ	1⅝"x1 5/8"x2⅜"
S	FB	2 5/16"x2 1/16"x2½"
CM	GB	2¾"x2⅜"x2 13/16"
H	GB	2¾"x2⅜"x2 13/16"
RT	JA	3 9/16"x3 1/16"x4⅞"

FERROTRAN ELECTRONICS COMPANY, INC.
683 BROADWAY ▪ NEW YORK, N.Y. 10012 ▪ PHONE 212-254-5810

specialty transformers

HIPOTRONICS®

. . . A COMPLETE RANGE OF SPECIALTY TRANSFORMERS FOR A WIDE VARIETY OF APPLICATIONS FOR INDOOR OR OUTDOOR USE — PLUS THE DESIGN AND MANUFACTURE OF TRANSFORMERS TO YOUR SPECIFICATIONS.

HIPOTRONICS' TRANSFORMER MANUFACTURING FACILITY IS AMONG THE MOST COMPLETE IN THE INDUSTRY, AND INCLUDES A VACUUM/PRESSURE VARNISH IMPREGNATING SYSTEM CAPABLE OF HANDLING COILS UP TO 7 FEET IN DIAMETER.

CORONA TEST

To assure high reliability and long life, all equipment is tested to Hipotronics' specification #2514 or #2515. These specifications require a corona detector with a basic sensitivity of 1 picocoulomb per centimeter.

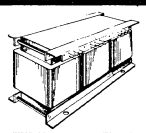
FILAMENT HEATER TRANSFORMERS

Specifications	Options	Applications
Power: as required Frequency: 25 Hz to 1 KHz Insulation: to 600 KV DC	Single or three phase Single or multi coil High voltage isolation Low capacitance High reactance (current limiting)	Oscillator tubes Power tubes Pulse applications (low capacitance) Cold filiment starting (high reactance)

FURNACE TRANSFORMERS

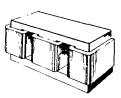
Specifications	Options	Applications
Power: up to 1000 KVA Frequency: 25 Hz to 60 Hz	Tapped primary or secondary (with switches) Water cooled Forced air cooled NEMA 1 or NEMA 12 enclosures	Electric furnaces High vacuum electric furnaces Resistive heating Wire annealing and preheating

PLATE TRANSFORMERS



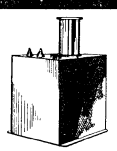
Specifications	Options	Applications
Power: up to 500 KV DC up to 2000 KVA Frequency: 25 Hz to 1 KHz	Tapped primary Epoxy encapsulation High impedance Oil or air insulation	Induction and dielectric heating X-ray equipment Electrostatic precipitators High power modulators Welding

SATURABLE REACTORS



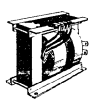
Specifications	Options	Applications
Power: up to 1000 KVA Frequency: 25 Hz to 1 KHz	Epoxy encapsulation Oil or air insulation Forced air, convection, or water cooled Multi-control windings Low turndown	Stepless power control for RF heating Resistance heating and annealing High vacuum furnace Capacitor charging Motor speed control Constant current control

HV AND/OR ISOLATION TRANSFORMERS



Specifications	Options	Applications
Power: up to 1000 KVA up to 500 KV rms Isolation: up to 500 KV Frequency: 25 Hz to 1 KHz	Single or three phase Epoxy encapsulation Oil, gas, or air insulation Multi-primary or secondary	Hipot testing Corona testing Laboratory power supplies Insulation and cable testing Laser power supplies Accelerator power supplies

CONSTANT VOLTAGE TRANSFORMERS



Specifications	Options	Applications
Power: up to 50 KVA Frequency: 50/60 Hz	Multiple inputs and/or outputs High voltage isolation Low capacitance Current limiting ± 2% output change for 15% line change	Oscillator tubes filiment Line voltage regulation

AUDIO TRANSFORMERS

Specifications	Options	Applications
Power: up to 500 KVA Frequency: 5 Hz to 50 KHz	Auto or isolated Multi-tapped outputs Air, oil, gas, or forced air insulation	Vibration testing Shaker amplifiers Ultrasonics

CHOKES

Specifications	Options	Applications
Reactive KVA: up to 2000 Voltage: up to 75 KV Isolation: up to 750 KV AC rms Frequency: DC to 25 KHz	Air or iron core Epoxy, oil, air or gas insulation Mechanically variable tapped, or multi-winding Water or forced air cooled	Filter chokes in DC supplies. Resonant charging, current limiting, AC line reactors Power factor correcting

HIPOTRONICS®

HIPOTRONICS, INC.

Brewster, N. Y. 10509 / (914) 279-8091

For more information on these and other specialized transformer applications, including balancing reactors, call or write Lou Torcicollo, Transformer Section Manager. See other Hipotronics listings under Test Instruments, Power Supplies, and Capacitors.

K.G.S. electronics, inc.

kgs electronics

2029 North Lincoln Avenue • Pasadena, California 91103 • Tel. (213) 798-0787

POWER TRANSFORMERS AND HIGH CURRENT CHOKES

Please refer to our ad, Page 2872, 1970/71 EEM for complete data.

ISOLATION TRANSFORMER

FEATURE:

- Designed to meet UL approval
- Built-in line cord and plug
- Built-in voltage meter
- Built-in circuit breaker protection
- Portable
- Dual Primary windings
- Electrostatic shield
- 50 Hz to 60 Hz

APPLICATION:

- 230 VAC to 115 VAC step-down
- 115 VAC to 230 VAC step-up
- Medical equipment
- House-hold appliances

HOW TO ORDER

IT - 500 - 115

IT: ISOLATION TRANSFORMER; 500: VA RATING; 115: SECONDARY VOLTAGE

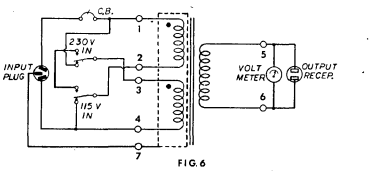


FIG. 6

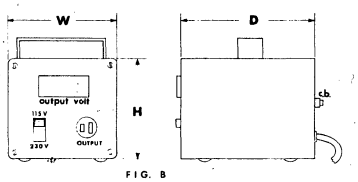


FIG. B

POWER RATING VA	PART NO.	VOLTAGE PRIMARY VAC	VOLTAGE SECONDARY VAC	DIMENSIONS IN INCHES W	D	H	APPROX. WEIGHT LBS.
500	IT-500	115/230	115	5¾	6½	4⅞	19
1000	IT-1000	115/230	115	6⅞	8	6	34
1500	IT-1500	115/230	115	8	9	6¾	42
2000	IT-2000	115/230	115	8	9¾	6¾	54

PART NO.	QUANTITIES FOR UNIT PRICE 1-5	6-11	12-24
IT-500	47.00	45.00	42.00
IT-1000	72.00	66.00	60.00
IT-1500	80.00	77.00	67.00
IT-2000	95.00	90.00	82.00

★400 Hz TRANSFORMERS

- Available immediately from stock.
- Secondary voltages between the standard units at no additional cost.
- Allow two weeks for non-standard voltage transformers.

★ APPLICATIONS:

- Isolation
- Power supplies
- Step-down

★ DESIGN INFORMATION:

- Transformers designed to meet MIL-T-27C per

TF 6 S X — ZZ

TF: Transformer Open Type; 6: 130°C; S: Open Type; X: (02) Rectified & (01) Unrectified Loads; ZZ: 10,000 Hrs. Minimum

- All primaries 115 Vac 380-1000 Hz.
- Transformer regulation is 6% no load to full load.
- All transformers have two secondary windings. They can be connected for parallel or series operation.
- Refer to POWER TRANSFORMER tables and schematics for rectified D.C. output information.

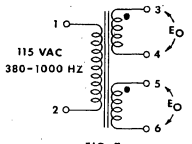


FIG. 7

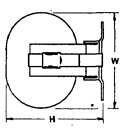
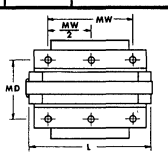


FIG. C



VA RATING	OVERALL DIMENSIONS W	H	L	MOUNTING DIMENSIONS MW	MW/2	MD	HOLE A	WT. LBS.
100	2½	2½	2⅜16	2⅛	NA	1⅛	3⁄16	1.25
250	3⅜	3⅜	3¼	2½	NA	1⅞16	5⁄32	2.50
500	4½	4⅜	4	3⅝	1⅜16	3	3⁄16	6.0
750	4¾	4½	4¼	3⅝	1⅜16	3	3⁄16	7.0

PART NUMBER VA RATING - SERIES	QUANTITIES FOR UNIT PRICE 1-5	6-11	12-24
100 - *	$16.80	$16.15	$14.70
250 - *	20.00	19.25	17.65
500 - *	31.50	30.00	27.50
750 - *	36.75	35.50	32.25

* Applicable Secondary Voltage

VA RATING	PART NUMBER	DUAL SECUNDARY Eo (RMS) P*	Eo (RMS) S*	AMPS (RMS) P*	AMPS (RMS) S*
100	CC100-6.3	6.3	12.6	16	8
	CC100-26	26	52	4	2
250	CC250-6.3	6.3	12.6	40	20
	CC200-26	26	52	10	5
500	CC500-6.3	6.3	12.6	80	40
	CC500-26	26	52	19	9.5
750	CC750-6.3	6.3	12.6	120	60
	CC750-26	26	52	30	15

* P = PARALLEL; S = SERIES

★HOW TO ORDER

CC 100 - 6.3 - *

"C" Core; 100: VA Rating; 6.3: Secondary Volts

Specify primary voltage if other than 115 Vac.

WIDEBAND TRANSFORMERS

FEATURE:

- Flat frequency response 20 Hz to 20 KHz ±1 DB.
- Hermetically sealed: MIL-T-27 Case size: JB.
- Finish: lead tin-fuse.
- Center-tapped secondary.
- Insulation: 1000 VDC.

APPLICATION:

- Impedance matching
- Audio output.

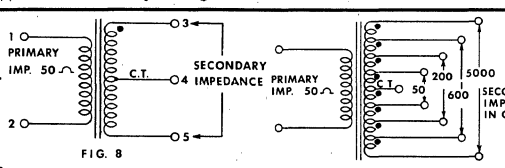


FIG. 8

FIG. 9

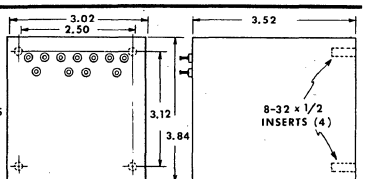


FIG. D

PART NO.	IMPED. IN OHMS PRIM.	IMPED. IN OHMS SECOND.	POWER RATING WATTS	SCHEMATIC FIG. NO.
WB-50	50	50	10	8
WB-200	50	200	10	8
WB-600	50	600	10	8
WB-5000	50	5000	10	8
WB-5265	50	50, 200 600, 5000	5	9

QUANTITIES FOR UNIT PRICE

PART NO.	1-5	6-11	12-24
WB-50	$51.00	$46.00	$42.00
WB-200	51.00	46.00	42.00
WB-600	51.00	46.00	42.00
WB-5000	51.00	46.00	42.00
WB-5265	56.00	51.00	47.00

HOW TO ORDER

WB - 50

Wide Band Transformer; Secondary Impedance

CONSULT FACTORY FOR:

1. Other impedance ranges.
2. Special applications.

SQUARE CORE SWITCHING TRANSFORMERS

DESIGN FEATURE:

- Designed to meet:
  - MIL-T-27C TF 5 S X — ZZ

Encapsulated; 130°C Temp.; Unrectified (01) Rectified (02); Life > 10,000 hrs.

  - Vibration • Humidity • Altitude • High Shock
- See Figures E and F for the mechanical configurations.
- See Figure 10, *Schematic for Possible Application.
- Tolerance: ±5%.
- Switching efficiency of 95% attainable.
- Isolated feedback windings.
- Secondary can be connected in series or parallel.
- Output power greater than 50 VA should be driven from another stage.
- Terminals for general application.
- Pins for printed circuit installation.
- Nomenclature simplified for ease of design selection.

APPLICATION:

- DC to AC inverter.
- DC to DC converter.
- DC isolation output AC or DC.
- DC to step-up or step-down.
- Volt-second support, saturable reactor

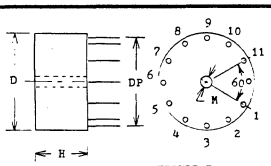


FIGURE F
P-Pin Configuration

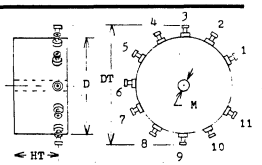


FIGURE E
T-Terminal Configuration

TABLE I — STANDARD SIZE AND COST

S SIZE	DIMENSIONS IN INCHES D	H	DT	HT	DP	M	WT. oz.	QUANTITIES FOR UNIT PRICE 1-5	6-11	12-24	25-49
8	.87	.50	1.18	.41	.80	.166	.45	$14.50	$13.85	$12.65	$12.05
10	1.00	.75	1.31	.66	.90	.166	.90	14.75	14.10	12.85	12.25
12	1.25	.75	1.56	.66	1.15	.166	1.80	15.10	14.50	13.25	12.60
15	1.50	1.00	1.81	.91	1.35	.166	4.00	16.00	15.30	14.00	13.30
17	1.75	1.00	2.06	.91	1.60	.166	4.80	16.25	15.55	14.20	13.50
20	2.00	1.25	2.31	1.16	1.80	.166	6.80	16.85	16.15	14.75	14.05

ALL TECHNICAL DATA AND PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
MINIMUM $25.00 PER ORDER. $10.00 PER ITEM. F.O.B., PASADENA, CALIF.

CONTINUED NEXT PAGE

K.G.S. electronics, inc.

kgs electronics

2029 North Lincoln Avenue • Pasadena, California 91103 • Tel. (213) 798-0787

SQUARE CORE SWITCHING TRANSFORMERS — Continued

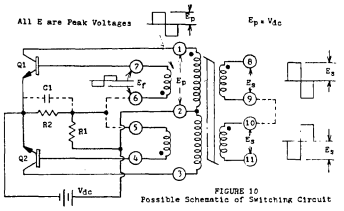


FIGURE 10
Possible Schematic of Switching Circuit

TABLE II — STANDARD RATING

S SIZE	RATING VA	SW FREQ. KHz
8	.4	.4
	1.0	1.0
	2.0	2.5
	4.0	10.0
10	1.0	.4
	2.5	1.0
	5.0	2.5
	10.0	10.0
12	2.0	.4
	5.0	1.0
	10.0	2.5
	20.0	10.0
15	5.0	.4
	12.0	1.0
	25.0	2.5
	50.0	10.0
17	12.0	.4
	25.0	1.0
	50.0	2.5
	100.0	10.0
20	25.0	.4
	50.0	1.0
	100.0	2.5

HOW TO ORDER

- Refer to Table I for physical size and cost.
- Refer to Table II for secondary volt-ampere rating and switching frequency that correspond to Table I.
- Recommended % feedback range should be such that it will drive the base of the switching transistor by 1.5 to 2.0 v peak.
- Follow the nomenclature shown below to specify your requirements when placing an order.

NOMENCLATURE: (A sample is shown below).

S12 - 10 - 2.5 - 28 - 6 - 50 - T or P

- S12 — Switching Transformer Size
- 10 — Power Rating in VA
- 2.5 — Switching Frequency in KHz
- 28 — Nominal DC Input Voltage, V_{dc}
- 6 — % feedback (E_f/E_p x 100)
- 50 — Secondary Voltage, E_s in Peak (125 v Max.)
- T or P — Specify Configurations

*Contact factory for the recommended transistors and switching circuit techniques.

CURRENT TRANSFORMERS

CT SERIES

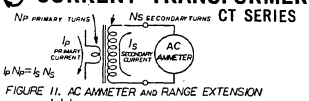


FIGURE 11. AC AMMETER AND RANGE EXTENSION

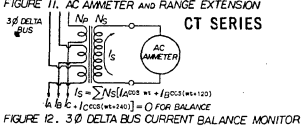


FIGURE 12. 3Ø DELTA BUS CURRENT BALANCE MONITOR

CMC SERIES

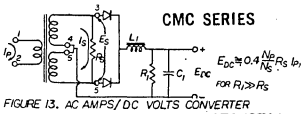


FIGURE 13. AC AMPS/DC VOLTS CONVERTER

CTA/CTAA SERIES

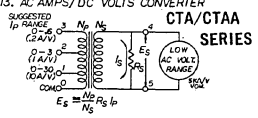


FIGURE 14 AMPS/VOLTS CONVERTER

Series	Typical Application Figures	Available Current Range Table	Description
CT	11 & 12	III	60-400 Hz toroidal type. Primary is single turn provided by conductor under test. Secondary drives 1 ampere or 5 ampere AC ammeter.
CMC	13	IV	60-400 Hz EI type. Multiple-turn primary transforms AC current to proportional AC secondary voltage for AC/DC control.
CTA	14	V	50-3 KHz multi primary current range toroidal type. This Series conveniently converts low AC voltmeter range into AC current meter. R_s = 150 ohms supplied per Fig. 14.
CTAA	14	V	Compact, assembled adaptor unit, using CTA Series, to convert quickly a typical VOM to measure AC current.

Refer to Table VI for size.

TABLE III

CT Series Size	Primary Current Amperes	Secondary Meter Current Amperes	Capacity VA @ 60 Hz	Second. Support V RMS @ 60 Hz Max.	Tracking Deviation ±%
11	20	1	2	2	2
	50	1	2	4	1.5
	100	1	2	9	1
51	40	5	5	1	6
	60	5	5	1.5	6
	100	5	5	2.5	6
52	120	5	5	3	2
	200	5	5	5	1.5
	400	5	5	9	1
53	500	5	5	3	1.5
	800	5	5	5	1
	1000	5	5	6	.5

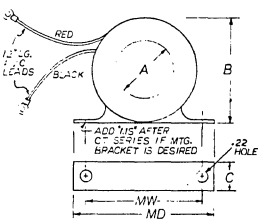


FIGURE G. CT SERIES

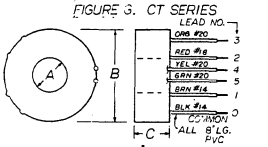


FIGURE K. CTA/CTAA SERIES

TABLE VI

SIZE	FIGURE	SERIES	DIMENSIONS IN INCHES A	B	C	MD	MW	WT. (lbs.)
11	G	CT	1 1/8	2 7/16	1 1/8	3 5/16	2 11/16	0.8
51	G	CT	1 1/4	2 7/8	1 1/8	3 3/4	3 1/8	1.2
52	G	CT	1 5/8	3 3/8	1 1/2	4 1/4	3 5/8	1.6
53	G	CT	1 3/4	3 7/8	1 5/8	4 3/4	4 1/8	1.4
37		CMC	1 15/32	1 3/16	1 5/16	2 1/16	1 3/4	0.22
CTA 1	K	CTA	5/8	2	1	—	—	.4
CTAA 1		CTAA	2 1/8	2 5/16	1 3/4	—	—	.8

TABLE IV

CMC Series Size	Primary Current Amperes	Burden RS (Ohms) @ 60 Hz	Secondary V RMS @ 60 Hz	Tracking Deviation ±%
37	0-1	1000	20	3
	0-5	1000	20	3
	0-10	1000	20	3
	0-20	1000	20	3

Size	Quantities for Unit Price 1-5	6-11	12-24	For "MB" Add (ea)
CT11	$10.25	$ 9.75	$ 8.90	$ .75
CT51	11.35	10.85	9.95	.75
CT52	13.55	13.00	11.85	1.00
CT53	15.70	15.05	13.75	1.00
CMC37	6.25	6.00	5.45	—
CTA 1	13.30	12.75	11.65	—
CTAA 1	18.00	17.30	15.70	—

TABLE V

CTA/CTAA Series Part No.	Primary Ampere Ranges	Full-Scale Deflection @5K/Vac	Tracking Deviation %	Size
CTA-3	.6A, 3A, 30A	3	2	CTA 1
CTAA-3	.6A, 3A, 30A	3	2	CTAA 1

HOW TO ORDER

- CT11 - * - 1 - MB
  - MB — Add "MB" for mounting brackets. See Fig. G.
  - 1 — Secondary current.
  - * — Primary current to be measured.
  - CT11 — Series type and size.
- CMC37 - * - 20
  - 20 — Secondary RMS voltage, E_s.
  - * — Primary current.
  - CMC37 — Series type and size.
- **CTA and CTAA SERIES** — Order per part number in TABLE V.

POT CORE INDUCTORS

FEATURES:

- Low cost but high quality inductors.
- High Q factor.
- Stable temperature range −30°C to +70°C.
- Designed to meet Mil-T-27C quality.

APPLICATIONS:

- Tank circuits.
- High pass filter.
- Low pass filter.
- Band pass filter.
- Volt-second averaging.

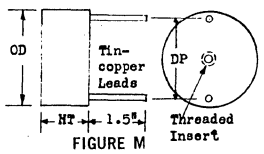


FIGURE M

SIZE	INDUCTANCE L (mh)	NOMINAL DCR (Ohms)	DC (A) CURRENT FOR 5% L DROP
11	1	2.5	.3
11	10	12	.08
11	50	45	.02
18	1	2.6	.7
18	10	6.2	.2
18	50	18	.06
18	100	38	.04
26	1	.7	1.5
26	50	8	.15
26	200	26	.05
26	300	26	.02
36	1	.3	1.2
36	50	2.2	.14
36	300	12	.03
36	500	18	.02

SIZE	DIMENSIONS IN INCHES OD	HT	DP	APPROX. WT. (oz)	THREADED INSERT
11	.62	.31	.50	.3	None
18	.82	.48	.70	.5	None
26	1.12	.70	1.00	1.3	None
36	1.50	1.00	1.40	3.6	4-40

SIZE	QUANTITIES FOR UNIT PRICE 1-5	6-11	12-24
11	$4.85	$4.65	$4.25
18	4.85	4.65	4.25
26	4.85	4.65	4.25
36	8.00	7.65	7.00

HOW TO ORDER

Listed are only representative values. Order desired inductance at required DC current levels as follows:

PC18 10

- PC18 — PC inductor and size
- 10 — Inductance in MH

Consult factory for large listing of other values and types available.

ALL TECHNICAL DATA AND PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
MINIMUM $25.00 PER ORDER. $10.00 PER ITEM. F.O.B., PASADENA, CALIF.

MICROTRAN

PLUG-IN PRINTED CIRCUIT POWER TRANSFORMERS and CHOKES

145 E. MINEOLA AVE. • VALLEY STREAM, N.Y. 11582 • PHONE: (516) 561-6050 • TWX: 510-225-8412

Plug-in printed circuit transformers designed for use in latest solid state circuitry application such as power supplies, control equipment and instrument applications. Units in this series provide a voltage step down and isolation from power line at relatively low power levels.

Smaller in size, designed for increased power ratings for optimum equipment miniaturization. Precision spaced plug-in terminals provide fixed mounting centers, found only in expensive molded transformers. Constructed in accordance with MIL-T-27 Grade 6, Class R. Class S available on special order.

Secondaries may be parallel connected to obtain twice the current rating or series connected to give twice the voltage.

Primary 115 volts. Also available from stock with 115/230 volt primary.

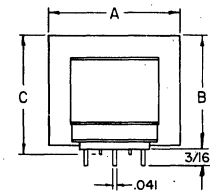
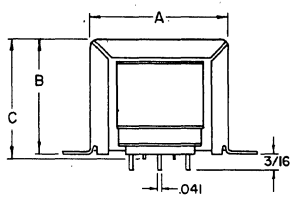
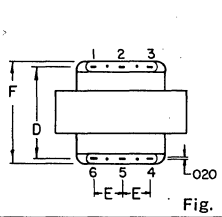


Fig. U





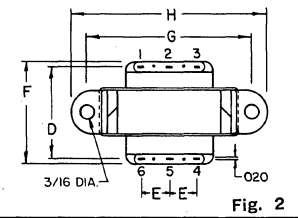


Fig. 2

400 Hz PLUG-IN PC POWER — 115V PRIMARY

Catalog No.	Secondary Parallel	Secondary Series	Net Each 1-9★
PC4304	3.15V @ .1A	6.3V CT @ .05A	$4.35
PC4312	12.6V @ .026A	25.2V CT @ .013A	4.50
PC4316	28V @ .012A	56V CT @ .006A	4.50
PC4320	35V @ .01A	70V CT @ .005A	4.65
PC4408	6.3V @ 0.60A	12.6V CT @ .30A	4.50
PC4412	12.6V @ 0.30A	25.2V CT @ .15A	4.50
PC4416	28V @ 0.14A	56V CT @ .07A	4.65
PC4424	40V @ 0.10A	80V CT @ .05A	4.65
PC4428	58V @ .066A	116V CT @ .033A	4.80
PC4432	115V @ .010A, 12.6V @ .150A		4.95

50/60 Hz PLUG-IN PC POWER — 115V PRIMARY

PC6506	6.3V CT @ .250A (Single Secondary)		$5.10
PC6512	12.6V @ .120A	25.2V CT @ .060A	5.40
PC6524	40V @ .040A	80V CT @ .020A	5.25
PC6528	58V @ .026A	116V CT @ .013A	5.25
PC6608	6.3V @ .70A	12.6V CT @ .35A	5.10
PC6616	28V @ .156A	56V CT @ .078A	5.25
PC6624	40V @ .110A	80V CT @ .055A	5.40
PC6628	58V @ .066A	116V CT @ .033A	5.40
PC6632	115V @ .020A, 12.6V @ .150A		5.70
PC6708	6.3V @ 1.2A	12.6V CT @ .60A	5.25
PC6712	12.6V @ .6A	25.2V CT @ .30A	5.25
PC6716	28V @ .27A	56V CT @ .135A	5.25
PC6724	40V @ .18A	80V CT @ .090A	5.40
PC6728	58V @ .13A	116V CT @ .065A	5.40
PC6732	115V @ .025A, 12.6V @ .250A		5.70

DIMENSIONS

Series	Fig.	A	B	C	D	E	F	G	H	Wt. Oz.
PC4300	U	49/64	23/32	†	.420	.187	11/16	—	—	.5
PC4400	U	1 1/64	27/32	†	.781	.200	6 1/64	—	—	1.2
PC6500	U	1 25/64	1 11/64	1 13/64	1.00	.312	1 5/32	—	—	3.2
PC6600	2	1 45/64	1 25/64	1 7/16	1.10	.400	1 1/4	2	2 3/8	6.5
PC6700	2	1 61/64	1 41/64	1 11/16	1.30	.400	1 15/32	2 3/8	2 13/16	9.5

† Do not have standoff.

MINIATURIZED INDUSTRIAL TRANSFORMERS AND CHOKES

60 Hz CONTROL/POWER SUPPLY TRANSFORMERS

For low voltage, high current applications such as filament supplies relays silicon rectifiers etc. Primary 105/115/125 VAC. D.C. Output for resistive or inductive load. Output volts based on 1V approximate drop per rectifier. Open frame.

Part No.	Secondary AC Volts	RMS Amp	Rectifier Circuit CT Full Wave DC Volts *	F.W. Bridge DC Volts ‡	Dimensions L	W	H	Mounting Centers	Fig.	Net Each 1-9★
M8242	6.3 CT	.6	1.9	3.8	2 3/8	1 3/8	1 1/2	2	X	$7.65
M8243	6.3 CT	2.0	1.9	3.8	3 1/4	1 5/8	1 15/16	2 13/16	X	9.00
M8286	6.3 CT	6.0	1.9	3.8	3 11/16	2 1/8	2 1/4	3 1/8	X	8.85
M8287	12.6 CT	3.0	4.7	9.4	3 11/16	2 1/8	2 1/4	3 1/8	X	8.85
M8247#	12	4.0	9.9§	19.8§	4 1/8	3 1/8	3 3/4	3 7/16 x 2 1/2	Y	17.40
	12	4.0								
M8244	12.6 CT	2.0	10.5§	21§	3 5/8	2 7/8	3 5/32	2 13/16 x 2 1/2	Y	12.00
	12.6	2.0								
M8222	18.5 CT	3.0	7.4	14.8	3 3/8	2 1/2	3 5/32	2 13/16 x 2 1/8	Y	11.70
M8288	26 CT	2.5	10.8	21.6	3	2 3/4	2 3/4	2 1/2 x 2 3/8	Y	12.15
M8245	28 CT	.6	11.7	23.4	3 1/4	2 1/8	1 15/16	2 13/16	X	9.60
M8255	30 CT	2.5	12.5	25	3 3/4	2 3/4	3 15/32	3 1/8 x 2 1/4	Y	12.90
M8223	35 CT	3.0	14.5	29	4 1/8	3	3 3/4	3 7/16 x 2 3/8	Y	16.35
M8289	40 CT	.1	17	34	2 3/8	1 3/8	1 1/2	2	X	7.80
M8290	40 CT	.3	17	34	2 13/16	1 5/8	1 7/8	2 3/8	X	8.70
M8291	40 CT	.75	17	34	3 11/16	2 1/8	2 1/4	3 1/8	X	9.45
M8246	49 CT	2.5	21	42	4 1/2	3 1/4	4 1/32	3 3/4 x 2 1/2	Y	19.65
M8224	70 CT	1.0	30	60	3 3/4	2 3/4	3 15/32	3 1/8 x 2 1/4	Y	12.45
M8256	80 CT	.6	35	70	3	2 3/8	2 3/4	2 1/2 x 2 3/8	Y	12.45

* C.T. Full wave ; ‡ bridge; § series; # Sec. connected in series, 24V @ 4A; parallel connected 12V @ 8A. All units color coded leads

60 Hz ISOLATION AND POWER TRANSFORMERS

With center tap for use in either full wave bridge or full wave C.T. circuitry. Electrostatic shielding. Open frame — Fig. X except M8278 — Fig. Y.

Part No.	Input Voltage	Output Voltage	Current RMS Amps	V.A. Rating	Dimensions L	W	H	Mounting Centers	Fig.	Net Each 1-9★
M8294	115	115 CT	.0085	1	2 1/8	1 1/8	1 3/16	1 3/4	X	$5.55
M8295	115	115 CT	.030	3.5						
		12.6 CT	.25	3.15	2 13/16	1 1/8	1 5/8	2 3/8	X	11.40
		12.6	.25	3.15						
M8251	115	115 CT	.13	15	3 1/4	1 5/8	1 15/16	2 13/16	X	13.20
M8296*	115	115 CT	.35	40	4	2 1/4	2 9/16	3 9/16	X	12.15
M8278*	115	115 CT	.9	100	3 3/4	3 1/4	3 15/32	3 1/8 x 2 3/4	Y	17.55

* Primary 105/115/125 Volts. All units color coded leads

MICROPHONE INPUT TRANSFORMERS

Broadcast fidelity type, double mu metal shielded. M8030 designed to replace Ampex No. 1733-1. Frequency response ±2 db, 20-20,000 Hz except M8027, 50-20,000 Hz and M8031, 30-20,000 Hz. Magnetic shielding, 65 db; low level, 5 dbm.

Part No.	Pri. Imp.	Sec. Imp.	Magn. Shldg.	Level DBM	Frequency Response ±2db	Dimensions	Fig.	Net Each 1-9★
M8027	200	40,000	25	+5	50-20,000	2 3/4 x 1 3/16 x 7/8	AA	$9.00
M8030	200/50 CT	50,000	65	+5	20-20,000	2 1/8 x 1 1/8 D	T	17.55
M8031	600 CT/150	50,000	65	+5	30-20,000	2 1/8 x 1 1/8 D	T	18.45
M8032	250 CT	50,000	65	+5	20-20,000	2 1/8 x 1 1/8 D	T	16.65
M8033	50 CT	50,000	65	+5	20-20,000	2 1/8 x 1 1/8 D	T	16.65
M1-S	50/250 CT/ 600 CT	50,000	65	+5	20-20,000	1 17/32 x 1 1/16 D	H	12.90

DECI-MINIATURE PC AUDIO TRANSFORMERS AND CHOKES

Primary and secondary windings may be interchanged to obtain varied matching requirements such as input, interstage, output and isolation. Designed for printed circuits; frequency response ±2 db, 200-15,000 Hz. Size: 13/16"W x 19/32"D x 3/4"H. Open frame — plug-in design. Fig. U.

Part No.	Primary Impedance	Secondary Impedance	Pri. DC Unbalance Ma.	Operating Level DBM	Net Each 1-9★
DCM1-PC	25000 CT	1200 CT	2	18	$4.95
DCM2-PC	15000 CT	1200 CT	3	19	5.10
DCM3-PC	15000 CT	600 CT	3	19	4.80
DCM4-PC	10000 CT	5000 CT	4	20	4.95
DCM5-PC	10000	2500/625 Split	2	20	4.95
DCM6-PC	10000 CT	1500 CT	4	20	4.65
DCM7-PC	5000 CT	80000 CT	6	15	5.25
DCM8-PC	4000 CT	1200 CT	6	20	4.50
DCM9-PC	4000 CT	600 CT	6	20	4.35
DCM10-PC	4000	600/150 Split	3	20	4.80
DCM11-PC	2500 CT	2500 CT	8	20	4.50
DCM12-PC	2500	2500/625 Split	4	20	4.80
DCM13-PC	2500 CT	625 CT	8	20	4.35
DCM14-PC	2500 CT	200 CT	8	20	4.20
DCM18-PC	600 CT	50000 CT	16	20	4.65
DCM19-PC	600	8000/2000 Split	8	20	4.80
DCM20-PC	600 CT	200 CT	16	20	4.05
DCM21-PC	600 CT	600 CT	16	20	4.05
DCM22-PC	250 CT	600 CT	25	20	4.05
DCM51-PC	Choke 10 hy @ 0 ma dc	5 hy @ 3 ma dc		300 Ω DCR	3.60
DCM52-PC	Choke 5 hy @ 0 ma dc	2 hy @ 5 ma dc		155 Ω DCR	3.30
DCM53-PC	Choke 2.5 hy @ 0 ma dc	1 hy @ 7 ma dc		75 Ω DCR	3.15

FILTER INDUCTORS

For transistor and low voltage applications. May be connected in series or parallel for varied inductive requirements. 1500 V test. Model numbers for MIL Type TF4RXO4 (Fig. P) are listed on left. Open frame model numbers are listed on right.

HERMETICALLY SEALED CONSTRUCTION

HERMETIC Part No.	Series Connected Inductance Henrys	D.C. Amps	D.C.R. Ohms	Parallel Connected Inductance Henrys	D.C. Amps	D.C.R. Ohms	MIL Case Fig. P xx	Net Each 1-9*
M8098	3.5	.050	200	.875	.10	50	AH	$9.90
M8099	1.0	.15	65	.25	.30	16	AJ	12.90
M8100	.5	.3	30	.125	.6	7.5	EB	14.70
M8101	.32	.6	16	.08	1.2	4	FB	16.65
M8102	.2	1.0	4	.05	2.0	1	JA	21.60
M8103	.07	2.5	.84	.0175	5.0	.21	JA	24.00
M8104	.022	4.0	.4	.0055	8.0	.1	JA	22.80
M8105	.022	5.0	.2	.005	10.0	.05	KA	25.65

OPEN FRAME CONSTRUCTION

OPEN Part No.	L	W	H	Mtg. Centers	Fig.	Net Each 1-9★
M8198	2 1/8	1 1/8	1 3/16	1 3/4	X	$3.60
M8199	2 3/8	1 1/4	1 1/2	"	X	3.75
M8200	2 13/16	1 3/8	1 5/8	2 3/8	X	5.85
M8201	3 1/4	1 5/8	1 15/16	2 13/16	X	6.60
M8202	3 3/4	2 3/8	3 3/32	2 13/16 x 2 1/8	Y	10.05
M8203	3 3/4	2 7/8	3 15/32	3 1/8 x 2 1/2	Y	12.90
M8204	3 3/8	2 3/4	3 3/32	2 13/16 x 2 1/2	Y	12.60
M8205	4 1/2	3 7/8	4 1/32	3 3/4 x 2 1/2	Y	17.25

IMMEDIATE DELIVERY FROM STOCKING DISTRIBUTORS

★ Quantity pricing schedule is as follows: 10-49 less 10%, 50-99 less 16⅔%, 100-249 less 33⅓%. Contact factory for prices over 249.

MICROTRAN

MINIATURIZED AUDIO 400 Hz ISOLATION AND POWER

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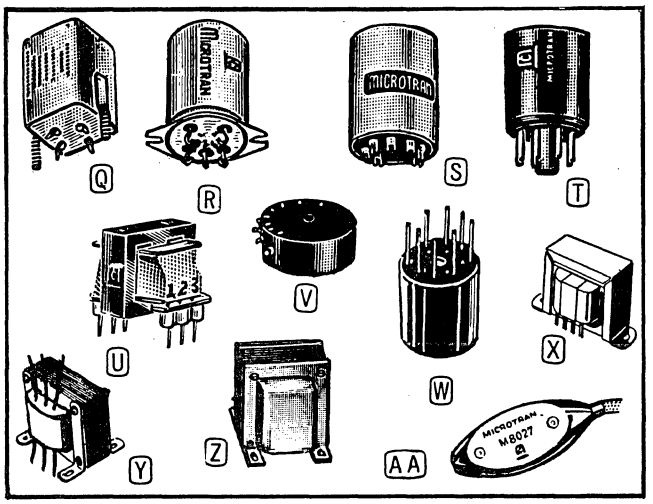

MINIATURE TRANSISTOR AND AUDIO TRANSFORMERS — M AND MT SERIES

M-M (Fig. O): Molded, for plug-in printed circuit use. Cast epoxy resin provides highest resistance to temperature extremes. MIL Types TF5RX—ZZ (Insert MIL No. from table). Max. Size, 1 5/32" x 7/8" x 7/8". Wt., 1¾ oz. **M-AG (Fig. Q):** Enclosed in modified MIL-T-27B AG case with compression sealed ceramic terminals. MIL Type TF4RX—YY. Max. Size, 1" x 1" x 1⅜". Wt., 2⅜ oz. **M-H (Fig. R):** Hermetically sealed with high compression glass terminals, gray enamel finish. Available on special order with .120" holes. MIL Type TF4RX—YY. Size, 1 5/16" dia. x 1 7/16" max. Wt., 1¼ oz. **M-A (Fig. S):** Aluminum case with 2-56 screws. MIL Type TF3RX—YY. Size, .875" dia. x 1 3/16". Wt., 1.25 oz. **M-FB (Fig. L):** Open frame with channel. Available with plug-in tab channel or without channel on special order. MIL Type TF6RX—ZZ. Size, 1 3/64" x 1 3/16" x 2 7/32" max., plus tabs. Wt., 1.13 oz. **M-P (Fig. T):** Octal plug-in type in sealed plastic housing. MIL Type TF6RX—ZZ. Size, 1 3/32" dia. x 1 15/32". Wt., 2 oz. **M90 Shield (Fig. E):** 25 db magnetic shield for Type M-A. Two clearance holes on 1 11/16" centers. **M-PC (Fig. U):** Open frame PC with terminals molded into bobbin to maintain accurate dimensions for PC board. MIL Type TF6RX—ZZ. Size, 7/8" x 1 1/32" x 1"; terminals 3/16" below bobbin. Wt., 1.2 oz. **M-CM (Fig. M):** Contour molded on special order only; for mtg. on top of chassis. Size, 1 5/32" x 7/8" x 7/8". Prices on request.

MINIATURE AUDIO TRANSFORMERS — M SERIES

Part No.†	Primary Impedance	Secondary Impedance	Pri. D.C. Unbalance Ma.	Operating Level DBM	Frequency Response ±2 db	MIL No.	Net Each, Lots of 1-9★ -A	-AG	-FB -PC	-H	-M	-P
M3-	7.5/30	50,000	0	5	20-20,000	10	$9.60	$10.80	$5.70	$10.50	$10.65	$9.75
•M12-	50/250 CT	50/250/600 CT	0	8	20-20,000	16	9.90	10.80	5.85	10.50	10.80	10.20
•M1-	50/250/600 CT	50,000	0	5	20-20,000	10	9.90	10.80	5.85	10.50	10.80	9.90
M1-S-	Same as M1 above — with dual nickel alloy shield — see Fig. H.						12.90	(M1-S Pricing)				
•M2-	50/250/600 CT	50,000 CT	0	5	20-20,000	10	10.20	11.10	6.30	10.80	11.10	10.20
M14-	200	½ Megohm	0	9	80- 3,000	10	9.45	10.80	5.25	10.50	11.10	10.20
M15-	10,000	1 Megohm	0	11	100- 2,500	10	9.45	10.20	5.40	9.90	10.50	10.20
•M8-	15,000	50/250/600 CT	0	8	20-20,000	16	9.90	10.65	6.00	10.35	11.25	10.20
•M9-	15,000	50/250/600 CT	4	21	150-20,000	13	9.90	10.80	5.85	10.50	11.25	10.20
M4-	15,000	60,000	0	6	20-15,000	10	8.40	9.45	5.10	9.15	9.45	8.85
M5-	15,000	60,000	4	14	200-20,000	15	8.55	9.30	4.95	9.00	9.30	8.85
M6-	15,000	95,000 CT	0	5	20-15,000	10	9.60	10.35	5.25	10.05	10.35	9.60
M7-	15,000	95,000 CT	4	11	200-20,000	15	9.60	10.20	5.10	9.90	10.65	9.60
•M10-	30,000 CT	50/250/600 CT	0	8	30-50,000	16	10.35	11.10	6.30	10.80	11.85	10.35
•M11-	50,000	50/250/600 CT	0	5	20-20,000	16	9.90	10.80	5.85	10.50	10.80	10.20
M13-	Reactor	300 hy. 0 d.c. 50 hy. @ 3 ma.			6000 Ω D.C.R.	20	8.10	9.00	4.20	8.70	8.85	8.55
M90	Magnetic Shield Mu-Metal slip on can for MA Series. 25 db shielding.						1.50	(M90 Pricing)				

MINIATURE TRANSISTOR TRANSFORMERS — MT SERIES

•MT2-	100	10 CT/40 CT	100	27	200-20,000	17	$9.00	$9.60	$4.20	$8.70	$9.90	$8.25
MT30-	250 CT	500	10	30	200-15,000	17	8.70	9.30	4.05	8.40	9.60	7.95
MT23-	250 CT	1,000	10	30	200-15,000	17	8.70	9.30	4.05	8.40	9.60	7.95
MT14-	400	10	50	25	200-20,000	17	8.10	8.70	3.75	7.80	9.00	7.35
•MT15-	500 CT	210	30	27	300-20,000	17	8.70	9.30	4.05	8.40	9.60	7.95
MT1-	600	600	10	23	200-15,000	17	8.10	8.70	3.75	7.80	9.00	7.35
††MT35-	600	600 CT & 600 CT	0	5	40-20,000	16	9.90	10.50	5.85	9.60	10.95	9.15
MT26-	600 CT	600 CT	20	23	200-15,000	17	8.85	9.45	4.50	8.55	10.65	8.10
MT9-	600 CT	1,200 CT	4	23	200-15,000	17	9.00	9.60	4.65	8.70	9.90	7.80
•MT33-	600/150 Split	600/150 Split	20	23	200-20,000	17	9.30	9.90	5.25	9.00	10.20	8.55
•MT22-	600/150 Split	1,200 CT	4	23	200-15,000	17	9.15	9.75	5.25	8.85	10.05	8.40
MT29-	1,600 CT	450	15	30	200-15,000	13	8.70	9.30	4.05	8.40	9.60	7.95
MT12	2,000	3.4	10	32	200-15,000	13	8.70	9.30	4.05	8.40	9.60	7.95
•MT24-	2,500	600 CT	10	32	200-15,000	13	8.70	9.30	4.05	8.40	9.60	7.95
•MT13-	4,000 CT	3.4	3	32	200-15,000	13	8.85	9.45	4.20	8.55	9.75	8.10
MT11-	4,000 CT	600 CT	3	32	200-15,000	13	9.00	9.60	4.50	8.70	9.90	8.25
•MT21-	4,000 CT	600/150 Split	3	32	200-15,000	13	9.15	9.75	5.25	8.85	10.05	8.40
MT25-	7,500 CT	600 CT	8	32	200-15,000	12	9.00	9.60	4.50	8.70	9.90	8.25
•MT34-	10,000/2,500 Split	2,000/500 Split	4	20	200-20,000	13	9.45	10.05	5.40	9.15	10.35	8.70
•MT10-	25,000	600	3	22	200-15,000	13	8.70	9.30	4.05	8.40	9.60	7.95
•MT7-	25,000	1,200 CT	3	22	200-15,000	13	8.85	9.45	4.65	8.55	9.75	8.10
•MT18-	25,000 CT	1,200 CT	6	22	200-15,000	13	9.00	9.60	4.80	8.70	9.90	8.25
MT5-	50,000	6	3	20	300-15,000	13	8.70	9.30	4.50	8.40	9.60	7.95
MT3-	50,000	600	3	20	300-15,000	13	8.70	9.30	4.50	8.40	9.60	7.95
MT8-	50,000 CT	1,200 CT	3	20	300-15,000	13	9.00	9.60	4.80	8.70	9.90	8.25
•MT20-	50,000 CT	1,200/300 Split	3	20	300-15,000	13	9.30	9.90	4.80	9.00	10.20	8.55
MT6-	100,000	1,200 CT	1.4	17	200-15,000	13	8.85	9.45	4.80	8.55	9.75	8.10

•Not available in P.C. construction. ††For telephone line coupling or hybrid telephone line. † ORDER BY COMPLETE MICROTRAN NUMBER (M1-A)

400 Hz ISOLATION TRANSFORMERS (FIG. P)

Electrostatic shielding. Also for use in either FW bridge or FW CT circuit. MIL Type TF4RX01—.

Micro. No.	Input Volts	Output Volts	rms Amps	VA	Size, Inches W. x D. x H.	MIL Case	Net 1-9★
M8058†	115	115 CT	.017	2	1 5/16 dia. x 1 7/16	YY	$10.20
M8059	115	115 CT	.35	40	1 13/16 x 1 15/16 x 2 7/16	EB	17.10
M8060	115	115 CT	1.3	150	2⅜ x 2¾ x 3 13/16	GA	28.50
M8061	115*	115 CT	2.6	300	3 1/16 x 3 9/16 x 4⅞	JA	48.00
M8062	115*	115 CT	4.4	500	3⅜ x 3 15/16 x 5¼	KA	55.50
M8082†	26	12.6 CT	.15	1.9	1 5/16 dia. x 1 7/16	YY	10.50
		12.6	.15	1.9			
M8083	115	115 CT	.03	10	1⅝ x 1⅝ x 2⅜	AJ	18.60
		12.6 CT	.25	total			
		12.6	.25				
M8084	115	115 CT	.12	14	1⅝ x 1⅝ x 2⅜	AJ	16.50
M8085	115	115 CT	.7	80	2 1/16 x 2 5/16 x 3⅛	FA	34.20

*Primary 105/115/125 V. †Fig. K.

400 Hz TOROIDAL POWER TRANSFORMERS (FIG. W)

Ideal for applications requiring minimum size and weight. Feature epoxy molded case and printed circuit pins which can be bent for chassis mounting. Toroidal cores provide greater efficiency and low phase shift. All have 115 V primary windings and center .170" clearance hole for #8 screw. MIL Type TF5SX01ZZ.

Micro. No.	Secondary V	Secondary mA	VA	Size, Inches O.D. x Ht.	Wt., Oz.	Net Ea., 1-9★
M8106	28 CT	320	9	1 5/32 x 1⅛	2	$17.55
M8107	28 CT	710	20	1½ x 1¼	4	17.10
M8108	56 CT	160	9	1 5/32 x 1⅛	2	17.10
M8109	56 CT	356	20	1½ x 1¼	4	17.55
M8110	115 CT	78	9	1 5/32 x 1⅛	2	18.60
M8111	115 CT	170	20	1½ x 1¼	4	16.80

IMMEDIATE DELIVERY FROM STOCKING DISTRIBUTORS

★ Quantity pricing schedule is as follows: 10-49 less 10%, 50-99 less 16⅔%, 100-249 less 33⅓%. Contact factory for prices over 249.

MICROTRAN

MINIATURIZED AUDIO CHOPPER INPUT TRANSFORMERS

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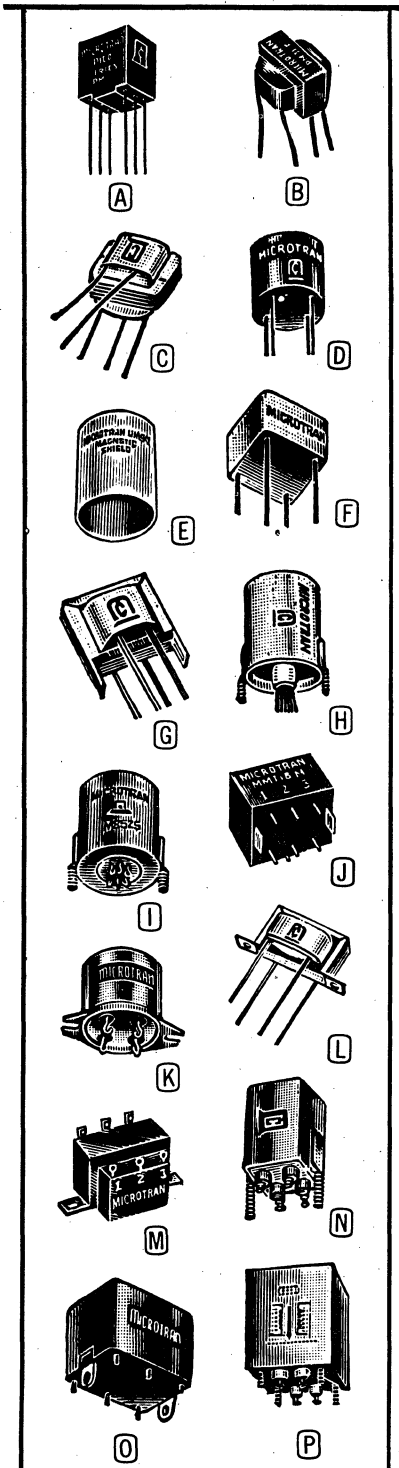


PICO MINIATURE TRANSFORMERS — PM SERIES

PM-M (Fig. A): Epoxy molded finish; gold plated leads, 0.020" x ¾". Frequency response ±2 db, 300 Hz to 100 kHz (PM3 and PM5, to 45 kHz). Power level given for 15% max. distortion, except PM35, 20% and PM37, 25%. Size, .410" x .465" x .310" max. Wt., 0.1 oz. MIL type TF5RZ—ZZ. **PM-F (Fig. B):** Open frame, resin impregnated, 4" #30 plastic leads. Size, .250" x .375" x .406" max. Wt., .05 oz. MIL type TF6RX—ZZ.

† ORDER BY COMPLETE MICROTRAN NO. (PM3-M)

Part No.†	Primary Impedance	Secondary Impedance	Unbal. Pri. DC Ma	Pri. D.C.R.	Sec. D.C.R.	Power Level MW.	MIL No.	Net Each Lots of 1-9★ -M	-F
PM37-	120 CT	3.2	10	16	0.75	50	17	$10.35	$4.65
PM38-	300 CT	600	7	41	98	50	17	10.95	4.80
PM35-	500	50	3	60	8	50	17	10.05	4.35
PM36-	500	500/125 Split	3	72	85	50	17	11.10	5.85
PM34-	600 CT	600 CT	3	75	105	50	17	10.80	5.55
PM33-	1,500 CT	600	3	170	95	50	12	10.50	4.95
PM31-	2,500	2,500 CT	1	250	325	50	12	10.65	6.60
PM29-	10,000 CT	500 CT	1	1050	80	50	12	11.10	—
PM27-	10,000	1,200	0.5	1050	280	50	12	10.20	4.80
PM23-	10,000 CT	1,200 CT	1	1050	280	50	12	11.25	—
PM25-	10,000	1200/300 Split	0.5	1050	280	50	12	11.55	—
PM19-	10,000 CT	2,000 CT	1	1000	300	50	12	11.25	—
PM21-	10,000	2000/500 Split	0.5	1000	300	50	12	11.70	—
PM17-	10,000 CT	10,000 CT	1	1000	1300	50	12	10.95	—
PM15-	25,000	1,000	0.25	1700	110	40	12	10.50	5.10
PM11-	25,000 CT	1,000 CT	0.5	1700	110	40	12	11.40	—
PM13-	25,000	1000/250 Split	0.25	1700	110	40	12	11.40	—
PM7-	50,000 CT	1,000 CT	0	3300	75	10	16	12.00	—
PM9-	50,000	1000/250 Split	0	3300	75	10	16	12.00	—
PM5-	200,000	1,000	0	5300	110	10	16	11.40	—
PM3-	200,000 CT	1,000 CT	0	5300	110	10	16	12.30	—
PM41-	Audio Choke	.3 Hy.	4	43			20	8.10	3.90
PM40-	Audio Choke	3.5 Hy.	2	700			20	8.55	4.05
PM39-	Audio Choke	6 Hy.	2	1800			20	9.00	4.20
PM90	Magnetic Shield Mu-Metal slip-on can for PM-M series. 20 db shielding.							1.05	—

ULTRA-MINIATURE TRANSISTOR TRANSFORMERS — UM SERIES

Frequency Response: ±2 db, 300-10K Hz Leads supplied, 4" #27 color-coded. Power levels given for 7½% max. distortion. **UM-F (Fig. C):** Size, ⅜" x ⅜" x 1 11/32". Wt., 0.08 oz. MIL type TF6RX—ZZ (Insert MIL No. from table). **UM-M (Fig. D):** Size, ½" dia. x ½", with 1" leads. Wt., 0.14 oz. MIL type TF5RX—ZZ.

† ORDER BY COMPLETE MICROTRAN NO. (UM25-M)

Part No.†	Primary Impedance	Secondary Impedance	Unbal. Pri. DC Ma	Pri. D.C.R.	Sec. D.C.R.	Level @ 300 Hz	Level @ 1 KHz	MIL No.	Net Each Lots of 1-9★ -F	-M
UM26-	400	11	3	35	1.5	15mw	500mw	17	$3.90	$6.90
UM27-	400 CT	11	6	35	1.5	15mw	500mw	17	4.20	7.05
UM25-	400	50	3	35	5	15mw	500mw	17	3.90	6.90
UM29-	600 CT	600 CT	7	45	60	5mw	400mw	21	4.65	8.25
UM24-	1,000	50	3	65	10	5mw	500mw	17	3.90	6.90
UM33-	1,000 CT	600	6	80	65	5mw	500mw	17	4.35	6.90
UM32-	1,500 CT	600	5	135	65	5mw	500mw	13	4.35	7.65
UM39-	2,500 CT	600 CT	2	250	50	5mw	500mw	13	4.50	7.65
UM34-	10,000 CT	600 CT	2	850	40	5mw	500mw	13	4.50	9.45
UM31-	10,000 CT	1,200 CT	2	850	120	5mw	500mw	21	4.80	9.60
UM37-	10,000	2,000 CT	1	850	200	5mw	500mw	13	4.50	7.80
UM35-	15,000 CT	15,000 CT	1	930	1210	5mw	300mw	15	4.95	10.05
UM36-	20,000 CT	800 CT	.5	1100	80	5mw	500mw	13	4.80	9.90
UM22-	20,000	1,000	.5	1100	100	5mw	300mw	13	4.35	7.95
UM23-	20,000	1,200 CT	.5	1100	110	5mw	300mw	13	4.65	8.10
UM21-	100,000	1,000	0	1900	135	5mw	70mw	16	6.00	8.40
UM30-	Choke			1.5hy (0dc)	0.7hy (2ma)		100	20	3.60	5.40
UM28-	Choke			10hy (0dc)	8hy (0.5ma)		650	20	3.75	6.00
UM90	Magnetic Shield Mu-Metal slip-on can for UM-M Series. 20 db shielding.								1.35	—

VERI-MINIATURE TRANSISTOR TRANSFORMERS — VM SERIES

Frequency Response: ±2 db, 200-10K Hz. Leads supplied, 4" #27 color-coded. Power levels given for 7½% max. distortion. **VM-M (Fig. F):** For plug-in printed circuit applications. Cast epoxy resin provides high resistance. Size, 9/16" x 9/16" x ½". Wt., 0.25 oz. MIL type TF5RX—ZZ (Insert MIL No. from table). **VM-FPB (Fig. G):** Plug-in tab mounted channel. Size, 17/32" x 15/32" x 7/16". Wt., 0.2 oz. MIL type TF6RX—ZZ.

‡ ORDER BY COMPLETE MICTROTRAN NO. (VM8-M)

Part No.†	Primary Impedance	Secondary Impedance	Unbal. Pri. DC Ma	Pri. D.C.R.	Sec. D.C.R.	Level MW.	MIL No.	Net Each Lots of 1-9★ -FPB	-M
VM1-	50	600	5.5	7	90	15	21	$4.20	$6.45
VM7-	500	3.4	3.5	50	.5	15	21	4.20	6.45
VM16-	500 CT	250 CT	7.5	50	25	15	17	4.50	7.65
VM14-	600 CT	600 CT	7.0	50	65	15	17	4.50	7.65
VM8-	1,250	3.4	2.0	135	.5	15	21	4.35	6.60
VM9-	1,250	50	2.0	135	6.5	15	21	4.35	6.60
VM10-	2,500	2,500 CT	1.5	225	215	3	21	4.65	7.95
VM17-	10,000 CT	5,000 CT	0	400	300	5	17	5.85	8.10
VM12-	20,000	1,000	.16	625	85	5	21	4.50	7.20
VM13-	20,000	1,000 CT	.16	625	85	5	21	4.65	7.80
VM3-	25,000	600	.15	720	45	2.5	21	4.50	7.20
VM5-	50,000	600	.1	830	55	5	21	4.65	7.50
VM15-	50,000 CT	50,000 CT	0	2000	2600	5	15	6.00	9.75
VM6-	100,000	1,200 CT	.07	2000	150	5	21	5.85	8.40
VM2-	200,000	600	.05	3000	110	2.5	21	5.70	8.10
VM4-	200,000	1,200	.035	3100	165	5	21	5.70	8.10
VM11-	Choke	20hy (0ma)	12hy (.5ma)		1000		21	4.05	5.85
VM90	Magnetic Shield Mu-Metal slip-on can for VM-M Series. 20 db shielding.							1.95	—

LOW LEVEL CHOPPER INPUT TRANSFORMERS

Efficiently transfer 30-500 Hz signals to instrument amplifiers. Signal level range, 0.5 μV to 0.5 V. Resin impregnated. Three mu-metal, two copper shields; 90 db shielding. Size, 1⅜" dia. x 1 25/32" h. with 6-32 x ⅜" studs on 1½" ctrs. Wt. 5 oz.

CASED (FIG. H)

Microtran No.	Turn Ratio Full Pri.- Full Sec.	½ Pri.- Full Sec.	Full Pri. H*	Full Pri. Imped.*	DC Resis. Full Pri.	Sec.	Net Each 1-9★
M8025	1:7.7	1:15.4	17.5	6,600	365Ω	4,140Ω	$13.80
M8026	1:3.2	1:6.4	60	22,500	455Ω	3,500Ω	13.80
M8052	1:4.53	1:9.06	90	34,000	760Ω	5,220Ω	15.60
M8053‡	1:0.5	1:1	140	53,000	920Ω	653Ω	14.10
M8112	1:0.5	1:1	450	80,000	2,300Ω	1,600Ω	15.00

HERMETIC (FIG. I)

Microtran No.	Turn Ratio Full Pri.- Full Sec.	½ Pri.- Full Sec.	Full Pri. H*	Full Pri. Imped.*	DC Resis. Full Pri.	Sec.	Net Each 1-9★
M8525	1:7.7	1:15.4	17.5	6,600	365Ω	4,140Ω	$16.65
M8526	1:3.2	1:6.4	60	22,500	455Ω	3,500Ω	16.65
M8552	1:4.53	1:9.06	90	34,000	760Ω	5,220Ω	17.10
M8553‡	1:0.5	1:1	140	53,000	920Ω	653Ω	16.50

*At 0.5 V, 60 Hz. ‡Secondary is center tapped.

IMMEDIATE DELIVERY FROM STOCKING DISTRIBUTORS

★ Quantity pricing schedule is as follows: 10-49 less 10%, 50-99 less 16⅔%, 100-249 less 33⅓%. Contact factory for prices over 249.

MICROTRAN

MINIATURIZED AUDIO DC-DC CONVERTER TRANSFORMERS

145 E. MINEOLA AVE. • VALLEY STREAM, N.Y. 11582 • PHONE: (516) 561-6050 • TWX: 510-225-8412

MICRO-MINIATURE AUDIO AND TRANSISTOR TRANSFORMERS—MM AND MMT SERIES

MM-M (Fig. J): Molded, for plug-in printed circuit applications. Cast epoxy resin for high resistance to extremes of ambient temperature. MIL Type TF5RX—ZZ. Size, 7/8" x 25/32" x 17/32" with 5/32" pins, .020" dia. Wt., 1/2 oz. **MM-H (Fig. K):** Hermetically sealed with high compression glass term. Gray enamel finish. MIL Type TF4RX—YY. Size, 15/16" dia. x 1 1/16". Wt., 3/4 oz. **MM-FB (Fig. L):** Open frame with channel. Available with plug-in tab channel or without channel on special order. MIL Type TF6RX—ZZ. Size, 1 3/16" x 1 13/32" x 1 5/32", plus tabs. **MM-CM (Fig. M):** Contour molded on special order only; for mtg. on top of chassis. Size, 7/8" x 9/16" x 25/32". Prices on request. † ORDER BY COMPLETE P/N i.e., MM1-M

Part No.†	Primary Impedance	Secondary Impedance	Pri. D.C. Unbalance Ma.	Oper. Level DBM	Frequency Response ±2 db.	MIL No.	Net Each Lots of 1-9★ -FB	-H	-M
MM1-	200/50	250,000/62,500	0	4	200-10,000	10	$5.25	$7.35	$8.55
MM3-	10,000	200	3	20	150-10,000	13	4.95	7.20	8.40
MM2-	10,000	90,000	0	4	150-10,000	10	5.40	7.50	8.70
MM4-	30,000	50	1	20	150-10,000	13	4.65	7.05	8.25
MM7-	30,000	1,200	0.5	20	200-10,000	13	3.90	6.45	7.65
MM6-	100,000	60	0.5	20	250-10,000	13	4.95	7.20	8.40
MM5-	Reactor 50 HY at 1 MIL. D.C.		4,700 ohms D.C. Res.			20	4.65	6.90	8.10
MMT1-	600	600	8	22	200-15,000	17	3.90	7.35	8.55
MMT26-	600 CT	600 CT	16	22	200-15,000	17	4.20	7.65	8.85
MMT33-	600 CT	600/150 split	16	22	200-15,000	10	4.80	8.85	9.75
MMT9-	600 CT	1,200 CT	16	22	200-15,000	17	4.50	7.65	8.85
MMT32-	600 CT	1,200/300 split	16	22	200-15,000	17	4.80	8.85	9.75
MMT12-	2,000	3.4	5	28	200-15,000	13	3.90	7.35	8.55
MMT31-	2,000 CT	500 CT	10	28	200-15,000	13	4.35	8.25	9.45
MMT19-	2,500	2,500 CT	2	23	200-15,000	13	4.35	7.50	8.70
MMT13-	4,000 CT	3.4	5	28	200-15,000	13	4.05	7.50	8.70
MMT11-	4,000 CT	600 CT	5	28	200-15,000	12	4.50	7.80	9.00
MMT21-	4,000 CT	600/150 split	5	28	200-15,000	13	4.65	8.55	9.75
MMT25-	7,500 CT	600 CT	4	22	200-15,000	13	4.50	7.80	9.00
MMT30-	7,500 CT	1,200 CT	4	22	200-15,000	13	4.50	8.40	9.60
MMT35-	10,000 CT	150/37.5 split	2	20	200-15,000	13	4.80	8.70	9.90
MMT17-	10,000 CT	200 CT	6	20	200-15,000	13	4.50	8.10	9.30
MMT16-	10,000	1,500 CT	1	20	200-15,000	13	4.50	8.40	9.60
MMT28-	10,000 CT	1,500 CT	2	20	200-15,000	13	4.65	8.55	9.75
MMT29-	10,000 CT	10,000 CT	2	20	200-15,000	13	4.65	8.55	9.75
MMT10-	25,000	600	1	20	200-15,000	13	4.35	7.20	8.40
MMT27-	25,000 CT	600 CT	2	20	200-15,000	13	4.50	8.40	9.60
MMT7-	25,000	1,200 CT	1	20	200-15,000	13	4.50	8.40	9.60
MMT18-	25,000 CT	1,200 CT	2	20	200-15,000	13	4.65	8.55	9.75
MMT5-	50,000	6	1	20	200-15,000	13	4.35	7.95	9.15
MMT3-	50,000	600	0.7	20	200-15,000	13	4.05	7.50	8.70
MMT4-	50,000 CT	600 CT	1.4	20	200-15,000	13	4.95	8.55	9.75
MMT8-	50,000 CT	1,200 CT	1.4	20	200-15,000	13	4.95	8.55	9.75

SUBMINIATURE AUDIO AND TRANSISTOR TRANSFORMERS — SM AND SMT SERIES

SM-AF (Fig. N): MIL-T-27B-AF modified case; compression sealed ceramic terminals; gray enamel finish. MIL Type TF4RX—YY. Size, 3/4" x 3/4" x 1 1/8" max. with two 4-40NC-2 spade mtg. bolts. Wt., 1 1/8 oz. **SM-H (Fig. K):** Hermetically sealed; high compression glass terminals; gray enamel finish. MIL type TF4RX—YY. Size, 15/16" dia. x 15/16" h. Wt., 1 oz. **SM-FB (Fig. L):** Open frame with channel. With plug-in tab mounted channel or without channel on special order. MIL Type TF6RX—ZZ. Size, 1 5/16" x 1 13/32" x 3/4", plus tabs. Wt., 0.750 oz. **SM-M (Fig. O):** Molded, for plug-in PC applications. MIL Type TF5RX—ZZ. Size, 1 5/32" x 7/8" x 3/4" max. Wt., 1 1/2 oz. **SM-CM (Fig. M):** Contour molded on special order; prices on request.

Part No.†	Primary Impedance	Secondary Impedance	Pri. D.C. Unbalance Ma.	Oper. Level DBM	Frequency Response ±2 db.	MIL No.	Net Each Lots of 1-9★ -AF	-FB	-H	-M
SM1-	200/50	250,000/62,500	0	6	80-10,000	10	$9.00	$5.25	$8.25	$9.90
SM3-	10,000	200	3	21	150-10,000	13	8.70	4.95	7.95	9.90
SM2-	10,000	90,000	0	8	100-10,000	10	8.70	4.95	7.95	9.90
SM4-	30,000	50	1	21	150-10,000	13	8.70	4.95	7.95	9.90
SM6-	100,000	60	0.5	21	150-10,000	13	8.70	5.25	8.10	9.90
SM5-	Reactor 50 HY at 1 MIL. D.C.		3,000 ohms D.C. Res.			20	7.20	4.20	7.20	9.30
SMT1-	600	600	9	23	200-15,000	17	6.75	4.50	7.20	8.40
•SMT26-	600 CT	600 CT	18	23	200-15,000	17	—	5.10	7.95	9.00
•SMT9-	600 CT	1,200 CT	18	23	200-15,000	17	—	4.95	7.65	8.70
SMT12-	2,000	3.4	5	30	200-15,000	13	6.75	4.50	7.20	8.40
SMT19-	2,500	2,500 CT	5	26	200-15,000	13	7.50	5.25	8.10	9.30
•SMT36-	2,500 CT	2,500/625 split	10	26	200-15,000	13	—	5.85	8.55	9.75
SMT13-	4,000 CT	3.4	5	30	200-15,000	13	6.90	4.65	7.35	8.55
•SMT17-	10,000 CT	200 CT	6	20	200-15,000	13	—	5.55	8.25	9.45
SMT16-	10,000	1,500 CT	1	23	200-15,000	13	7.50	5.40	8.10	9.30
SMT10-	25,000	600	2	20	200-15,000	13	7.05	4.95	7.65	8.70
SMT7-	25,000	1,200 CT	1.5	20	200-15,000	13	7.50	5.40	8.10	9.30
•SMT18-	25,000 CT	1,200 CT	3	20	200-15,000	13	—	5.70	8.40	9.60
SMT5	50,000	6	1	20	300-15,000	13	7.20	4.95	7.80	8.85
SMT3-	50,000	600	1	20	300-15,000	13	7.35	5.10	7.95	9.00
•SMT4-	50,000 CT	600 CT	2	20	200-15,000	13	—	5.70	8.40	9.60
•SMT8-	50,000 CT	1,200 CT	2	20	200-15,000	13	—	5.70	8.40	9.60

DC TO DC CONVERTER TRANSFORMERS — SWITCHING TYPE ▲

Permits conversion of low-voltage D.C. to higher voltages for operating mobile equipment or for D.C. isolation. Supplied with schematic and component values.

Select the Unit That Meets Your Power & Size Requirements	Catalog No.	Total VA Output♦	D.C. Input Volts	D.C. Output** Bridge Volts	Bridge MA	C.T. Full Wave Volts	C.T. Full Wave MA	Switching Freq. Hz (approx.)	Dimensions D	W	H	Mtg. MD	Cent. MW	Type of Construction	Fig. No.	Approx. Weight Oz.	Net Each 1-9★
High Voltage Low Power Miniature Design	M8050	25mW	3	1000*	25μA	—	—	400	1 1/16	13/16	27/32	1 3/8	—	Open Frame	L	1.25	$7.35
	M8051	25mW	3	1000*	25μA	—	—	400	1	1	1 3/8	1 1/8	—	MIL — AG	Q	2.4	13.50
	M8073	25mW	4	425-500*	50μA	—	—	50-3K†	3/8	3/8	3/8	—	—	Open Frame	C	.1	5.25
	M8074	50mW	3	535*	90μA	—	—	400	1 11/16	13/16	27/32	1 3/8	—	Open Frame	L	1.25	6.30
	M8072	190mW	2.7	480*	400μA	—	—	800	1 11/16	13/16	27/32	1 3/8	—	Open Frame	L	1.25	8.40
	M8120	190mW	28	480*	400μA	—	—	3.5K	1 11/16	13/16	27/32	1 3/8	—	Open Frame	L	1.25	7.80
High Voltage Low Profile Encapsulated	M8115	5	13.8	±250 or 500■	10	250	20	6K	1 1/4 D x 3/4 H — .140 Cl. Hole					Toroidal	V	1.1	21.30
	M8117	5	28	±250 or 500■	10	250	20	6K	1 1/4 D x 3/4 H — .140 Cl. Hole					Toroidal	V	1.1	21.30
NEW! High Frequency Encapsulated	M8132	30	13.8	±15 or 30■	1000	15	2000	20K	1 1/4 D x 3/4 H — .140 Cl. Hole					Toroidal	V	1.1	18.90
	M8133	30	28	±15 or 30■	1000	15	2000	20K	1 1/4 D x 3/4 H — .140 Cl. Hole					Toroidal	V	1.1	18.45
High Voltage Hermetic	M8036	40	13.6	±225 or 450■	90	225	155	800	2 5/16	2 1/16	3 1/8	1 11/16	1 7/16	MIL — FA	P	1 1/4 lbs.	32.10
Medium Power Low Profile Encapsulated	M8113	50	13.8	±14 or 28■	1750	14	3500	2.5K	2 1/8 D x 1 1/4 H — .170 Cl. Hole					Toroidal	V	6	28.50
	M8114	50	28	±14 or 28■	1750	14	3500	2.5K	2 1/8 D x 1 1/4 H — .170 Cl. Hole					Toroidal	V	6	27.75
	M8116	50	13.8	±35 or 70■	700	35	1400	2.5K	2 1/8 D x 1 1/4 H — .170 Cl. Hole					Toroidal	V	6	28.50
	M8118	50	28	±35 or 70■	700	35	1400	2.5K	2 1/8 D x 1 1/4 H — .170 Cl. Hole					Toroidal	V	6	27.75
High Voltage High Power Hermetic	M8035	125	13.6	±250 or 500■	250	250	420	800	2 3/4	2 3/8	3 13/16	2 1/8	1 3/4	MIL — GA	P	2 1/4 lbs.	34.20
	M8034	125	28	±250 or 500■	250	250	420	800	2 3/4	2 3/8	3 13/16	2 1/8	1 3/4	MIL — GA	P	2 1/4 lbs.	34.20

♦Full wave and CT loads may be simultaneously drawn, but for continuous duty, total V.A. output should not be exceeded.
■For positive and negative voltage supply as utilized in op-amp and similar circuitry.
**Based on approximately 1 volt drop per rectifier.
†Frequency depends on load and bias conditions.
▲M8050, M8051, M8073, M8074 are blocking oscillator types.

IMMEDIATE DELIVERY FROM STOCKING DISTRIBUTORS

★ Quantity pricing schedule is as follows: 10-49 less 10%, 50-99 less 16⅔%, 100-249 less 33⅓%. Contact factory for prices over 249.

MICROTRAN

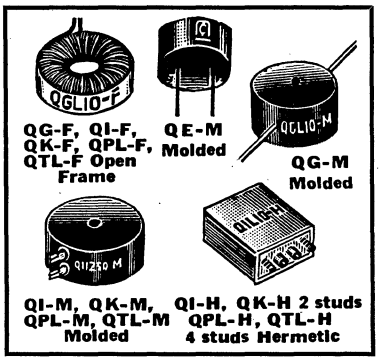
MINIATURIZED INDUSTRIAL & MIL TOROIDAL INDUCTORS

145 E. MINEOLA AVE. • VALLEY STREAM, N.Y. 11582 • PHONE: (516) 561-6050 • TWX: 510-225-8412

ULTRA-MINIATURE TOROIDAL INDUCTORS — QE-M SERIES

Affords new application oportunities in high density packaging. Ultra miniaturized with low height design. Exceptionally high "Q" and wide frequency range. Available on special order with ±1% inductance tolerance. Frequency range of QEL Series 1 to 300 kHz; QEM, 3 to 500 kHz. Accuracy, ±2%. Molded in epoxy resin with .020" x 2" gold-plated nickel alloy leads. Size, .450" dia. x .285".

Inductance	QEL-M SERIES Microtran No.	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Ea., Lots of 1-9*	QEM-M SERIES Microtran No.	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Ea., Lots of 1-9★
.5 mM	—	—	—	—	QEM05-M	2.1	20	$8.40
1 mH	QEL1-M	2.1	25	$7.95	QEM1-M	3.8	30	8.40
2 mH	QEL2-M	3.6	30	7.95	QEM2-M	6.2	35	8.40
5 mH	QEL5-M	7.3	35	8.40	QEM5-M	15.9	45	8.85
10 mH	QEL10-M	15.8	45	8.55	QEM10-M	19	50	9.00
15 mH	QEL15-M	20	45	8.70	QEM15-M	42	55	9.15
25 mH	QEL25-M	32	50	9.00	QEM25-M	88	60	9.45
50 mH	QEL50-M	69	50	9.15	QEM50-M	193	70	9.75
100 mH	QEL100-M	185	70	9.60	—	—	—	—



MICRO-MINIATURE TOROIDAL INDUCTORS — QG SERIES

Frequency range of QGL Series, to 20 kHz; QGM Series, 2 to 100 kHz. Accuracy, ±2%. **QG-F:** Open frame, microcrystalline wax dipped with 4" #28 plastic leads. Size, 5/8" dia. x 9/32". **QG-M:** Molded in high temperature epoxy resin with .020" x 2" gold plated nickel alloy leads. Leads may be bent downward for plug-in printed circuit use. Size, 7/8" dia. x 3/8". **QGH:** Hermetically sealed on special order only ($12.50 setup charge in Lots of 1-49). Size 11/16" dia. x 13/32". **QG-HC:** Hermetic crystal can. Special order only; prices setup charge same as QG-H Series. Size, 23/32" x 11/32" x 49/64".

QGL SERIES

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QGL5-	5 mH	2.5	30	$4.35	$7.50	$6.90
QGL10-	10 mH	5	33	4.35	7.50	6.90
QGL15-	15 mH	8	34	4.50	7.65	7.05
QGL30-	30 mH	17	37	4.65	7.80	7.20
QGL50-	50 mH	28	40	4.80	7.95	7.35
QGL100-	100 mH	50	42	$4.95	$8.40	$7.50
QGL250-	250 mH	130	46	5.10	8.40	7.65
QGL500-	500 mH	290	48	5.85	9.15	9.30
QGL1000-	1.0 H	530	51	6.75	9.60	9.90
QGL1500-	1.5 H	825	53	6.90	10.20	10.35

QGM SERIES

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QGM1-	1 mH	1.4	22	$4.80	$8.10	$7.35
QGM2-	2 mH	2.5	25	4.80	8.10	7.35
QGM5-	5 mH	6	28	5.10	8.25	7.50
QGM10-	10 mH	12	31	5.25	8.25	7.65
QGM15-	15 mH	18	32	$5.40	$8.40	$7.80
QGM25-	25 mH	30	35	5.70	8.55	7.95
QGM50-	50 mH	52	37	6.30	9.60	8.10
QGM100-	100 mH	115	39	6.45	9.90	8.85

SUBMINIATURE TOROIDAL INDUCTORS — QIL SERIES

Frequency range to 20 kHz; accuracy, ±2%. **QIL-M:** Molded in high temperature epoxy with silver plated turret lugs. Size, 13/16" dia. x 1/2". **QIL-H:** Hermetically sealed in metal case with Teflon® terminals. Size, 1 1/16" x 1/2" x 17/32". **QIL-F:** Open frame. Microcrystalline wax dipped with 4" #28 plastic leads. Size, 1" dia. x 13/32".

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Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QIL3-	3 mH	.73	36	$4.20	$7.35	$7.05
QIL5-	5 mH	1.1	38	4.20	7.35	7.05
QIL10-	10 mH	2.1	40	4.20	7.35	7.05
QIL15-	15 mH	3.3	42	4.20	7.35	7.20
QIL25-	25 mH	5.3	45	4.35	7.80	7.20
QIL50-	50 mH	11	47	4.35	7.80	7.35
QIL100-	100 mH	22	49	4.50	8.25	7.65
QIL150-	150 mH	34	50	$4.65	$8.40	$7.80
QIL250-	250 mH	55	53	4.80	8.85	7.95
QIL500-	500 mH	95	55	5.10	9.15	8.10
QIL1000-	1.0 H	210	57	5.40	9.75	8.55
QIL1500-	1.5 H	335	59	6.15	10.20	9.60
QIL2500-	2.5 H	550	61	7.05	11.55	11.10

MINIATURE TOROIDAL INDUCTORS — QK SERIES

Frequency range of QKL Series, to 10 kHz; QKM Series, 5 to 50 kHz. Accuracy, ±2%. **QK-F:** Open frame, microcrystalline wax dipped; 4" #28 plastic leads. Size, 1 1/4" dia. x 5/8". **QK-H:** Hermetic with Teflon terminals. Size, 1 15/32" x 25/32" x 1 47/64". **QK-M:** Molded in high temperature epoxy resin; silver plated turret lugs. Size, 1 3/8" dia. x 3/4"; #8 clearance hole.

QKL SERIES

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QKL5-	5 mH	.62	60	$4.35	$7.65	$6.90
QKL10-	10 mH	1.1	66	4.50	7.80	6.90
QKL15-	15 mH	1.7	68	4.80	7.95	6.90
QKL25-	25 mH	2.8	72	4.95	8.10	7.05
QKL50-	50 mH	6	76	4.95	8.40	7.05
QKL-100-	100 mH	11	81	5.10	9.00	7.50
QKL150-	150 mH	17	83	5.25	9.15	7.65
QKL250-	250 mH	28	87	$5.25	$9.45	$7.80
QKL500-	500 mH	63	91	5.40	9.75	7.95
QKL1000-	1.0 H	110	96	5.55	10.20	8.40
QKL1500-	1.5 H	175	98	5.70	10.65	8.55
QKL2500-	2.5 H	275	103	6.30	10.95	8.70
QKL5000-	5 H	645	106	7.05	12.00	9.60
QKL10,000-	10 H	1175	112	7.80	13.35	10.95

QKM SERIES

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QKM2-	2 mH	.45	52	$5.10	$8.70	$7.50
QKM5-	5 mH	1.1	58	5.25	8.85	7.50
QKM10-	10 mH	2.5	62	5.25	9.00	7.65
QKM25-	25 mH	6.5	70	5.40	9.30	7.80
QKM50-	50 mH	11	74	5.55	9.45	7.95
QKM100-	100 mH	25	79	$5.70	$9.45	$8.10
QKM250-	250 mH	65	87	5.85	9.75	8.40
QKM500-	500 mH	115	92	6.15	10.05	8.70
QKM1000-	1.0 H	250	97	6.45	11.10	9.90

HIGH-Q TOROIDAL INDUCTORS — QPL SERIES

Frequency range to 10 kHz; accuracy, ±2%. **QPL-F:** Open frame, microcrystalline wax dipped; 4" #24 leads. Size, 1 15/16" dia. x 7/8". **QPL-H:** Hermetically sealed with Teflon terminals. Size, 1 15/16" x 1 1/16" x 2 9/32". **QPL-M:** Molded in high temperature epoxy resin; silver plated turret lugs. Size, 2" dia. x 1".

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QPL25-	25 mH	1.5	100	$6.90	$12.75	$9.90
QPL50-	50 mH	2.5	105	7.05	12.90	10.05
QPL100-	100 mH	6	110	7.20	13.20	10.20
QPL250-	250 mH	15	115	7.35	13.35	10.50
QPL500-	500 mH	25	120	7.50	13.50	10.80
QPL1000-	1.0 H	60	125	7.80	13.95	11.25
QPL1500-	1.5 H	90	130	8.10	14.55	11.55
QPL2500-	2.5 H	150	133	$8.70	$15.30	$12.15
QPL5000-	5.0 H	350	138	9.45	16.20	12.90
QPL7500	7.5 H	525	140	10.05	17.55	13.65
QPL10,000	10 H	600	142	11.10	18.45	14.85
QPL15,000-	15 H	900	146	12.00	19.80	15.60
QPL25,000-	25 H	1500	150	13.05	21.60	17.40

HIGH-Q TOROIDAL INDUCTORS — QTL SERIES

Frequency range to 15 kHz; accuracy, ±2%. **QTL-F:** Open frame, microcrystalline wax dipped; 4" #24 leads. Size, 2 7/16" dia. x 1". **QTL-H:** Hermetic, Teflon terminals. Size, 2 9/16" x 1 5/16" x 2 13/16". **QTL-M:** Molded in epoxy resin. Size, 2 7/8" dia. x 1 3/8".

Microtran No.†	Inductance	Typ. DC Res., Ohms	Typ. Dist. Cap., pF	Net Each, Lots of 1-9★ -F	-H	-M
QTL25-	25 mH	0.85	127	$11.85	$13.50	$14.55
QTL50-	50 mH	1.5	136	12.00	13.65	14.70
QTL100-	100 mH	2.8	144	12.45	13.95	15.00
QTL150-	150 mH	3.9	149	12.90	14.25	15.75
QTL250-	250 mH	7	156	13.20	14.55	16.05
QTL500-	500 mH	15	164	13.50	14.85	16.05
QTL1000-	1.0 H	27	173	13.50	15.15	13.95
QTL1500-	1.5 H	40	177	$13.65	$15.45	$16.35
QTL2500-	2.5 H	70	184	14.40	16.05	17.10
QTL5000-	5 H	140	192	14.40	16.65	17.25
QTL10,000-	10 H	270	200	15.75	17.25	18.60
QTL15,000-	15 H	430	205	16.80	18.30	19.80
QTL25,000	25 H	850	212	18.00	19.50	21.15
QTL50,000-	50 H	1500	221	25.20	26.40	27.75

IMMEDIATE DELIVERY FROM STOCKING DISTRIBUTORS

† ORDER BY COMPLETE MICTROTRAN NO. (QGL5-F)

★ Quantity pricing schedule is as follows: 10-49 less 10%, 50-99 less 16⅔%, 100-249 less 33⅓%. Contact factory for prices over 249.

MICROTRAN

HERMETIC POWER TRANSFORMERS AND INDUCTORS

145 E. MINEOLA AVE. • VALLEY STREAM, N.Y. 11582 • PHONE: (516) 561-6050 • TWX: 510-225-8412

POWER SUPPLY TRANSFORMERS (FIG. P)

For silicon rectifier circuitry and filament applications. Hermetically sealed. Primary, 105/115/125 V. Output voltage given for resistive or inductive loads, based on approx. 1 V. drop per rectifier. MIL Type TF4RX01—(add MIL Case Type from table) per MIL-T-27B.

400 Hz TYPE

Micro. No.	Secondary VAC	Secondary rms Amps	Rect. Cir. VDC*	Rect. Cir. VDC†	Size, Inches W. x D. x H.	MIL Case	Net 1-9★
M8063‡•	2.85	.045	1.5§	3	15/16 dia. x 1 1/16	YY	$10.50
	2.85	.045					
M8064‡	6.3 CT	.6	1.9	3.8	1 5/16 x 1 5/16 x 1 3/4	AH	11.55
M8075‡•	6.3 CT	.3	1.9	3.8	15/16 dia. x 1 1/16	YY	9.75
M8076‡	12.6 CT	.3	4.7	9.4	1 5/16 x 1 5/16 x 1 3/4	AH	11.70
M8039	12.6	.8	10.5§	21§	1 5/8 x 1 5/8 x 2 3/8	AJ	19.65
	12.6 CT	.8					
M8077	12.6	2	10.5§	21§	2 1/16 x 2 5/16 x 3 1/8	FA	27.75
	12.6 CT	2					
M8038	12.6	.3	16§	32§	1 5/8 x 1 5/8 x 2 3/8	AJ	18.60
	12.6	.3					
	12.6	.3					
M8018	18.5 CT	1	7.4	14.8	1 13/16 x 1 15/16 x 2 3/4	EA	18.00
M8019	18.5 CT	3	7.4	14.8	2 1/16 x 2 5/16 x 3 1/8	FA	23.55
M8065	26 CT	1.5	10.8	21.6	1 13/16 x 1 15/16 x 2 3/4	EA	23.25
M8066	26 CT	3	10.7	21.5	2 1/16 x 2 5/16 x 3 1/8	FA	31.50
M8079	26 CT	4	10.8	21.6	2 5/8 x 3 1/16 x 4 1/4	HA	31.50
M8067	30 CT	1.5	12.5	25	2 1/16 x 2 5/16 x 2 1/2	FB	24.15
M8020	35 CT	3	14.5	29	2 3/8 x 2 3/4 x 3 13/16	GA	28.50
M8068	40 CT	.2	17	34	1 5/8 x 1 5/8 x 2 3/8	AJ	15.15
M8041‡	50 CT	.25	21.5	43	1 5/16 x 1 5/16 x 1 3/4	AH	11.10
M8080	50 CT	.2	21.5	43	1 5/8 x 1 5/8 x 2 3/8	AJ	14.85
M8069‡•	60 CT	.003	26	52	15/16 dia. x 1 1/16	YY	9.75
M8070‡	65 CT	.170	28.4	56.8	1 5/16 x 1 5/16 x 1 3/4	AH	14.85
M8081‡•	65 CT	.030	28.4	56.8	15/16 dia. x 1 1/16	YY	9.75
M8021	70 CT	1	30	60	2 1/16 x 2 5/16 x 3 1/8	FA	27.75
M8071	80 CT	.90	35	70	2 1/16 x 2 5/16 x 3 1/8	FA	24.15

*Full-wave CT. †Full-wave bridge. ‡Primary 115 V only. §Series. •Fig. K.

60 Hz TYPE

Micro. No.	Secondary VAC	Secondary rms Amps	Rect. Cir. VDC*	Rect. Cir. VDC†	Size, Inches W. x D. x H.	MIL Case	Net 1-9★
M8042	6.3 CT	.6	1.9	3.8	1 5/8 x 1 5/8 x 2 3/8	AJ	$14.70
M8043	6.3 CT	2	1.9	3.8	2 1/16 x 2 5/16 x 2 1/2	FB	17.40
M8086	6.3 CT	6	1.9	3.8	2 3/8 x 2 3/4 x 3 13/16	GA	21.60
M8087	12.6 CT	3	4.7	9.4	2 3/8 x 2 3/4 x 3 13/16	GA	21.60
M8044	12.6	2	10.5§	21§	3 1/16 x 3 1/16 x 3 7/8	JB	25.65
	12.6 CT	2					
M8022	18.5 CT	3	7.4	14.8	3 1/16 x 3 1/16 x 3 7/8	JB	28.05
M8088	26 CT	2.5	10.8	21.6	2 5/8 x 3 1/16 x 4 1/4	HA	24.15
M8152	28 CT	.15	11.7	23.4	1 5/8 x 1 5/8 x 2 3/8	AJ	15.30
M8045	28 CT	.6	11.7	23.4	2 1/16 x 2 5/16 x 3 1/8	FA	21.15
M8055	30 CT	2.5	12.5	25	3 1/16 x 3 1/16 x 4 7/8	JA	27.60
M8023	35 CT	3	14.5	29	3 3/8 x 3 15/16 x 5 1/4	KA	30.00
M8089	40 CT	.1	17	34	1 5/8 x 1 5/8 x 2 3/8	AJ	13.80
M8090	40 CT	.3	17	34	1 13/16 x 1 15/16 x 2 3/4	EA	19.80
M8091	40 CT	.75	17	34	2 3/8 x 2 3/4 x 2 13/16	GB	21.15
M8046	49 CT	2.5	21	42	3 11/16 x 4 5/16 x 5 1/16	LA	33.00
M8024	70 CT	1	30	60	3 1/16 x 3 1/16 x 4 7/8	JA	26.85
M8056	80 CT	.6	35	70	2 5/8 x 3 1/16 x 4 1/4	HA	22.20

*Full-wave CT. †Full-wave bridge. §Series.

60 Hz ISOLATION/POWER TRANSFORMERS (FIG. P)

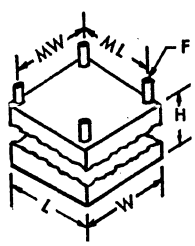
Electrostatic shielding. Center tap permits use in either FW bridge or FW CT circuit. MIL Type TF4X01—.

Micro. No.	Input Volts	Output Volts	rms Amps	VA	Size, Inches W. x D. x H.	MIL Case	Net Ea., 1-9★
M8094	115	115 CT	.0085	1	1 5/16 x 1 5/16 x 1 3/4	AH	$14.10
M8095	115	115 CT	.03	3.5	1 13/16 x 1 15/16 x 2 3/4	EA	28.50
		12.6 CT	.25	3.15			
		12.6	.25	3.15			
M8151	115	115CT	.13	15	2 1/16 x 2 5/16 x 3 1/8	FA	23.40
M8096*	115	115 CT	.35	40	2 3/8 x 2 3/4 x 3 13/16	GA	22.20
M8078*	115	115 CT	.9	100	3 3/8 x 3 15/16 x 5 1/4	KA	35.10

*Primary 105/115/125 V.

STANDARD MIL-T-27B CASE SIZES

Case symbol **YY** — all metal cases not included below or with non-standard mounting centers. Case symbol **ZZ** — open type and encapsulated units. In tabulation at right, * indicates not in conformance with MIL-T-27B; † indicates two studs in a diagonal.



Case Type	Size, Inches W. x L. x H.	Mtg. Centers, In. MIL	Mtg. Centers, In. MW	Stud Type F
AF	3/4 x 3/4 x 1 1/8	1 3/16*	—	4-40 x 3/8
AG	1 x 1 x 1 3/8	1 1/8*	—	6-32 x 3/8
AH	1 5/16 x 1 5/16 x 1 3/4	1 1/4†	—	6-32 x 3/8
AJ	1 5/8 x 1 5/8 x 2 3/8	1 3/16	1 3/16	6-32 x 3/8
EA	1 13/16 x 1 15/16 x 2 3/4	1 3/8	1 1/4	6-32 x 3/8
EB	1 13/16 x 1 15/16 x 2 7/16	1 3/8	1 1/4	6-32 x 3/8
FA	2 1/16 x 2 5/16 x 3 1/8	1 11/16	1 7/16	6-32 x 3/8
FB	2 1/16 x 2 5/16 x 2 1/2	1 11/16	1 7/16	6-32 x 3/8
GA	2 3/8 x 2 3/4 x 3 13/16	2 1/8	1 3/4	6-32 x 3/8
HA	2 5/8 x 3 1/16 x 4 1/4	2 19/64	1 55/64	8-32 x 3/8
JA	3 1/16 x 3 9/16 x 4 7/8	2 5/8	2 1/8	8-32 x 3/8
JB	3 1/16 x 3 9/16 x 3 7/8	2 5/8	2 1/8	8-32 x 3/8
KA	3 3/8 x 3 15/16 x 5 1/4	3	2 7/16	10-32 x 1/2
LA	3 11/16 x 4 5/16 x 5 9/16	3 5/16	2 11/16	10-32 x 1/2
NB	4 5/16 x 5 1/16 x 5 1/2	4 1/16	3 5/16	1/4-20 x 5/8
OA	4 1/2 x 5 1/2 x 6 3/4	3 3/4	3	1/4x20 x 5/8

IMMEDIATE DELIVERY OF CATALOG ITEMS FROM STOCKING DISTRIBUTORS

SEND FOR CATALOG

MODIFIED CATALOG ITEMS are available on special order with revisions of electrical and mechanical specifications. Please contact factory.

CUSTOM TRANSFORMERS — DESIGNS TO MEET YOUR NEEDS!

Call our design staff to assist you in all aspects of application and specification. Extensive design files and large specialized material stocks enable our prototype division to render rapid service.

PRECISION HI-FI ACCESSORIES

STEREO CENTER CHANNEL OUTPUT MATCHING TRANSFORMER FOR MONAURAL EXTENSION SPEAKERS

Designed for the Audiophile who wishes to convert a Stereo system to Monaural or wishes to modify or enlarge his Stereo system. Permits "hole-in-the-middle" fill in with 3rd channel speaker. Matches impedance, polarity and power level. 30 watts. Response 40 to 20,000 cps.

HM-90 — User net **$10.95**

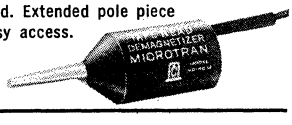
HUM-BUCKING TELEPHONE PICK-UP COIL

Hum free transcription, no connection to phone. Perfect for high impedance tape recorders and dictating machines. Rugged construction of high impact plastic.

HP-70 — User net **$6.95**

TAPE HEAD DEMAGNETIZER Model HD-40M

Removes permanent magnetism, protects tape from erasure, minimizes noise and distortion, reduces hum of tape head. Extended pole piece designed for easy access.



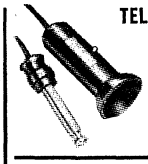
User net **$7.49**

MAGNETIC TAPE ERASER Model HD-15

A compact bulk tape demagnetizer. Erases recorded signals and noise instantly, when passed over tapes of sound film without rewinding. Removes background noise below level of new tapes or film. Universal unit for any size reel. ¼" and ½". Erases cassettes, cartridges.

User net **$12.95**

TELEPHONE PICK-UP COIL



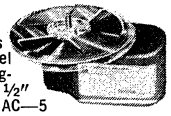
For recorder or direct feed into amplifier — Use as probe for locating hum. Equalized pick-up level.

- Universal design with phone plug
- Black finish with 68" cable
- Size: 5/8"D x 2½"L. Wgt: 1½ oz.
- **Model HP-61**

User net **$6.15**

HEAVY DUTY MAGNETIC TAPE ERASER

Epoxy Molded Model HD-11M



Develops a high intensity magnetic field. Erases tapes without rewinding. Noise level reduced below standard demagnetizers. Restores tape up to ½" to like new condition. 117V AC—5 Amps.
Size: 7"L x 3½"W x 3¼"H.
Weight: 9 lbs.
Adapter hub for 10½ reels Model HD-11-AD — User net **$3.15**
A MUST FOR STEREO RECORDING. Ideal for cassette erasure. Model HD-11M — User net **$31.00**

MICROTRAN CO., INC.

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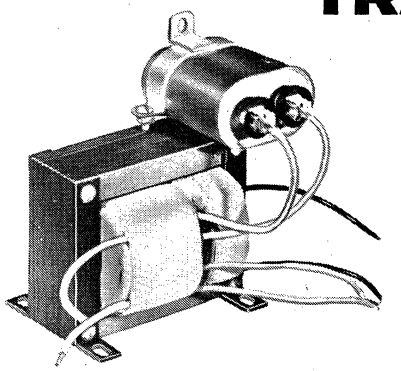
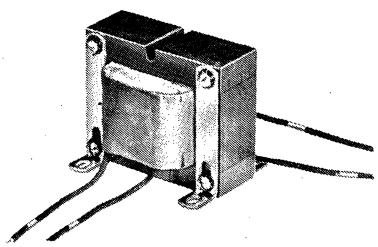
MAGNETIC WINDINGS COMPANY

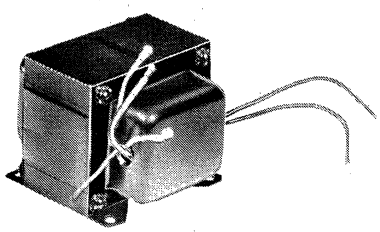
CONSTANT VOLTAGE
control and power
TRANSFORMERS



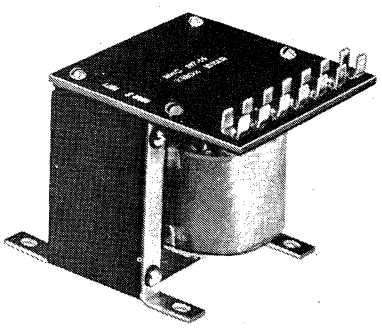
CONSTANT VOLTAGE—Sinusoidal and normal harmonic type regulated for both line and load variations.



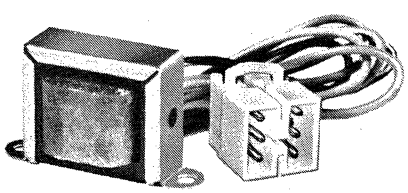
CONTROL TRANSFORMERS — For motor and industrial control, from 10 VA thru 3 KVA, from 24 volts thru 600 volts.



END-BELL TYPE — Enclosed type, both horizontal and vertical mount with flexible insulated leads.



TERMINAL BOARD TYPE — Open type units with solder lugs, quick-connect or threaded type terminations.



OPEN FRAME TYPE WITH CHANNEL OR "L" BRACKET—Mounting with leads or terminals to your requirements.

Commercial industrial, and MIL-T-27C transformers, powers, outputs, inputs, high voltage, drivers, and chokes. Available in, multiple and bobbin wound. Heat conductive impregnants to reduce size are available.

custom engineering to meet your specifications

Quick response is a major benefit when specifying Magnetic Windings' products. For custom applications our experienced staff can submit definite proposals and quotations in a matter of days after receipt of customer's specifications. Following acceptance, prototypes can be available for evaluation within 2 weeks and production quantities can be coming off the production line within 4 weeks after approval. Magnetic's engineers offer a unique blending of practical experience and theory to assure you optimum performance and reliability at the lowest possible cost; and, as new products and techniques are developed, we stand ready to offer knowledge and experience of our first thirty-five (35) years.

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A STERLING ELECTRONICS COMPANY
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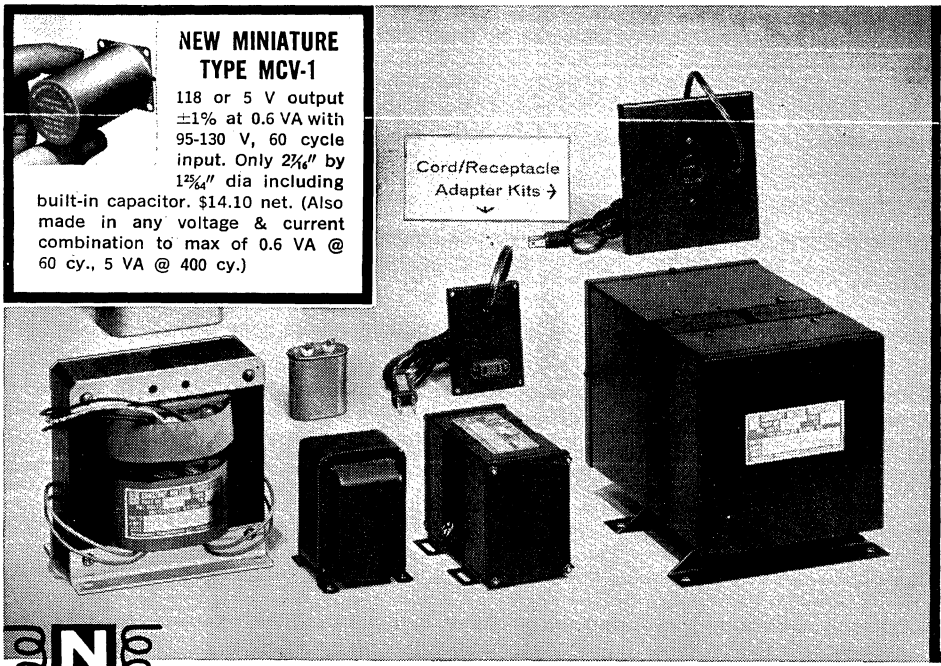
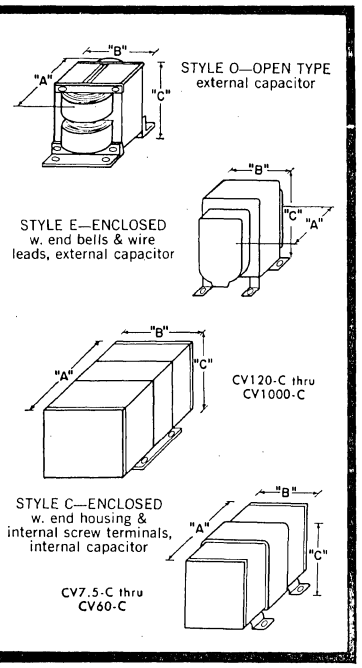
NEW MINIATURE TYPE MCV-1

118 or 5 V output ±1% at 0.6 VA with 95-130 V, 60 cycle input. Only 2 7/16" by 1 25/64" dia including built-in capacitor. $14.10 net. (Also made in any voltage & current combination to max of 0.6 VA @ 60 cy., 5 VA @ 400 cy.)





NTC CONSTANT VOLTAGE TRANSFORMERS

STATIC-MAGNETIC VOLTAGE REGULATING TRANSFORMERS

NORMAL HARMONIC TYPES

- Output capacity from 0.5 to 3,000 VA
- Instantaneous, continuous voltage regulation
- No tubes or manual adjustments
- Ratings made to order at low cost
- Compact, single-unit design
- Low-cost open types for component applications
- Heavy-duty, enclosed types for accessory uses
- Single or multiple secondaries

NTC constant voltage transformers maintain output voltages within one percent with input voltage fluctuations up to 15 percent. Regulation is instantaneous, continuous and completely automatic. Operating on principles of ferro-resonance, the transformers have no tubes, moving parts or separate saturable reactors.

Most important, the design of NTC constant voltage transformers enables their outputs to be made exactly to your specifications — and at decidedly low cost even in small quantities. With only a few basic lamination configurations and windings, virtually any output voltage/current combination can be obtained. *Since the transformers are designed to your specific requirements they often eliminate costly circuitry and expensive components.*

POWER SUPPLIES, too . . . Neshaminy's engineering skills are at your service for the design and quantity production of complete, regulated power supplies in any capacity and rating. Let us discuss your next requirement.

Model	Net User Price	Regulated Output Voltage	Input Voltage Range (60 cycles)	VA Output	Nominal Mounting Centers	Approx. Overall Dimensions, Inches A B C	Approx. Net Wt., lbs.	Style
MCV-1	$ 14.10	5 or 118	95-130	0.6	1 3/16 x 1 3/16	1 25/64 dia. x 2 7/16	6 oz	—
CV7.5—E	13.00	6.3 or 118	95-130	7.5	2 3/8 x 1 1/8	2 1/2 x 4 x 2 3/4	3	E
CV7.5—C	16.00	6.3 or 118	95-130	7.5	3 x 1 5/8	4 5/8 x 3 7/8 x 2 3/4	4	C
CV15—E	14.00	6.3 or 118	95-130	15	2 3/8 x 1 1/2	2 7/8 x 4 x 2 3/4	4	E
CV15—C	17.50	6.3 or 118	95-130	15	3 x 2	5 x 3 7/8 x 2 3/4	5	C
CV30—E	16.75	6.3 or 118	95-130	30	2 3/8 x 2 1/4	3 5/8 x 4 x 2 3/4	6	E
CV30—C	21.00	6.3 or 118	95-130	30	3 x 2 3/4	5 3/4 x 3 7/8 x 2 3/4	7	C
CV60—E	20.25	6.3 or 118	95-130	60	2 3/8 x 3 1/8	4 1/2 x 4 x 2 3/4	8	E
CV60—C	25.00	6.3 or 118	95-130	60	3 x 3 5/8	6 5/8 x 3 7/8 x 2 3/4	9	C
CV120—O	27.80	6.3 or 118	95-130	120	2 5/16 x 5 3/16	4 x 5 7/8 x 5 3/4	12	O
CV120—C	33.50	6.3 or 118	95-130	120	4 5/8 x 6 1/8	9 3/8 x 7 1/16 x 6	14	C
CV150—O	35.00	6.3 or 118	95-130	150	2 5/16 x 5 3/16	4 x 5 7/8 x 5 3/4	14	O
CV150—C	42.00	6.3 or 118	95-130	150	4 5/8 x 6 1/8	9 3/8 x 7 1/16 x 6	16	C
CV250—O	44.00	118	95-130 or 190-260	250	2 11/16 x 5 3/16	4 3/8 x 5 7/8 x 5 3/4	24	O
CV250—C	51.00	118	95-130 or 190-260	250	4 5/8 x 6 1/8	9 3/4 x 7 1/16 x 6	27	C
CV500—O	71.00	118	95-130 or 190-260	500	3 15/16 x 5 3/16	5 5/8 x 5 7/8 x 5 3/4	35	O
CV500—C	78.50	118	95-130 or 190-260	500	4 5/8 x 6 1/8	11 x 7 1/16 x 6	38	C
CV1000—O	115.00	118	95-130 or 190-260	1000	5 3/16 x 6 11/16	8 3/8 x 5 7/8 x 5 3/4	52	O
CV1000—C	130.00	118	95-130 or 190-260	1000	4 3/4 x 6 1/8	14 7/8 x 7 1/16 x 6	56	C

TYPICAL STANDARD MODELS

1% output regulation. Closer regulation to order. Output contains approx 14% total rms harmonic content. SPECIAL MODELS can be made quickly to exact requirements in any step-up or step-down ratio of voltage to current within the desired VA rating and with single or multiple secondaries, with or without centertaps. CV models also available for 50 cycles, and MCV models for 50 or 400 cycles.

NOTES

1. Cord/Receptacle kits, similar to that shown in illustration are available on all "C" style transformers of 118 VAC output rating.
2. Specify required input voltage range on CV transformers from 250 to 1000 VA.
3. To specify output voltage required (6.3 or 118 VAC) add voltage to model number (Example — 15 VA cased transformer with 118 VAC output would be model #CV15-118).
4. "C" style units have built-in capacitors. Styles "E" and "O" have external capacitors.

Send us your requirements for a prompt quotation.

NESHAMINY TRANSFORMER COMPANY Furlong, Pa. 18925 (215) 794-7411

NTC is a division of the Neshaminy Electronic Corporation

Prices and specifications subject to change without notice

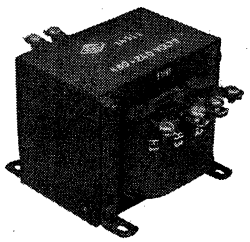
SPECIALISTS IN SPECIAL TRANSFORMERS

POWER & ELECTRONIC

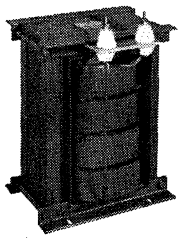
Your one source for all types...designed and manufactured to your specifications or actual requirements

NWL designs and manufactures transformers:

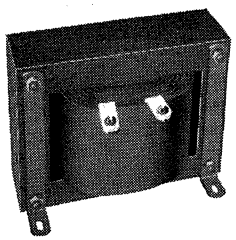
FURNACE
FILAMENT
HEATING
LIGHTING
SCR CONTROLS
PLATE
HIGH FREQUENCY
INSTRUMENT
PHASE CHANGING
WELDING
HIGH VOLTAGE
TESTING
HIGH REACTANCE
OUTPUT
also
SATURABLE CORE REACTORS
CHOKES
AC REACTORS
PACKAGED CONTROLS
AIR CORE REACTORS



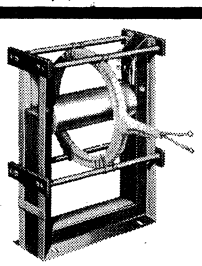
Instrument transformers, current and potential, 1-10,000 amperes, 1-50,000 volts. High accuracy, through type, bus bar, indoor and outdoor.



Plate, audio and modulation transformers in sizes from 50 VA to 100 KVA and up to 100,000 volts.

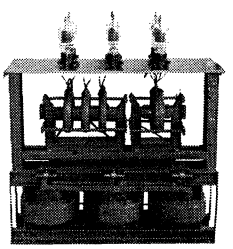


Chokes, linear and swinging. 0.1 millihenry to 10 henry.

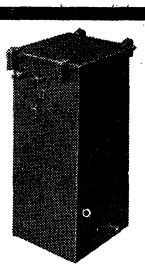


Filament transformers, single and multiple. Up to 100,000 volts, dry and oil types.

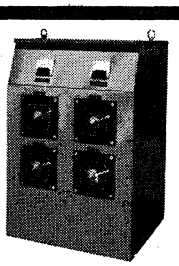
Saturable Core Reactors, from 50 VA to 500 KVA. Single and 3 phase.



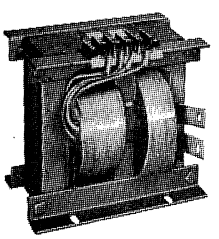
Rectifying transformers and supplies, 1, 2 or 3 phase. 1 to 3,000 amperes, up to 500 KVA.



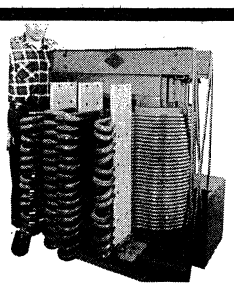
Oil filled specialty and high voltage transformers up to 300 KVA.



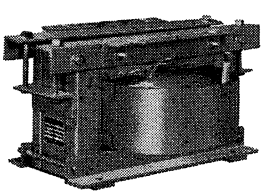
Heating transformers for resistance and induction furnaces. All types. Up to 1200 KVA.



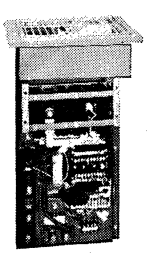
High impedance type transformers, from 50 VA to 50 KVA and up to 10,000 volts.



High power and high current water-cooled transformers.



Reactors, 50 VA to 500 KVA. AC and DC. Linear and swinging.



Solid State SCR Power Controllers.

NWL TRANSFORMERS

NOTHELFER WINDING LABORATORIES

P. O. BOX 455, TRENTON, N. J. 08603 • 609-882-2500

"Call us for quotes or specs."

NORTH HILLS • WIDEBAND TRANSFORMERS AND HYBRIDS

UNBALANCED TO BALANCED TRANSFORMERS

Balanced secondaries center-tapped and dc-isolated from primaries. Power ratings: 1 watt cont., 5, 10, 25, 100 watt versions available. Mid-band insertion loss less than 0.5 dB. Bandwidth defined at low frequency end by 3 dB drop from mid-band response, at high end by max. VSWR of 1.3.

RADIO FREQUENCY SERIES

Response down to 100 kHz. Available in BA, BB, HB cases.

Type No.	Unb/Bal (Ω)	Bandwidth MHz
0001	50:50	.1-125
0101	50:75	.1-125
0200	50:90	.1-125
0300	50:100	.1-100
0307	50:124	.1-100
0400	50:150	.1-100
0500	50:200	.1-100
0501	50:300	.1-100
0600	50:450	.1-65
0700	50:600	.1-65
0800	50:800	.1-60
0900	50:1200	.1-30

Type No.	Unb/Bal (Ω)	Bandwidth MHz
1000	75:50	.1-100
1100	75:75	.1-100
1300	75:100	.1-100
1302	75:124	.1-100
1400	75:150	.1-100
1500	75:200	.1-100
1501	75:300	.1-100
1600	75:450	.1-60
1700	75:600	.1-60
1800	75:800	.1-30
1900	75:1200	.1-30
1906	75:1850	.1-15

MEDIUM FREQUENCY SERIES

Response down to 10 kHz. Available in BA, BB cases.

Type No.	Unb/Bal (Ω)	Bandwidth MHz
0010	50:50	.01-80
0111	50:75	.01-80
0202	50:90	.01-60
0301	50:100	.01-60
0302	50:124	.01-60
0401	50:150	.01-60
0520	50:200	.01-60
0521	50:300	.01-50
0602	50:450	.01-40
0703	50:600	.01-30
0801	50:800	.01-25
0902	50:1200	.01-15

Type No.	Unb/Bal (Ω)	Bandwidth MHz
1001	75:50	.01-60
1112	75:75	.01-60
1310	75:100	.01-60
1311	75:124	.01-60
1405	75:150	.01-60
1513	75:200	.01-60
1514	75:300	.01-60
1601	75:450	.01-40
1707	75:600	.01-30
1801	75:800	.01-20
1905	75:1200	.01-15
1901	75:1850	.01-8

VIDEO SERIES

Response down to 1 kHz. Available in LA, LB cases.

Type No.	Unb/Bal (Ω)	Bandwidth MHz
0009	50:50	.001-25
0311	50:100	.001-20
0306	50:124	.001-20
0303	50:135	.001-18
0511	50:200	.001-15
0517	50:300	.001-12
1102	75:75	.001-25

Type No.	Unb/Bal (Ω)	Bandwidth MHz
1301	75:124	.001-20
1312	75:135	.001-18
1502	75:300	.001-15
1704	75:600	.001-10
1902	75:1200	.001-9
1903	75:1850	.001-6
2300	90:124	.001-15

EXTENDED VIDEO SERIES

Response down to 20 Hz. Available in LA, LB cases.

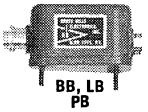
Type No.	Unb/Bal (Ω)	Bandwidth
1111	75:75	20 Hz- 6 MHz
1307	75:110	20 Hz- 6 MHz
1309*	75:124	20 Hz-10 MHz
1706	75:600	20 Hz- 5 MHz

*PB case only.

OVERALL DIMENSIONS (INCHES)

Case	L	W	H
BA	2.3	1.3	1.2
BB	2.6	1.3	1.2
HB	0.9	0.9	0.7
LA	2.8	1.7	1.3
LB	3.2	1.7	1.3
PB	3.0	3.6	2.0

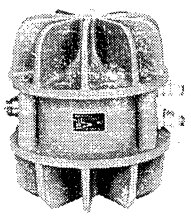
HB


BB, LB PB

BA, LA

Cases are solder-sealed steel cans with glass-to-metal hermetic seal terminals or, respectively, type BNC coax connectors.

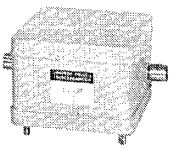
1 kW Series in KA Case — 2 to 32 MHz



Type No.	Impedance Unb/Bal (Ω)
0107	50:75
0513	50:300
0601	50:450
0702	50:600
1108	75:75
1511	75:300
1705	75:600

ISOLATION TRANSFORMERS

GROUND ISOLATION IN 75Ω COAXIAL VIDEO/DATA LINES

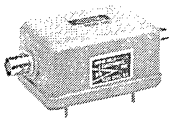


1109-PA: 75Ω Unb: 75Ω Unb.

- 20 Hz to 7 MHz bandwidth.
- Flat frequency, linear phase response.
- Insulated BNC connectors.
- 140 dB isolation at power frequencies.

ISOLATION TRANSFORMERS FOR 50 & 75Ω COAXIAL SYSTEMS

CC case, insulated BNC input and output connectors.



Type No.	Impedance	Bandwidth (MHz)
0005	50:50	.001-20
1103	75:75	.001-20
0112	50:75	.001-20

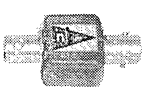
10 KV ISOLATION FOR PUBLIC UTILITY DATA TRANSMISSION

6 kHz to 2.5 MHz bandwidths. Models matching.

- 75Ω coax to 75Ω coax.
- 75Ω coax to 124Ω balanced line.
- Two 75Ω coax inputs to 124Ω balanced line in difference hybrid arrangement.

ULTRA-WIDE SERIES

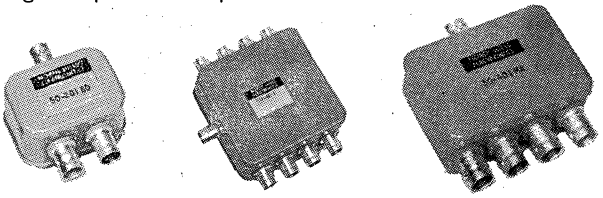
Unbalanced to unbalanced transformers. BNC input and output connectors. Low VSWR. 0.1-300 MHz. Available in JA case only.



0003-JA	50:50	Phase Reversing
1106-JA	75:75	Phase Reversing
0102-JA	50:75	Impedance Adapter

HYBRIDS

Power Dividers and Adders. 2, 4, and 8-Way.
50 and 75Ω ports. 0.5 to 10, 1 to 50, 50 to 250 MHz bands.
Low VSWR and insertion loss, minimum of 30 dB isolation.
Tight amplitude and phase balance.



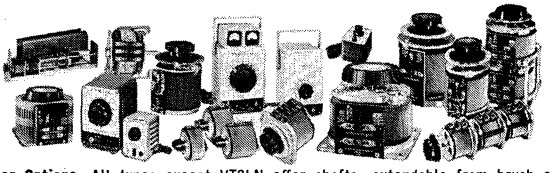
See The RADIO-ELECTRONIC MASTER for NORTH HILLS high performance inductor series.

SEE EEM SECTION 4000 FOR PRECISION POWER SOURCES, AND SECTION 2200 FOR HIGH-PERFORMANCE SYSTEM MODULES

North Hills Electronics, INC.
GLEN COVE, N.Y. 11542 • 516 671-5700

OHMITE has the answer in variable transformers

Seven basic physical types meet most industrial requirements with long, maintenance-free life. Excellent regulation at any point within rated load; free from wave-form distortion. Direct-reading 2-scale (1 per side) dial supplied; CCW also available. New space-saving low power types VT1, VT02 and VT3 have adjustable shaft independent of brush assembly, 3-way terminals, instantly replaceable brush contacts and improved heat dissipation. **Mounting:** Easily replace other brands: VT2LN, VT1, VT02 and VT3 have 3/8-32 thd. bushing; VT8 and VT20, 4-hole bolt mount; VT4, 3-hole bolt mount convertible to 4-hole with adapter plate. **Enclosed Types:** Gray hammertone-finish cases. Units with suffix **B** have exposed terminal panel and mounting base; **E**, fixed type for table or panel mounting; **F**, portable with cord, outlet socket and fuse; **G**, deluxe portable with handle, circuit breaker and switch for overvoltage selection. Final suffix: **V** indicates with voltmeter; **VA**, voltammeter; **VW**, volt/wattmeter; all come with handle except VT8NF series.



Other Options: All types except VT2LN offer shafts, extendable from brush or base side; ganged versions have thru-shaft with same flexibility. Final suffix **C** types come with 3-cond. input and output with one grounded to case. **UL Listing:** Most single and tandem VT4, VT8 and VT20 units for 120 volt operation are U/L Listed. Consult factory.

SINGLE TRANSFORMERS

Ohmite Number	Input Volts	Max. Output Amps	Max. Output Volts	Feature or Connection	Size, Inches W. x D.↓ x H.	Net Each 1-9
PANEL MOUNTING, SINGLE-PHASE 60 HERTZ* (50 Hz for VT4 thru VT20HN)						
VT1†	120	1.3	0-120/132	Low power, space saver	2⅞ dia. x 1 13/16 d.	**$12.50**
VT1N	120	1.5	0-120	Same, no overvoltage	2⅞ dia. x 1 13/16 d.	**12.50**
VT02†	120	2.0	0-120/132	Low power, space saver	2⅞ dia. x 2 5/16 d.	**12.00**
VT02N	120	2.5	0-120	Same, no overvoltage	2⅞ dia. x 2 5/16 d.	**12.00**
VT2LN	40	5.0	0-40	High amps, low volts	2 13/16 dia. x 2 1/8 d.	**14.00**
VT3†	120	3.0	0-120/132	Low power, space saver	2⅞ dia. x 2 13/16 d.	**13.00**
VT3N	120	3.3	0-120	Same, no overvoltage	2⅞ dia. x 2 13/16 d.	**13.00**
VT4	120	3.5	0-120/132	Basic, 3.5-amp model	4 5/32 x 4¾ x 4 13/16	**17.50**
VT4N	120	4.75	0-120	Same, no overvoltage	4 5/32 x 4¾ x 4 13/16	**17.50**
VT4LN	40	12.0	0-40	High amps, low volts	4 5/32 x 4¾ x 4 13/16	**20.00**
VT8	120	7.5	0-120/140	Basic, 7.5-amp model	4⅞ x 5⅝ x 5 11/16	**23.00**
VT8N	120	10.0	0-120	Same, no overvoltage	4⅞ x 5⅝ x 5 11/16	**23.00**
VT8LN	40	22.0	0-40	High amps, low volts	4⅞ x 5⅝ x 5 11/16	**25.50**
VT8H	240‡	3.0	0-240/480	240 V input, 120 V tap	4⅞ x 5⅝ x 5 11/16	**25.50**
VT8HN	240‡	4.0	0-240	Same, no overvoltage	4⅞ x 5⅝ x 5 11/16	**25.50**
VT20	120	20.0	0-120/140	Basic 20-amp model	7½ x 5⅝ x 8 1/16	**63.00**
VT20N	120	25.0	0-120	Same, no overvoltage	7½ x 5⅝ x 8 1/16	**63.00**
VT20H	240‡	9.0	0-240/280	240 V input, 120 V tap	7½ x 5⅝ x 8 1/16	**65.00**
VT20HN	240‡	11.0	0-240	Same, no overvoltage	7½ x 5⅝ x 8 1/16	**65.00**
ENCLOSED, SINGLE-PHASE 60 HERTZ* (50 Hz for VT4E thru VT20HNFC)						
VT1E†	120	.8	0-120/132§	Fixed mounting	3⅜ x 2½ x 4¼	**$20.00**
VT1NE	120	1.0	0-120	Fixed mounting	3⅜ x 2½ x 4¼	**20.00**
VT1F†	120	1.0	0-132 #	Portable	3⅜ x 2½ x 4¼	**23.00**
VT1NF	120	1.2	0-120	Portable	3⅜ x 2½ x 4¼	**23.00**
VT02E†	120	1.4	0-120/132§	Fixed mounting	3⅜ x 2½ x 4¼	**18.50**
VT02NE	120	1.6	0-120	Fixed mounting	3⅜ x 2½ x 4¼	**18.50**
VT02F†	120	1.75	0-132 #	Portable	3⅜ x 2½ x 4¼	**21.00**
VT02NF	120	2.0	0-120	Portable	3⅜ x 2½ x 4¼	**21.00**
VT4E	120	2.8	0-120/140§	Fixed mounting	4½ x 4½ x 6 3/16	**24.00**
VT4NE	120	3.8	0-120	Fixed mounting	4½ x 4½ x 6 3/16	**24.00**
VT4F	120	3.5	0-140 #	Portable	4⅞ x 4½ x 6¼	**26.00**
VT4NF	120	4.75	0-120	Portable	4⅞ x 4½ x 6¼	**26.50**
VT4FC	120	3.5	0-140 #	In/out grounded VT4F	4⅞ x 4½ x 6¼	**30.50**
VT4NFC	120	4.75	0-120	In/out grounded VT4NF	4⅞ x 4½ x 6¼	**30.50**
VT8E	120	6.0	0-120/140§	Fixed mounting	5 3/16 x 5¼ x 7 3/16	**30.00**
VT8NE	120	8.0	0-120	Fixed mounting	5 3/16 x 5¼ x 7 3/16	**29.75**
VT8F	120	7.5	0-140 #	Portable	5 11/32 x 5¼ x 7⅜	**32.00**
VT8NF	120	10.0	0-120	Portable	5 11/32 x 5¼ x 7⅜	**32.00**
VT8FC	120	7.5	0-140 #	In/out grounded VT8F	5 11/32 x 5¼ x 7⅜	**35.75**
VT8NFC	120	10.0	0-120	In/out grounded VT8NF	5 11/32 x 5¼ x 7⅜	**35.75**
VT8G	120	6.0	0-120/140 •	Deluxe portable, handle	5 3/16 ¶ x 5¼ x 7 3/8 ■	**35.75**
VT8GC	120	6.0	0-120/140 •	In/out grounded VT8G	5 3/16 ¶ x 5¼ x 7 3/8 ■	**39.50**
VT20B	120	20.0	0-120/140	Basic case model	7⅝ x 8⅛ x 4⅞ ♦	**69.00**
VT20NB	120	25.0	0-120/140	No overvoltage	7⅝ x 8⅛ x 4⅞ ♦	**69.00**
VT20E	120	20.0	0-120/140§	Fixed mounting	7¾ x 5½ x 10 15/16	**86.00**
VT20NE	120	25.0	0-120	No overvoltage	7¾ x 5½ x 10 15/16	**86.00**
VT20FC	120	20.0	0-140	Portable	8¼ x 5½ x 11¼	**98.00**
VT20NFC	120	25.0	0-120	Portable	8¼ x 5½ x 11¼	**96.00**
VT20GC	120	20.0	0-120/140 •	In/out grounded	7¾ θ x 5½ x 11¼ ■	**110.00**
VT20HB	240‡	9.0	0-240/280	Basic Case model	7⅝ x 8⅛ x 4⅞ ♦	**73.00**
VT20HNB	240‡	11.0	0-240	Same, no overvoltage	7⅝ x 8⅛ x 4⅞ ♦	**73.00**
VT20HE	240‡	9.0	0-240/280§	Fixed mounting	7¾ x 5½ x 10 15/16	**88.00**
VT20HNE	240‡	11.0	0-240	Same, no overvoltage	7¾ x 5½ x 10 15/16	**88.00**
VT20HFC	240‡	9.0	0-240/280	Portable	8¼ x 5½ x 11¼	**98.00**
VT20HNFC	240‡	11.0	0-240	Portable	8¼ x 5½ x 11¼	**98.00**
CASED WITH CORD, RECEPTACLE and METERS, SINGLE-PHASE, 50 HERTZ*						
VT8GCV	120	6.0	0-120/140 •	Voltmeter, grnd. conn.	7 x 5¼ x 10½ ■	**$75.00**
VT8GCVA	120	6.0	0-120/140 •	Volt/ammeter, grounded	7 x 5¼ x 10½ ■	**112.00**
VT8GCVW	120	6.0	0-120/140 •	Volt/wattmeter, grnd.	7 x 5¼ x 10½ ■	**151.00**
VT8NFCV	120	10.0	0-120	Voltmeter, grnd. conn.	7⅜ x 5¼ x 10½	**70.50**
VT8NFCVA	120	10.0	0-120	Volt/ammeter, grounded	7⅜ x 5¼ x 10½	**109.00**
VT8NFCVW	120	10.0	0-120	Volt/wattmeter, grnd.	7⅜ x 5¼ x 10½	**146.00**
VT20GCV	120	20.0	0-120/140 •	Voltmeter, grnd. conn.	8¼ x 5½ x 14 ■	**158.00**
VT20GCVA	120	20.0	0-120/140 •	Volt/ammeter, grounded	8¼ x 5½ x 14 ■	**196.00**
VT20GCVW	120	20.0	0-120/140 •	Volt/wattmeter, grnd	8¼ x 5½ x 14 ■	**281.00**
VT20NFCV	120	25.0	0-120	Voltmeter, grnd. conn.	8¼ x 5½ x 14 ■	**143.00**
VT20NFCVA	120	25.0	0-120	Volt/ammeter, grounded	8¼ x 5½ x 14 ■	**180.00**
VT20NFCVW	120	25.0	0-120	Volt-wattmeter, grnd.	8¼ x 5½ x 14 ■	**265.00**

MULTIPLE, IN-TANDEM TRANSFORMER ASSEMBLIES

SINGLE-PHASE, TWO-IN-TANDEM

Normally wired for series connection; when so connected, load cannot be grounded. Standard CW dial 240/280 volts except VT02 tandems where 240/264 V dial is supplied; on VT8H-2, 480/560 volt dial is standard. Other dials available.

Ohmite Number	Input Volts	Max. Output Amps	Max. Output Volts	Feature or Connection	Size, Inches W. x D.↓ x H.	Net Each 1-4
60 HERTZ* (50 Hz for VT4N-2 to VT20HN-2)						
VT1-2†	240	1.0	0-240/264	Uncased, series conn.	2⅞ x 4 7/32 x 4¼	**$39.00**
VT1N-2	240	1.2	0-240	Same, no overvoltage	2⅞ x 4 7/32 x 4¼	**39.00**
VT02-2†	240	1.75	0-240/264	Uncased, series conn.	2⅞ x 5 7/32 x 4¼	**36.00**
VT02N-2	240	2.0	0-240	Same, no overvoltage	2⅞ x 5 7/32 x 4¼	**36.00**
VT3-2†	240	2.6	0-240/264	Uncased, series conn.	2⅞ x 6 17/32 x 4¼	**37.50**
VT3N-2	240	3.0	0-240	Same, no overvoltage	2⅞ x 6 17/32 x 4¼	**37.50**
VT4-2	240	3.5	0-240/280	Uncased, series conn.	4 5/32 x 7 13/16 x 4 13/16	**49.50**
VT4N-2	240	4.75	0-240	Same, no overvoltage	4 5/32 x 7 13/16 x 4 13/16	**49.50**
VT8-2	240	7.5	0-240/280	Uncased, series conn.	4⅞ x 9 5/16 x 5 11/16	**61.00**
VT8N-2	240	10.0	0-240	Same, no overvoltage	4⅞ x 9 5/16 x 5 11/16	**61.00**
VT8H-2	480‡	3.0	0-480/560	480 V input VT8-2	4⅞ x 9 5/16 x 5 11/16	**66.00**
VT8HN-2	480‡	4.0	0-480	Same, no overvoltage	4⅞ x 9 5/16 x 5 11/16	**66.00**
VT20-2	240	20.0	0-240/280	Uncased, series conn.	7½‡* x 10 x 8 1/16	**144.00**
VT20N-2	240	25.0	0-240	Same, no overvoltage	7½‡* x 10 x 8 1/16	**144.00**
VT20-2B	240	20.0	0-240/280	B-cased version VT20-2	7½ x 10½ x 8 1/16	**157.00**
VT20N-2B	240	25.0	0-240	Same, no overvoltage	7½ x 10½ x 8 1/16	**157.00**
VT20H-2	480‡	9.0	0-480/560	480 V input VT20-2	7½‡* x 10 x 8 1/16	**149.00**
VT20HN-2	480‡	11.0	0-480	Same, no overvoltage	7½‡* x 10 x 8 1/16	**149.00**

THREE-PHASE, TWO-IN-TANDEM

Supplied with 240/280 volt CW dial, except VT02 (204/264 V). Other dials available. See similar listing in Radio Master.

Ohmite Number	Input Volts	Max. Output Amps	Max. Output Volts	Feature or Connection	Size, Inches W. x D.↓ x H.	Net Each 1-4
60 HERTZ* (50 Hz for VT4-2 to VT20HN-2)						
VT1-2†	120	1.0	0-120/132	Uncased, open delta con.	2⅞ x 4 7/32 x 4¼	**$39.00**
VT1N-2	120	1.2	0-120	Same, no overvoltage	2⅞ x 4 7/32 x 4¼	**39.00**
VT02-2†	120	1.75	0-120/132	Uncased, open delta con.	2⅞ x 4 7/32 x 4¼	**36.00**
VT02N-2	120	2.0	0-120	Same, no overvoltage	2⅞ x 4 7/32 x 4¼	**36.00**
VT3-2†	120	2.6	0-120/132	Uncased, open delta con.	2⅞ x 6 17/32 x 4¼	**37.50**
VT3N-2	120	3.0	0-120	Same, no overvoltage	2⅞ x 6 17/32 x 4¼	**37.50**
VT4-2	120	3.5	0-120/140	Uncased, open delta con.	4 5/32 x 7 13/16 x 4 13/16	**49.50**
VT4N-2	120	4.75	0-120	Same, no overvoltage	4 5/32 x 7 13/16 x 4 13/16	**49.50**
VT8-2	120	7.5	0-120/140	Uncased, open delta con.	4⅞ x 9 5/16 x 5 11/16	**61.00**
VT8N-2	120	10.0	0-120	Same, no overvoltage	4⅞ x 9 5/16 x 5 11/16	**61.00**
VT8H-2	240‡	3.0	0-240/280	240 V input VT-2	4⅞ x 9 5/16 x 5 11/16	**66.00**
VT8HN-2	240‡	4.0	0-240	Same, no overvoltage	4⅞ x 9 5/16 x 5 11/16	**66.00**
VT20-2	120	20.0	0-120/140	Uncased, open delta con.	7½‡* x 10 x 8 1/16	**144.00**
VT20N-2	120	25.0	0-120	Same, no overvoltage	7½‡* x 10 x 8 1/16	**144.00**
VT20-2B	120	20.0	0-120/140	B-case version VT20-2	7½ x 10½ x 8 1/16	**157.00**
VT20N-2B	120	25.0	0-120	Same, no overvoltage	7½ x 10½ x 8 1/16	**157.00**
VT20H-2	240‡	9.0	0-240/280	240 V input VT20-2	7½‡* x 10 x 8 1/16	**149.00**
VT20HN-2	240‡	11.0	0-240	Same, no overvoltage	7½‡* x 10 x 8 1/16	**149.00**

THREE-PHASE, THREE-IN-TANDEM

Normally wired for Y-connection. Standard CW dial 240/280 volts except VT02 types where 240/264 V dial is supplied, and VT8H-3, where 480/560 volt dial is standard. Other dials available as listed elsewhere on these pages.

Ohmite Number	Input Volts	Max. Output Amps	Max. Output Volts	Feature or Connection	Size, Inches W. x D.↓ x H.	Net Each 1-3
60 HERTZ*						
VT1-3	240	1.0	0-240**	Uncased, Y-connection	2⅞ x 6 17/32 x 4¼	**$57.00**
VT02-3	240	1.75	0-240**	Uncased, Y-connection	2⅞ x 8 1/32 x 4¼	**52.00**
VT3-3	240	2.6	0-240**	Uncased, Y-connection	2⅞ x 9 29/32 x 4¼	**55.00**
VT4-3†	240	3.5	0-240/280	Uncased, Y-connection	4 5/32 x 11 7/8 x 4 13/16	**71.00**
VT8-3†	240	7.5	0-240/280	Uncased, Y-connection	4⅞ x 14 1/8 x 5 11/16	**88.00**
VT8-3E†	240	6.0	0-240/280	Uncased, Y-connection	5 3/16 x 15 3/4 x 7 3/16	**107.00**
VT8H-3†	480‡	3.0	0-480/560	Uncased, Y-connection	4⅞ x 14 1/8 x 5 11/16	**96.00**
VT20-3†	240	20.0	0-240/280	E-case version VT8-3	7½‡* x 15 1/16 x 8 1/16	**211.00**
VT20N-3	240	25.0	0-240	No overvoltage VT20-3	7½‡* x 15 1/16 x 8 1/16	**211.00**
VT20-3B†	240	20.0	0-240/280	B-case version VT20-3	7½ x 15 13/16 x 8 1/16	**231.00**
VT20N-3B	240	25.0	0-240	Same, no overvoltage	7½ x 15 13/16 x 8 1/16	**231.00**
VT20H-3	480‡	9.0	0-480/560	480 V input VT20-3	7½‡* x 15 1/16 x 8 1/16	**219.00**
VT20HN-3	480‡	11.0	0-480	Same, no overvoltage	7½‡* x 15 1/16 x 8 1/16	**219.00**

*Minimum; max. up to 1000 cps for all models. †Use also at 50 cps if connected at no overvoltage output. ‡With 120V input tap at which the max. current output rating applies up to 120 volts, but reduces approx. 50% at max. output voltage shown. In tandem units, the use of low voltage inputs would halve the rated input and output voltages. §User wires for desired output; dial normally calibrated for overvoltage. #Factory-connected for overvoltage output; easily re-connected by user for no overvoltage. •Switch selects overvoltage or no overvoltage. ¶5¾" including handle. ■Case height only, excluding handle. ♦Depth behind panel: add 1" for knob thickness for VT8 types; ⅞", VT02 or VT4 types; 1¼" for VT20 types. θ9" including handle. ††Includes knob, dial and hardware. **Must not be connected for overvoltage. ‡ For mounting bracket, add 1¼" w. x 7/16" d.

TRANSFORMER ACCESSORIES

Extra Dials, Extra Knobs for Uncased Units, Adjustable Stops, Brush Contact Assemblies, and Special Mounting Adapters are available for Ohmite Variable Transformers. See Radio Master for Complete Details.

OHMITE MFG. CO., a NORTH AMERICAN PHILIPS company • 3635 HOWARD STREET, SKOKIE, ILLINOIS 60076 • PHONE (312) 675-2600 • TWX 910-223-0805

PERKIN-ELMER

PRECISION TOROIDAL TRANSFORMERS

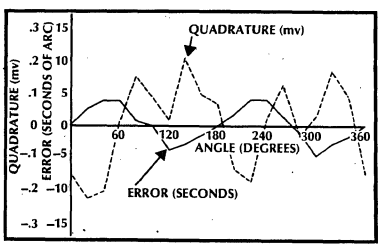
- **INPUT SCOTT T**
- **OUTPUT SCOTT T**
- **COMBINATION**
- **RESOLVER ISOLATION**
- **REFERENCE ISOLATION**
- **DIGITALLY TAPPED**
- **PRECISION RATIO**
- **CUSTOM DESIGNS**

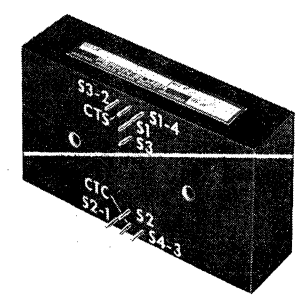
The Electronic Products Department of the Perkin-Elmer Corporation is in a unique position to provide Custom Precision Signal Transformers as a result of 15 years of experience designing and manufacturing very special transformers for the Vernistat® a.c. potentiometer and allied products. **High Performance in small size has always been a successful objective.** Our State of The Art Winding Equipment and Techniques enable close control of turns and taps for close matching of windings and repeatability of product.

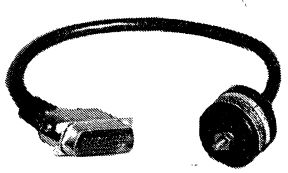
Perkin-Elmer can provide Custom Signal Transformers with high accuracies over the full MIL temperature range. For example, exponential function units with 80 taps to an accuracy of ±0.003% can be provided. SCOTT T Transformers have been built to an accuracy of 5 seconds of arc with a null of 0.1 millivolt. The transformers are fully encapsulated toroidal units and are available with contact pins for PC board mounting. They are manufactured in accordance with MIL-T-27B Grade 5. High input impedance and low output impedance can be matched to specifications. Operating frequency can also be per specifications.

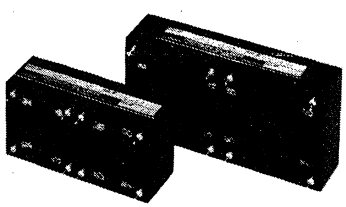
SCOTT T TRANSFORMERS

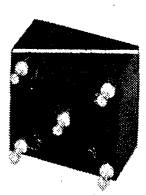
The SCOTT T input transformers converts 3 wire synchro inputs to 4 wire resolver outputs (sin θ and cos θ) with high transformation accuracy and minimum quadrature. SCOTT T Transformers for converting 4 wire resolver inputs to 3 wire synchro outputs can also be supplied. Our output SCOTT T Transformers maintain high accuracies even under heavy load conditions. These units are useful in solid state synchro to digital and digital to synchro converter applications and are particularly applicable in multiplexed conversion systems.











INPUT SCOTT T TRANSFORMERS (SYNCHRO TO RESOLVER)

Input V rms L-L	Output V rms	Load K Ω	Trans. Accuracy Arc. Sec.	Output Quadrature Null mV	Z in K Ω	Z out Ω	Dimensions L x W x H	Mount	Part Number
11.8	2.5	5	20	1.0	25	5	2x1x.6	PC 2x4-40	403-2074
	5.0	20	30	1.0	50	75	2x1x.6	PC 2x4-40	403-2064
	7.2 CT	10 to CT	60	1.0	20	10 to CT	2x1x.6	PC 2x4-40	403-2065
	10.2	10	60	2.0	50	50	2x1x.6	PC 2-4-40	403-2066
12	7.5	10	15	1.0	50	75	2x1x.6	PC 2x4-40	403-2055
90	1.1	10	15	0.03	300	1	2x1x1.1	PC 2x4-40	403-2078
	4.25	10	30	1.0	1000	11	2.5x1.25x.65	PC 2x4-40	403-2034
	4.25 CT	10	30	1.0	1000	11	2.78x1.41x.8	PC 2x4-40	403-2033
	17.8 CT	2.3 to CT	30	.7	100	12 to CT	2.78x1.41x.8	PC 2x4-40	403-2019
	26.0 CT	10 to CT	30	1.4	100	15 to CT	2.78x1.41x.8	PC 2x4-40	403-2051
90 (60 Hz)	14 CT	100 to CT	360	12.0	45	15 to CT	4x2.25x1.15	2x6-32	403-2058
96	14.4 CT	10 to CT	15	.25	200	12 to CT	2.78x1.41x.8	PC 2x4-40	403-2067
			45	.75	200	12 to CT	2.78x1.41x.8	PC 2x4-40	403-2068
			180	5.0	30	12 to CT	2.78x1.41x.8	PC 2x4-40	403-2069
	20 CT	10 to CT	15	.25	200	10 to CT	2.78x1.41x.8	PC 2x4-40	403-2007

COMBINATION INPUT SCOTT T TRANSFORMERS

11.8 2 channel	5.0	20	30	1.0	50	45	2x1x.8	PC 2x4-40	403-2042
11.8 3 channel	3.2	300	45	.5	50	20	2.94x1.06x.8	PC 2x4-40	403-2048

COMBINATION SCOTT T / RESOLVER ISOLATION

Scott T 11.8 OR Resolver 26	6.0	20	30	1.0	35	20	2x1x.6	PC 2x4-40	403-2070
	6.0	20	30	1.0	300	20			

OUTPUT SCOTT T TRANSFORMERS (RESOLVER TO SYNCHRO)

Output V rms	Input V rms L-L	Load Ω L-L	Trans. Accuracy Arc. Sec.	Output Quadrature Null mV	Z in K Ω	Z out Ω	Dimensions L x W x H	Mount	Part Number
11.8	4.7	150	1	15	.25	7	2.78x1.41x.8	PC 2x4-40	403-2027
			6	20	.20	7	2.78x1.41x.8	PC 2x4-40	403-2028
	6	150	2	8	.5	8	2.78x1.41x.61	PC 2x4-40	403-2071
	5 F.B. 2.5	100	3	8	.35	8	2.78x1.41x.61	PC 2x4-40	403-2075
	11.8 F.B. 6 CT	25	6	12	.8	2	2.78x1.41x.61	PC 2x4-40	403-2056
90	7 F.B. 2.8	6000	1.5	50	3.0	600	2x1x1.1	PC 2x4-40	403-2077

F.B. = Feedback winding.

RESOLVER ISOLATION TRANSFORMERS

Output V rms L-L	Input V rms L-L	Load K Ω L-L	Trans. Accuracy Arc. Sec.	Output Quadrature Null mV	Z in K Ω	Z out Ω	Dimensions L x W x H	Mount	Part Number
7	7 (5 KHz)	10	.5	2	50	25	2x1x.6	PC 2x4-40	403-2072
9 CT	11.8	25 to CT	.3	1	80	50 to CT	1.63x.81x.5	PC	403-2063
11.1	6	.4	2	36	6	14	2.5x1.25x.65	PC 2x4-40	403-2003
26	6	6	3	36	.2	10	2.78x1.41x.61	PC 2x4-40	403-2073

PRECISION REFERENCE ISOLATION TRANSFORMERS

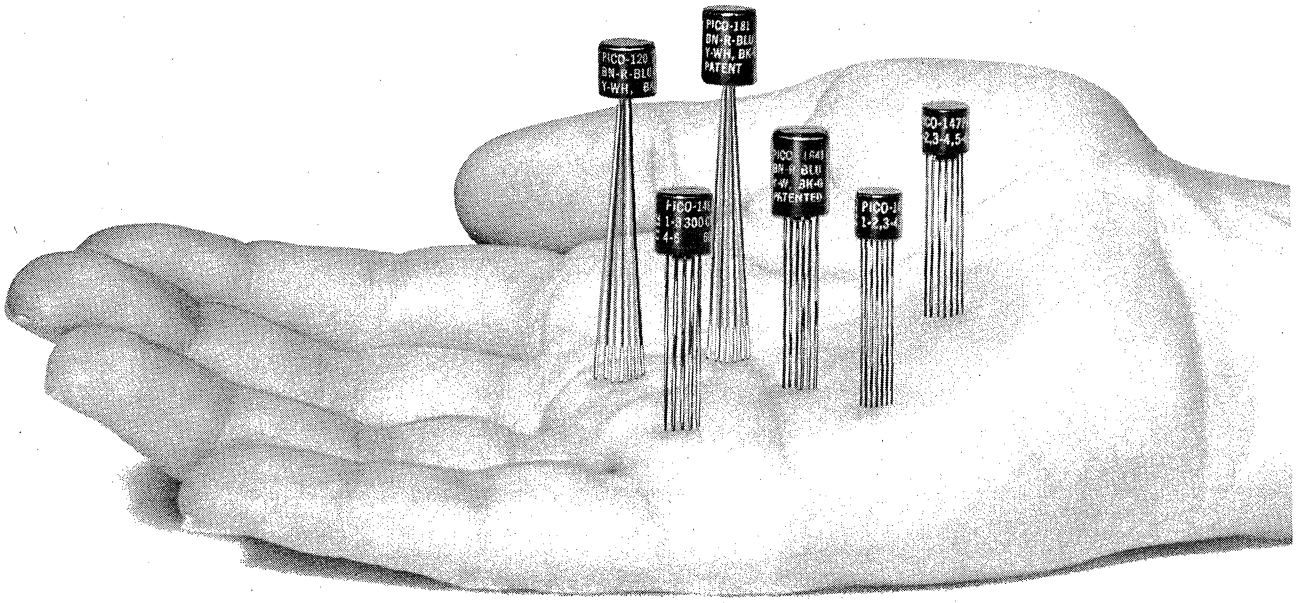
Output V rms	Input V rms	Load K Ω	Trans. Accuracy %	Output Quadrature Null mV	Z in K Ω	Z out Ω	Dimensions L x W x H	Mount	Part Number
3	115	90	.05	2.5	40	.7	1.5x1.5x.75	PC 1x6-32	403-2061
	26			5	4.5				
	115	10	.1	2.5	125	3	1x1x.5	PC	403-2079
5	26	.4	.1	1	100	5.5	1x1x.58	PC	403-2026
		1.0	.1	8	15	15	1x1x.58	PC	403-2036
6	26	10	.01	2.5	70	15	1x1x.58	PC	403-2040
			.02	2.5	70	15	1x1x.58	PC	403-2041
6 CT	26	45 to CT	.1	1.5	100	4 to CT	1.25x1.25x.5	PC	403-2015
20	20	5	.2	2	50	140	1x1x.5	PC	403-2062
30	7.5	50	.2	200	.5	225	.88x.88x.88	2x2-56	403-2047

Operating Temperature Range −55°C to +125°C. Frequencies 400 Hz except as otherwise stated.

Manufactured in accordance with MIL-T-27 Grade 5. Specified transformation accuracies are with stated load.

For information on price, delivery and other standard or custom designed transformers call or write
THE PERKIN-ELMER CORPORATION • ELECTRONIC PRODUCTS DEPT. • 131 Danbury Road, Wilton, Connecticut 06897 • Telephone (203) 762-6574 or 762-4786
Contact us about our **VERNISTAT® a.c. Potentiometers, Adjustable Function Generators and Digital Converters.**

This is a line of the smallest transformers ever offered...



that can meet all of these specs!

Pico Electronics has made a design breakthrough in the ultra-miniaturization of audio transformers.

All Pico units are guaranteed to meet MIL-T-27C. Every transformer is hermetically sealed in a metal case. Each will pass thermal shock requirements of MIL-STD-202D, Method 107, Test Condition A-1 (25 cycles).

Pico Electronics is a QPL source.

PICO Electronics, Inc. 316 WEST FIRST STREET
MOUNT VERNON, N.Y. 10550
Telephone 914-699-5514

Send today for 1971 24 page Pico Catalog

.25" diameter x .25" height / Pico-F

- Primary and secondary impedances 3 ohms to 30K ohms
- ±2 DB 300Hz—250KHz
- 90 milliwatts at 1KHz
- Inductors to 10 henries
- Plug-in construction with terminals spaced the same as "TO-5" transistors

.34" diameter x .34" height / Pico-C

- Primary and secondary impedances 3 ohms to 40K ohms
- ±30B 400Hz—100 KHz
- 600 Milliwatts at 1KHz
- Inductors to 20 henries
- Plug-in construction with terminals spaced the same as "TO-5" transistors

.34" diameter x .49" height / Pico-D

- Primary and secondary impedances 3 ohms to 250K ohms
- ±3 DB 300Hz—100KHz
- 600 milliwatts at 1KHz
- Inductors to 50 henries
- Plug-in construction with terminals spaced the same as "TO-5" transistors

.34" diameter x .3" height / Pico-B

- Primary and secondary impedances 3 ohms to 40K ohms
- ±3 DB 400Hz—100KHz
- 600 Milliwatts at 1KHz
- Inductors to 20 henries
- Flying lead construction

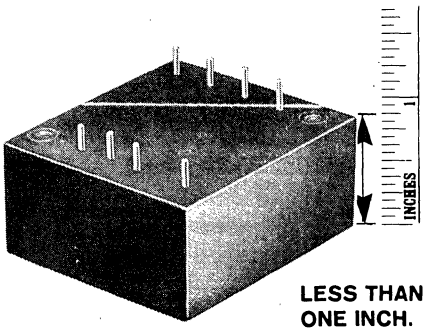
.34" diameter x .45" height / Pico-A

- Primary and secondary impedances 3 ohms to 250K ohms
- ±3 DB 300Hz—100KHz
- 600 Milliwatts at 1KHz
- Inductors to 50 henries
- Flying lead construction

(All PICO Products are patented)

FLAT

EPOXY MOLDED PLUG-IN POWER TRANSFORMERS FOR PRINTED CIRCUIT APPLICATION ALLOW ONE INCH CARD SPACING.



LESS THAN ONE INCH.

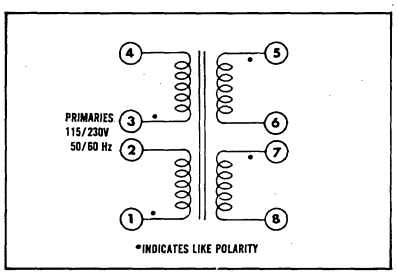
MAXIMUM HEIGHT OF 0.850 INCHES - Allows stacking with 1 inch space between PC cards.

6 VA @ 50/60 HZ - in 0.850 inch height, 7 oz weight - 40° C max. temperature rise.

EPOXY MOLDED - completely sealed - class S construction

HUM-BUCKING CONSTRUCTION - Reduced magnetic field - balanced windings.

DUAL PRIMARIES - 115/230V - 50/60HZ



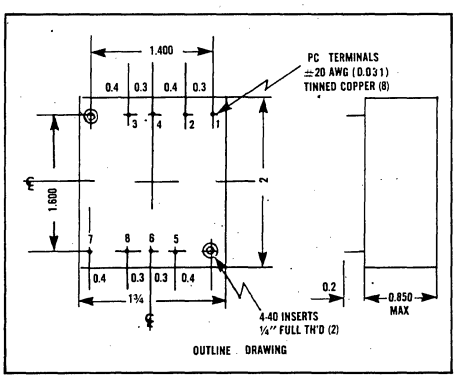
	SECONDARY*	
PART NUMBER	SERIES	PARALLEL
FP-10-600	10V CT @ 600 MA	5V @ 1.2A
FP-12-450	12.6V CT @ 450 MA	6.3V @ 900 MA
FP-16-350	16V CT @ 350 MA	8V @ 700 MA
FP-20-300	20V CT @ 300 MA	10V @ 600 MA
FP-24-250	24V CT @ 250 MA	12V @ 500 MA
FP-34-170	34V CT @ 170 MA	17V @ 340 MA
FP-40-150	40V CT @ 150 MA	20V @ 300 MA
FP-56-100	56V CT @ 100 MA	28V @ 200 MA
FP-88-65	88V CT @ 65 MA	44V @ 130 MA
FP-120-50	120V CT @ 50 MA	60V @ 100 MA
FP-230-25	230V CT @ 25 MA	115V @ 50 MA

*CORRESPONDS TO 30% REGULATION, I.E., NO LOAD SECONDARY VOLTAGE IS 30% HIGHER THAN FULL LOAD.

Signals "FP" series of epoxy molded PC plug-in power transformers offer the main advantage of 0.850 inch height with a 6VA rating at 50/60HZ. This allows its use in PC boards stacked with 1 inch centers.

Internal construction is semi-toroidal (hum bucking) which results in a reduced radiated magnetic field and balanced windings. All materials used are at least class S in rating. The transformer is completely molded and sealed in epoxy. Two 4-40 inserts are provided to assure secure mechanical mounting.

The dual primary and secondary windings offer a large diversity of output combinations with a 115/230V input. The voltages and currents are ideal for power applications in semi-conductor control and instrumentation such as single or dual output DC supplies and isolated control circuit and reference supplies.



- **We can quote on your specials up to 6 VA**
- **New sizes for ratings up to 25 VA are currently under development. Please check with us on your requirements.**

ANY UNIT
QUANTITY 1-9 pieces
$9.50 net.

SIGNAL TRANSFORMER CO., INC

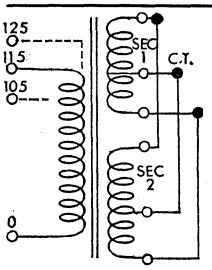
FACTORY: 1 JUNIUS ST., BROOKLYN, N. Y. 11212 • (212) 498-5111

SHIPPED FROM STOCK IMMEDIATELY

HIGH & LOW CURRENT TRANSFORMERS

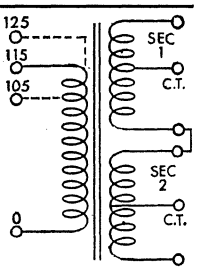
OPEN FRAME • EPOXY ENCAPSULATED (GRADE 5) • HERMETICALLY SEALED (GRADE 4)

SECONDARY VOLTS	Part No.	Primary Volts 50-500CPS	SECONDARY AMPS Series	Parallel	OPEN FRAME OR EPOXY ENCAPSULATED* Mtg. Style	L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.	HERMETICALLY SEALED IN STEEL CASE‡ L	W	H	ML	MW	Mtg. Stud
10 or 5 V C.T. Series 0 - 2.5 - 5 - 7.5 - 10 V Parallel 0 - 2.5 - 5 V @ 2 x Current	10-0.1	115	0.1	0.2	C	2	1½	1¾	1 23/32	—	#8	0.3	1⅝	⅝	2 3/16	1 3/16	1 3/16	6-32 x ⅜
	10-0.25	115	0.25	0.5	C	2⅜	1½	2	2	—	#8	0.5	1 15/16	1 3/16	2 7/16	1⅜	1¼	6-32 x ⅜
	10-0.5	115	0.5	1.0	C	2⅜	1¾	2	2	—	#8	0.8	1 15/16	1 3/16	2 7/16	1⅜	1¼	6-32 x ⅜
	10-1	115	1	2	C	2⅞	1¾	2 5/16	2⅜	—	#8	1.0	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
	10-2	115	2	4	C	3⅛	2⅛	2¾	2 13/16	—	#8	1.5	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
	10-4	115	4	8	C	3 7/16	2⅜	3 1/16	3⅛	—	#8	2.3	3¼	2¾	2⅞	2½	2	8-32 x ⅜
	10-6	115	6	12	B	3⅜	2¾	2 13/16	2 13/16	2⅛	#8	3.3	3⅝	3	3¼	2 13/16	2⅛	8-32 x ⅜
	10-8	115	8	16	B	3⅜	3⅛	2 13/16	2 13/16	2½	#8	4.0	3⅝	3⅜	3¼	2 13/16	2⅜	8-32 x ⅜
	10-12	115	12	24	B	3¾	3¼	3⅛	3⅛	2½	#8	5.0	4⅛	3¾	3½	3⅛	2½	10-32 x ½
	10-25	115	25	50	B	4½	3¾	3¾	3¾	2¾	#10	8.7	4¾	5¼	4¼	3¾	4¼	10-32 x ½
	10-50	105, 115, 125	50	100	B	5¼	5½	4⅜	4⅜	3⅝	¼	17.0	5½	7	5½	4⅜	5⅞	¼-20 x ⅝
	10-100	105, 115, 125	100	200	B	6⅜	7¼	5 5/16	5 5/16	4⅜	¼	34.5	6¾	8¾	6½	5 5/16	6¼	¼-20 x ⅝
12.8 or 6.4 C.T. Series 0 - 3.2 - 6.4 - 9.6 - 12.8 V Parallel 0 - 3.2 - 6.4 V @ 2 x Current	12.8-0.1	115	0.1	0.2	C	2	1½	1¾	1 23/32	—	#8	0.3	1⅝	⅝	2 3/16	1 3/16	1 3/16	6-32 x ⅜
	12.8-0.25	115	0.25	0.5	C	2⅜	1½	2	2	—	#8	0.5	1 15/16	1 3/16	2 7/16	1⅜	1¼	6-32 x ⅜
	12.8-0.5	115	0.5	1	C	2⅞	1⅝	2 5/16	2⅜	—	#8	0.8	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
	12.8-1	115	1	2	C	2⅞	2	2 5/16	2⅜	—	#8	1.2	2 5/16	2 1/16	2½	1 11/16	1 7/16	6-32 x ⅜
	12.8-2A	115	2	4	C	3⅛	2⅛	2¾	2 13/16	—	#8	1.5	2¾	2⅝	2⅞	2⅛	1¾	6-32 x ⅜
	12.8-2	115	2	4	B	3	2½	2½	2½	2	#8	2.3	3¼	2¾	2⅞	2½	2	8-32 x ⅜
	12.8-4	115	4	8	B	3	2⅞	2½	2½	2⅜	#8	2.8	3¼	3⅛	2⅞	2½	2⅜	8-32 x ⅜
	12.8-6	115	6	12	B	3⅜	3 1/16	2 13/16	2 13/16	2½	#8	4.0	3⅝	3⅜	3¼	2 13/16	2⅜	8-32 x ⅜
	12.8-8	115	8	16	B	3¾	3⅛	3⅛	3⅛	2¼	#8	4.5	4⅛	3½	3½	3⅛	2¼	10-32 x ½
	12.8-12	115	12	24	B	4⅛	3¼	3 7/16	3 7/16	2⅜	#10	6.0	4½	3¾	3⅞	3 7/16	2⅜	10-32 x ½
	12.8-25	115	25	50	B	5¼	4¼	4⅜	4⅜	2⅞	#10	12.5	5½	5¾	5¼	4⅜	4⅝	¼-20 x ⅝
	12.8-50	105, 115, 125	50	100	B	5¼	6	4⅜	4⅜	4⅛	¼	20.7	5½	7½	5½	4⅜	6⅜	¼-20 x ⅝
	12.8-100	105, 115, 125	100	200	B	6⅜	7¼	5 5/16	5 5/16	4⅜	¼	34.5	6¾	8¾	6½	5 5/16	6¼	¼-20 x ⅝
16 or 8 V C.T. Series 0 - 4 - 8 - 12 - 16 V Parallel 0 - 4 - 8 @ 2 x Current	16-0.1	115	0.1	0.2	C	2	1⅝	1¾	1 23/32	—	#8	0.4	1⅝	⅝	2 3/16	1 3/16	1 3/16	6-32 x ⅜
	16-0.25	115	0.25	0.5	C	2⅜	1¾	2	2	—	#8	0.7	1 13/16	1 3/16	2 7/16	1⅜	1¼	6-32 x ⅜
	16-0.5	115	0.5	1	C	2⅞	1⅝	2 5/16	2⅜	—	#8	0.8	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
	16-1	115	1	2	C	2⅞	2	2 5/16	2⅜	—	#8	1.2	2 5/16	2 1/16	2½	1 11/16	1 7/16	6-32 x ⅜
	16-2	115	2	4	C	3⅛	2¼	2¾	2 13/16	—	#8	1.7	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
	16-4	115	4	8	B	3⅜	2¾	2 13/16	2 13/16	2⅛	#8	3.3	3⅝	3	3¼	2 13/16	2⅛	8-32 x ⅜
	16-6	115	6	12	B	3¾	3⅛	3⅛	3⅛	2¼	#10	4.5	4⅛	3½	3½	3⅛	2¼	10-32 x ½
	16-8	115	8	16	B	3¾	3½	3⅛	3⅛	2⅜	#10	5.4	4⅛	3¾	3½	3⅛	2½	10-32 x ½
	16-12	115	12	24	B	4⅛	3⅞	3⅝	3 7/16	3	#10	7.9	4½	4½	3⅞	3 7/16	3	10-32 x ½
	16-25	115	25	50	B	4½	5⅜	4	3¾	4	#10	14.5	4¾	6½	4¼	3¾	5½	10-32 x ½
	16-50	105, 115, 125	50	100	B	6⅜	5¾	5 5/16	5 5/16	3¾	¼	26.5	6¾	6⅝	6	5 5/16	5⅛	¼-20 x ⅝
	16-100	105, 115, 125	100	200	B	7½	7½	6⅜	6¾	4⅝	¼	50.0	8	8½	7	6¾	7¼	¼-20 x ⅝
24 or 12 C.T. Series 0 - 6 - 12 - 18 - 24 V Parallel 0 - 6 - 12 V @ 2 x Current	24-0.1	115	0.1	0.2	C	2⅜	1½	2	2	—	#8	0.5	1 15/16	1 13/16	2 7/16	1⅜	1¼	6-32 x ⅜
	24-0.25	115	0.25	0.5	C	2⅞	1¾	2 5/16	2⅜	—	#8	1.0	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
	24-0.5	115	0.5	1	C	2⅞	2	2 5/16	2⅜	—	#8	1.2	2 5/16	2 1/16	2½	1 11/16	1 7/16	6-32 x ⅜
	24-1A	115	1	2	C	3⅛	2⅛	2¾	2 13/16	—	#8	1.5	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
	24-1	115	1	2	B	3	2½	2½	2½	2	#8	2.3	3¼	2¾	2⅞	2½	2	8-32 x ⅜
	24-2	115	2	4	B	3	2⅞	2½	2½	2⅜	#8	2.9	3¼	3⅛	2⅞	2½	2⅜	8-32 x ⅜
	24-4	115	4	8	B	3¾	3⅛	3⅛	3⅛	2¼	#8	4.5	4⅛	3½	3½	3⅛	2¼	10-32 x ½
	24-6	115	6	12	B	4⅛	3¼	3 7/16	3 7/16	2⅜	#10	5.8	4½	3¾	3⅞	3 7/16	2⅜	10-32 x ½
	24-8	115	8	16	B	4⅛	3⅞	3⅝	3 7/16	3	#10	7.9	4½	4½	3⅞	3 7/16	3	10-32 x ½
	24-12	105, 115, 125	12	24	B	4½	4½	3¾	3¾	3⅜	#10	11.0	4¾	5⅜	4¼	3¾	4⅜	10-32 x ½
	24-20	105, 115, 125	20	40	B	5¼	4¾	4⅜	4⅜	3⅜	¼	15.3	5½	5½	5¼	4⅜	3½	¼-20 x ⅝
	24-25	105, 115, 125	25	50	B	5¼	5⅝	4⅜	4⅜	4⅛	¼	19.5	5½	6½	5¼	4⅜	5⅜	¼-20 x ⅝
	24-50	105, 115, 125	50	100	B	6⅜	6¼	5 5/16	5 5/16	4⅜	¼	31.3	6¾	7½	6	5 5/16	6	¼-20 x ⅝
	24-100	115/230	100	200	B	7½	7	6⅜	6¾	4⅛	¼	43	8	8	7	6¾	6¾	¼-20 x ⅝
36 or 18 V C.T. Series 0 - 9 - 18 - 27 - 36 V Parallel 0 - 9 - 18 V @ 2 x Current	36-0.1	115	0.1	0.2	C	2⅜	1⅝	2	2	—	#8	0.5	1 15/16	1 13/16	2 7/16	1⅜	1¼	6-32 x ⅜
	36-0.25	115	0.25	0.5	C	2⅞	1⅝	2 5/16	2⅜	—	#8	0.8	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
	36-0.5	115	0.5	1	C	3⅛	2	2¾	2 13/16	—	#8	1.3	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
	36-1A	115	1	2	C	3 3/16	2⅜	3 1/16	3⅛	—	#8	2.3	3¼	2¾	2⅞	2½	2	8-32 x ⅜
	36-1	115	1	2	B	3	2¾	2½	2½	2¼	#8	2.6	3¼	3⅛	2⅞	2½	2⅜	8-32 x ⅜
	36-2	115	2	4	B	3⅜	2 15/16	2 13/16	2 13/16	2⅜	#8	3.8	3⅝	3⅜	3¼	2 13/16	2⅜	8-32 x ⅜
	36-4	115	4	8	B	4⅛	3⅜	3 7/16	3 7/16	2⅝	#10	6.8	4½	3¾	3⅞	3 7/16	2⅜	10-32 x ½
	36-6	115	6	12	B	4½	3¾	3¾	3¾	2¾	#10	8.7	4¾	4¼	4¼	3¾	2⅞	10-32 x ½
	36-8	105, 115, 125	8	16	B	4½	4½	4⅛	3¾	3⅜	#10	11.0	4¾	5	4⅜	3¾	3⅜	10-32 x ½
	36-12	105, 115, 125	12	24	B	5¼	5	4⅜	4⅜	3⅜	¼	15.0	5½	5½	5¼	4⅜	3½	¼-20 x ⅝
	36-20	105, 115, 125	20	40	B	6⅜	5⅜	5 5/16	5 5/16	3⅜	¼	22.8	6¾	5¾	5¾	5 5/16	4¼	¼-20 x ⅝
	36-25	105, 115, 125	25	50	B	6⅜	5¾	5 5/16	5 5/16	3¾	½	26.5	6¾	6⅝	6	5 5/16	5⅛	¼-20 x ⅝
	36-30	105, 115, 125	30	60	B	6⅜	6	5 5/16	5 5/16	4⅜	¼	31.5	6¾	7½	6	5 5/16	6	¼-20 x ⅝
	36-50	115/230	50	100	B	6⅜	7¼	5 5/16	5 5/16	5⅛	¼	40.0	6¾	8	6	5 5/16	6½	¼-20 x ⅝
	36-100	115/230	100	200	B	7½	9	6¼	6¾	5 7/16	¼	63.5	8	10	7	6¾	8¾	¼-20 x ⅝
56 or 28 V C.T. Series 0 - 14 - 28 - 42 - 56 V Parallel 0 - 14 - 28 V @ 2 x Current	56-0.1	115	0.1	0.2	C	2⅜	1¾	2	2	—	#8	.8	1 15/16	1 13/16	2 7/16	1⅜	1¼	6-32 x ⅜
	56-0.25	115	0.25	0.5	C	2⅞	2	2 5/16	2⅜	—	#8	1.2	2 5/16	2 1/16	2½	1 11/16	1 7/16	6-32 x ⅜
	56-0.5	115	0.5	1	C	3⅛	2¼	2¾	2 13/16	—	#8	1.7	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
	56-1	115	1	2	B	3⅜	2⅞	2 13/16	2 13/16	2¼	#8	3.5	3⅝	3⅜	3¼	2 13/16	2⅜	8-32 x ⅜
	56-2	115	2	4	B	3¾	3¼	3⅛	3⅛	2½	#8	5.0	4⅛	3¾	3½	3⅛	2½	10-32 x ½
	56-4	115	4	8	B	4⅛	3¾	3 7/16	3 7/16	3	#10	7.7	4½	4½	3⅞	3 7/16	3	10-32 x ½
	56-6	115	6	12	B	5¼	4¼	4⅜	4⅜	2⅞	#10	12.0	5½	4¾	5	4⅜	3	¼-20 x ⅝
	56-8	105, 115, 125	8	16	B	5¼	5	4⅜	4⅜	3⅝	¼	17.0	5½	5½	5¼	4⅜	3½	¼-20 x ⅝
	56-12	105, 115, 125	12	24	B	6⅜	5¼	5 5/16	5 5/16	3⅜	¼	22.0	6¾	5¾	5¾	5 5/16	4¼	¼-20 x ⅝
	56-25	105, 115, 125	25	50	B	6⅜	7⅛	5 5/16	5 5/16	5⅛	¼	38.0	6¾	8	6	5 5/16	6½	¼-20 x ⅝
	56-50	115/230	50	100	B	7½	7½	6¼	6¾	4⅞	¼	56.3	8	8½	7	6¾	7¼	¼-20 x ⅝
	56-100	115/230	100	200	B	7½	11¼	6¼	6¾	8¼	¼	95.0	8	13	7	6¾	11¾	¼-20 x ⅝



PARALLEL CONNECTED SECONDARIES

SERIES CONNECTED SECONDARIES



All transformers are designed conservatively for a max of 45°C rise above ambient, for use on 115V power line from 50-500 cps. Only prime raw materials are used. Units are thoroughly impregnated and baked with Signal's own high gloss black baking varnish. The transformers and chokes are rugged in construction, well-insulated, and have a consistently uniform appearance. All ratings are at full load current continuous operation.

Electrical ratings have been chosen to cover a wide range of applications. All transformers have two center-tapped secondary windings.

Special variations such as dual primaries, 230V primaries, electrostatic shields, etc. are available on special order.

SIGNAL TRANSFORMER CO., INC

ENGINEERS • DESIGNERS • MANUFACTURERS

FACTORY: 1 JUNIUS STREET, BROOKLYN, NEW YORK 11212 — (212) 498-5111

HIGH & LOW CURRENT TRANSFORMERS

OPEN FRAME • EPOXY ENCAPSULATED (GRADE 5) • HERMETICALLY SEALED (GRADE 4)

0.1 to 200 Amps
2.5 to 300 Volts

IDEAL FOR USE IN SINGLE OR DUAL DC POWER SUPPLIES

SECONDARY VOLTS	Part No.	Primary Volts 50-500CPS	SECONDARY AMPS Series	SECONDARY AMPS Parallel	OPEN FRAME OR EPOXY ENCAPSULATED* Mtg. Style	L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.	HERMETICALLY SEALED IN STEEL CASE‡ L	W	H	ML	MW	Mtg. Stud
68 or 34 C.T. Series 0 - 17 - 34 - 51 - 68 V Parallel 0 - 17 - 34 V @ 2 x Current	68-0.1	115	0.1	0.2	C	2 7/8	1 5/8	2 5/16	2 3/8	→	#8	0.8	2 1/16	2 1/16	2 1/2	1 7/16	1 7/16	6-32 x 3/8
	68-0.25	115	0.25	0.5	C	2 7/8	2	2 5/16	2 3/8	—	#8	1.2	2 5/16	2 1/16	2 1/2	1 11/16	1 7/16	6-32 x 3/8
	68-0.5A	115	0.5	1	C	3 1/8	2 1/4	2 3/4	2 13/16	—	#8	1.7	2 3/4	2 3/8	2 7/8	2 1/8	1 3/4	6-32 x 3/8
	68-0.5	115	0.5	1	B	3	2 3/4	2 1/2	2 1/2	2 1/4	#8	2.7	3 1/4	3 1/8	2 7/8	2 1/2	2 3/8	8-32 x 3/8
	68-1	115	1	2	B	3 3/8	2 13/16	2 13/16	2 13/16	2 3/8	#8	3.8	3 5/8	3 3/8	3 1/4	2 13/16	2 3/8	8-32 x 3/8
	68-2	115	2	4	B	4 1/8	3 3/8	3 7/16	3 7/16	2 5/8	#10	6.8	4 1/2	3 3/4	3 7/8	3 7/16	2 3/8	10-32 x 1/2
	68-4	115	4	8	B	4 1/2	4 1/2	4 1/8	3 3/4	3 3/8	#10	11.5	4 3/4	5	4 3/8	3 3/4	3 3/8	10-32 x 1/2
	68-6	105, 115, 125	6	12	B	5 1/4	5	4 3/8	4 3/8	3 3/8	1/4	15.0	5 1/2	5 1/2	5 1/4	4 3/8	3 1/2	1/4-20 x 5/8
	68-8	105, 115, 125	8	16	B	5 1/4	5 1/2	4 3/8	4 3/8	3 7/8	1/4	19.0	5 1/2	6	5	4 3/8	3 7/8	1/4-20 x 5/8
	68-12	105, 115, 125	12	24	B	6 3/8	5 3/4	5 5/16	5 5/16	3 3/4	1/4	26.5	6 3/4	6 5/8	6	5 5/16	5 1/8	1/4-20 x 5/8
	68-25	115/230	25	50	B	6 3/8	7 1/4	5 5/16	5 5/16	5 1/8	1/4	39.7	6 3/4	8	6	5 5/16	6 1/2	1/4-20 x 5/8
	68-50	115/230	50	100	B	7 1/2	9	6 1/4	6 3/4	5 7/16	1/4	58.5	8	10	7	6 3/4	8 3/4	1/4-20 x 5/8
80 or 40 C.T. Series 0 - 20 - 40 - 60 - 80 V Parallel 0 - 20 - 40 V @ 2 x Current	80-0.1	115	0.1	0.2	C	2 7/8	1 5/8	2 5/16	2 3/8	—	#8	0.8	2 1/16	2 1/16	2 1/2	1 7/16	1 7/16	6-32 x 3/8
	80-0.25	115	0.25	0.5	C	3 1/8	2	2 3/4	2 13/16	—	#8	1.3	2 3/4	2 3/8	2 7/8	2 1/8	1 3/4	6-32 x 3/8
	80-0.5A	115	0.5	1	C	3 3/16	2 3/8	3 1/16	3 1/8	—	#8	2.2	3 1/4	2 3/4	2 7/8	2 1/2	2	8-32 x 3/8
	80-0.5	115	0.5	1	B	3	2 3/4	2 1/2	2 1/2	2 1/4	#8	2.8	3 1/4	3 1/8	2 7/8	2 1/2	2 3/8	8-32 x 3/8
	80-1	115	1	2	B	3 3/8	3 1/16	2 13/16	2 13/16	2 1/2	#8	4.0	3 5/8	3 3/8	3 1/4	2 13/16	2 3/8	8-32 x 3/8
	80-2	115	2	4	B	4 1/8	3 3/8	3 7/16	3 7/16	2 5/8	#10	6.8	4 1/2	3 3/4	3 7/8	3 7/16	2 3/8	10-32 x 1/2
	80-4	115	4	8	B	5 1/4	4 1/4	4 3/8	4 3/8	2 7/8	1/4	12.3	5 1/2	4 3/4	5	4 3/8	3	1/4-20 x 5/8
	80-6	105, 115, 125	6	12	B	5 1/4	5 1/2	4 5/8	4 3/8	3 7/8	1/4	19.0	5 1/2	6	5	4 3/8	3 7/8	1/4-20 x 5/8
	80-8	105, 115, 125	8	16	B	6 3/8	5 1/4	5 5/16	5 5/16	3 1/4	1/4	20.5	6 3/4	5 3/4	5 3/4	5 5/16	4 1/4	1/4-20 x 5/8
	80-12	105, 115, 125	12	24	B	6 3/8	6	5 5/16	5 5/16	4 1/8	1/4	29.0	6 3/4	6 5/8	6	6 5/16	5 1/8	1/4-20 x 5/8
	80-25	115/230	25	50	B	7 1/2	6 1/2	6 1/4	6 3/4	3 7/8	1/4	40.3	8	7	7	6 3/4	6 3/4	1/4-20 x 5/8
	80-50	115/230	50	100	B	7 1/2	9	6 1/4	6 3/4	6 1/2	1/4	78.0	8	10	7	6 3/4	8 3/4	1/4-20 x 5/8
88 or 44 C.T. Series 0 - 22 - 44 - 66 - 88 V Parallel 0 - 22 - 44 V @ 2 x Current	88-0.1	115	0.1	0.2	C	2 7/8	1 3/4	2 5/16	2 3/8	—	#8	1.0	2 1/16	2 1/16	2 1/2	1 7/16	1 7/16	6-32 x 3/8
	88-0.25	115	0.25	0.5	C	3 1/8	2 1/8	2 3/4	2 13/16	—	#8	1.5	2 3/4	2 3/8	2 7/8	2 1/8	1 3/4	6-32 x 3/8
	88-0.5	115	0.5	1	C	3 3/16	2 3/8	3 1/16	3 1/8	—	#8	2.2	3 1/4	2 3/4	2 7/8	2 1/2	2	8-32 x 3/8
	88-1	115	1	2	B	3 3/4	3	3 1/8	3 1/8	2 1/4	#8	4.5	4 1/8	3 1/2	3 1/2	3 1/8	2 1/4	10-32 x 1/2
	88-2	115	2	4	B	4 1/8	3 3/8	3 7/16	3 7/16	2 5/8	#10	6.8	4 1/2	3 3/4	3 7/8	3 7/16	2 3/8	10-32 x 1/2
	88-4	115	4	8	B	5 1/4	4 1/2	4 3/8	4 3/8	3 1/8	1/4	13.4	5 1/2	4 3/4	5	4 3/8	3	1/4-20 x 5/8
	88-6	105, 115, 125	6	12	B	5 1/4	5 1/2	4 3/8	4 3/8	3 7/8	1/4	19.0	5 1/2	6	5	4 3/8	3 7/8	1/4-20 x 5/8
	88-8	105, 115, 125	8	16	B	6 3/8	5 3/8	5 5/16	5 5/16	3 3/8	1/4	22.8	6 3/4	5 3/4	5 3/4	5 5/16	4 1/4	1/4-20 x 5/8
	88-12	105, 115, 125	12	24	B	6 3/8	6 1/2	5 5/16	5 5/16	4 5/8	1/4	35.0	6 3/4	7	5 3/4	5 5/16	5 1/2	1/4-20 x 5/8
	88-25	115/230	25	50	B	7 1/2	8	6 1/4	6 3/4	5 5/8	1/4	62.0	8	10	7	6 3/4	8 3/4	1/4-20 x 5/8
	88-50	115/230	50	100	B	7 1/2	11	6 1/4	6 3/4	8 5/8	1/4	100.0	8	13	7	6 3/4	11 3/4	1/4-20 x 5/8
120 or 60 C.T. Series 0 - 30 - 60 - 90 - 120 V Parallel 0 - 30 - 60 V @ 2 x Current	120-0.5	115	0.5	1.0	B	3 3/8	2 7/8	2 13/16	2 13/16	2 1/4	#8	3.2	3 5/8	3 3/8	3 1/4	2 13/16	2 3/8	8-32 x 3/8
	120-1	115	1	2	B	3 3/4	3 3/8	3 1/8	3 1/8	2 3/4	#8	5.8	4 1/8	4	3 1/2	3 1/8	2 7/8	10-32 x 1/2
	120-2	115	2	4	B	4 1/2	3 3/4	3 3/4	3 3/4	2 3/4	#10	8.5	4 3/4	4 1/4	4 1/4	3 3/4	2 7/8	10-32 x 1/2
	120-4	115	4	8	B	5 1/4	5 1/2	4 3/8	4 3/8	3 7/8	1/4	17.0	5 1/2	6	5	4 3/8	3 7/8	1/4-20 x 5/8
	120-6	105, 115, 125	6	12	B	6 3/8	6	5 5/16	5 5/16	3 7/8	1/4	27.0	6 3/4	6 5/8	6	5 5/16	5 1/8	1/4-20 x 5/8
	120-8	105, 115, 125	8	16	B	6 3/8	6 1/2	5 5/16	5 5/16	4 5/8	1/4	34.0	6 3/4	7	5 3/4	5 5/16	5 1/2	1/4-20 x 5/8
	120-12	105, 115, 125	12	24	B	6 3/8	7 1/4	5 5/16	5 5/16	5 3/8	1/4	42.0	6 3/4	8	6	5 5/16	6 1/2	1/4-20 x 5/8
	120-20	105, 115, 125	20	40	B	7 1/2	8	6 1/4	6 3/4	5 3/8	1/4	57.0	8	9	7	6 3/4	7 3/4	1/4-20 x 5/8
160 or 80 C.T. Series 0 - 40 - 80 - 120 - 160 V Parallel 0 - 40 - 80 V @ 2 x Current	160-0.5	115	0.5	1	B	3 3/8	3 1/16	2 13/16	2 13/16	2 1/2	#8	4.0	3 5/8	3 3/8	3 1/4	2 13/16	2 3/8	8-32 x 3/8
	160-1	115	1	2	B	4 1/8	3 5/8	3 7/16	3 7/16	2 5/8	#10	6.5	4 1/2	3 3/4	3 7/8	3 7/16	2 3/8	10-32 x 1/2
	160-2	115	4	8	B	4 1/2	4 3/8	3 3/4	3 3/4	3 3/8	#10	11.0	4 3/4	5	4 3/8	3 3/4	3 3/8	10-32 x 1/2
	160-4	105, 115, 125	4	8	B	6 3/8	5 1/4	5 5/16	5 5/16	3 1/4	1/4	21.0	6 3/4	5 3/4	5 3/4	5 5/16	4 1/4	1/4-20 x 5/8
	160-8	105, 115, 125	8	16	B	6 3/8	6 3/4	5 5/16	5 5/16	4 7/8	1/4	36.0	6 3/4	7 1/2	6	5 5/16	6	1/4-20 x 5/8
	160-12	115/230	12	24	B	7 1/2	6 1/2	6 1/4	6 3/4	3 7/8	1/4	39.8	8	8	7	6 3/4	6 3/4	1/4-20 x 5/8
180 or 90 C.T. Series 0 - 45 - 90 - 135 - 180 V Parallel 0 - 45 - 90 @ 2 x Current	180-0.5	115	0.5	1	B	3 3/4	3 3/8	3 1/8	3 1/8	2 3/4	#8	5.8	4 1/8	4	3 1/2	3 1/8	2 3/8	10-32 x 1/2
	180-1	115	1	2	B	4 1/8	3 7/8	3 5/8	3 7/16	3	#10	8.2	4 1/2	4 1/2	3 7/8	3 7/16	3	10-32 x 1/2
	180-2	115	2	4	B	5 1/4	5	4 3/8	4 3/8	3 5/8	1/4	15.8	5 1/2	5 1/2	5 1/4	4 3/8	3 1/2	1/4-20 x 5/8
	180-4	115	4	8	B	6 3/8	5 3/4	5 5/16	5 5/16	3 3/4	1/4	27.0	6 3/4	6 5/8	6	5 5/16	5 1/8	1/4-20 x 5/8
	180-6	105, 115, 125	6	12	B	6 3/8	7 1/4	5 5/16	5 5/16	5 1/8	1/4	37.0	6 3/4	8	6	5 5/16	6 1/2	1/4-20 x 5/8
	180-8	105, 115, 125	8	16	B	6 3/8	7 3/4	5 5/16	5 5/16	5 5/8	1/4	42.0	6 3/4	8	6	5 5/16	6 1/2	1/4-20 x 5/8
	180-12	105, 115, 125	12	24	B	7 1/2	8 1/4	6 1/4	6 3/4	5 5/8	1/4	62.0	8	9	7	6 3/4	7 3/4	1/4-20 x 5/8
230 or 115 C.T. Series 0-57 1/2-115-172 1/2-230 V Parallel 57 1/2 - 115 V @ 2 x Current	230-0.5	115	0.5	1	B	3 3/4	3 5/8	3 1/8	3 1/8	3	#8	6.5	4 1/8	4	3 1/2	3 1/8	2 7/8	10-32 x 1/2
	230-1	115	1	2	B	4 1/2	3 3/4	3 3/4	3 3/4	3	#10	9.4	4 3/4	4 1/4	4 1/4	3 3/4	2 7/8	10-32 x 1/2
	230-2	115	2	4	B	5 1/4	4 3/4	4 3/8	4 3/8	3 3/8	1/4	14.5	5 1/2	5 1/2	5 1/4	4 3/8	3 1/2	1/4-20 x 5/8
	230-4	105, 115, 125	4	8	B	6 3/8	6	5 5/16	5 5/16	4 1/8	1/4	28.4	6 3/4	6 3/8	6	5 5/16	5 1/8	1/4-20 x 5/8
	230-6	105, 115, 125	6	12	B	6 3/8	7 1/4	5 5/16	5 5/16	5 1/8	1/4	38.0	6 3/4	8	6	5 5/16	6 1/2	1/4-20 x 5/8
300 or 150 C.T. Series 0-75-150-225-300 V Parallel 0 - 75 - 150 V @ 2 x Current	300-0.5	115	0.5	1	B	4 1/2	3 1/2	3 3/4	3 3/4	2 1/2	#10	7.0	4 3/4	4 1/4	4 1/4	3 3/4	2 7/8	10-32 x 1/2
	300-1	115	1	2	B	5 1/4	4 1/8	4 3/8	4 3/8	3	1/4	12.8	5 1/2	4 3/4	5	4 3/8	3	1/4-20 x 5/8
	300-2	115	2	4	B	5 1/4	5 3/4	4 3/8	4 3/8	4 1/2	1/4	21.0	5 1/2	6 1/4	5	4 3/8	5 1/8	1/4-20 x 5/8
	300-4	105, 115, 125	4	8	B	6 3/8	5 3/4	5 5/16	5 5/16	3 7/8	1/4	27.5	6 3/4	6 3/8	6	5 5/16	5 1/8	1/4-20 x 5/8

AVAILABLE IN 3 STYLES

FOR OPEN FRAME USE PART NUMBERS SHOWN

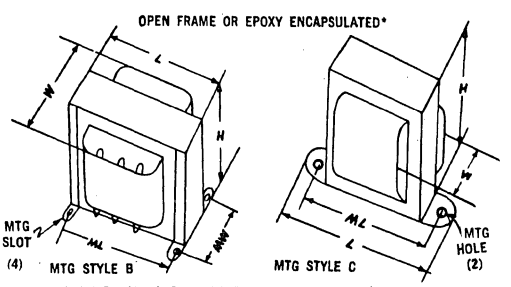
* For epoxy encapsulation add prefix "E-" to Part No., e.g., E-36-1 add 3/16 to L, W, H Dim. Grade 5.
‡ For hermetically sealed units add prefix "H-" to Part No., e.g., H-36-1. Grade 4.

AVAILABLE IN 3 STYLES

METHOD OF DETERMINING SECONDARY CURRENT RATINGS

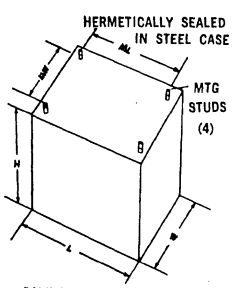
RECTIFIER TYPE	FILTER TYPE	RMS SECONDARY CURRENT
Full Wave Center-Tap	Choke Input	.7 × DC amps
Full Wave Center-Tap	Capacitor Input	1.2 × DC amps
Full Wave Bridge	Choke Input	= to DC amps
Full Wave Bridge	Capacitor Input	1.8 × DC Amps

OPEN FRAME OR EPOXY ENCAPSULATED*



*FOR EPOXY ENCAPSULATION, PART NO'S "E" — ADD 3/16" TO L, W, H

HERMETICALLY SEALED IN STEEL CASE



PART NO'S WITH PREFIX "H"

SIGNAL TRANSFORMER CO., INC

FACTORY: 1 JUNIUS STREET, BROOKLYN, NEW YORK 11212 — (212) 498-5111

HIGH & LOW CURRENT CHOKES 0.1 to 1000 AMPS

OPEN FRAME • EPOXY ENCAPSULATED (GRADE 5) • HERMETICALLY SEALED (GRADE 4)

Signal's line of High and Low Current Chokes is the most extensive available. It is designed to complement the selection of High and Low Current Transformers so that a set may be specified for power supplies using inductive filters.

The inductance ratings given are minimum values guaranteed at full DC current. All resistance ratings are maximum values.

Special variations or intermediate values of inductance, current, or resistance can be supplied promptly and accurately.

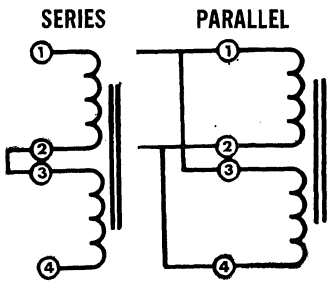
FOR MECHANICAL DIMENSIONS REFER TO TRANSFORMER OUTLINES ON PREVIOUS PAGE

				OPEN FRAME OR EPOXY ENCAPSULATED*								HERMETICALLY SEALED IN STEEL CASE‡					
PART No.	IND. (MHY)	CURR. (Amps)	RES. (Ohms)	MTG. STYLE	L	W	H	ML	MW	MTG. SCREW	APPR. LBS.	L	W	H	ML	MW	MTG. STUD
CH-0.1	1000	0.1	25	C	2	1½	1¾	1 23/32	—	#8	0.3	1⅝	1⅝	2 3/16	1 3/16	1 3/16	6-32 x ⅜
CH-0.2	800	0.2	15	C	2⅜	1⅝	2	2	—	#8	0.7	1 15/16	1 13/16	2 7/16	1⅜	1¼	6-32 x ⅜
CH-0.25	800	0.25	10.0	C	2⅞	1¾	2 5/16	2⅜	—	#8	1.0	2 1/16	2 1/16	2½	1 7/16	1 7/16	6-32 x ⅜
CH-0.5	400	0.5	4.0	C	3⅛	2⅛	2¾	2 13/16	—	#8	1.5	2¾	2⅜	2⅞	2⅛	1¾	6-32 x ⅜
CH-1	100	1	1.5	B	3	2½	2½	2½	2	#8	2.3	3¼	2¾	2⅞	2½	2	8-32 x ⅜
CH-2	70	2	0.9	B	3⅜	2¾	2⅞	2 13/16	2⅛	#8	3.2	3⅝	3	3¼	2 13/16	2⅛	8-32 x ⅜
CH-4	70	4	0.6	B	3¾	3⅛	3¼	3⅛	2½	#8	5.3	4⅛	3½	3½	3⅛	2½	8-32 x ⅜
CH-6	40	6	0.4	B	3¾	3⅝	3¼	3⅛	3	#8	6.5	4⅛	4	3½	3⅛	2⅞	8-32 x ⅜
CH-8	30	8	0.3	B	4⅛	3⅝	3½	3 7/16	3	#10	8	4½	4	3⅞	3 7/16	3	10-32 x ½
CH-12	15	12	0.1	B	5¼	4	4 7/16	4⅜	3⅛	#10	13.7	5½	4½	5	4⅜	3⅛	10-32 x ½
CH-16	15	16	.08	B	5¼	4⅝	4 7/16	4⅜	3⅝	#10	17.5	5½	5⅛	5	4⅜	3⅝	10-32 x ½
CH-20	7	20	.05	B	5¼	4	4 7/16	4⅜	3⅛	#10	13.3	5½	4¾	5	4⅜	3⅛	10-32 x ½
CH-25	5	25	.025	B	5¼	4¾	4 7/16	4⅜	3⅞	#10	17.8	5½	5⅜	5	4⅜	3⅞	¼-20 x ⅝
CH-30	4	30	.01	B	6⅜	5	5⅜	5 5/16	3⅜	¼	24.4	6¾	5¼	5⅞	5 5/16	3⅜	¼-20 x ⅝
CH-50	1.4	50	0.01	B	6⅜	5¼	5⅜	5 5/16	3¾	¼	26.7	6¾	5¼	5⅞	5 5/16	3¾	¼-20 x ⅝
CH-100	0.5	100	0.005	B	6⅜	6¼	5⅜	5 5/16	4⅛	¼	31.4	6¾	6⅝	5⅞	5 5/16	4⅛	¼-20 x ⅝
CH-200	0.3	200	0.001	B	7½	7	6⅜	6¾	4⅛	¼	48.0	NOT AVAILABLE					
CH-250	0.3	250	0.00115	B	7½	8	6¼	6¾	5⅛	¼	56.0	NOT AVAILABLE					
CH-500	0.055	500	0.00027	B	7½	6½	6⅜	6¾	4⅛	¼	50.0	NOT AVAILABLE					
CH-1000	0.015	1,000	0.000065	B	7½	6½	6¾	6¾	4⅜	¼	70.0	NOT AVAILABLE					

AVAILABLE IN 3 STYLES — FOR OPEN FRAME USE PART NUMBERS SHOWN ABOVE

* For epoxy encapsulation add prefix "E-" to Part No., e.g., E-CH-1 add 3/16 to L, W, H W, H Dim. Grade 5.
‡ For hermetically sealed units add prefix "H" to Part No., e.g., H-CH-1, Grade 4.

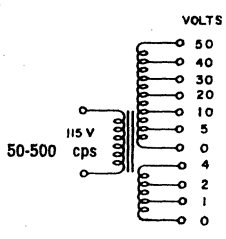
DUAL CHOKES FOR LOWER INDUCTANCE APPLICATIONS



Part No.	Series Connected Ind. (MHY)	Curr. (Amps)	Res. (Ohms)	Parallel Connected Ind. (MHY)	Curr. (Amps)	Res. (Ohms)	Mtg. Style	Dimensions L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.
CL-1-2	72	1	1.4	18	2	0.35	C	2⅞	1¾	2 5/16	2⅜	—	#8	0.9
CL-2-4	40	2	0.7	10	4	0.18	C	3⅛	2⅛	2¾	2 13/16	—	#8	1.5
CL-4-8	20	4	0.3	5	8	0.075	B	3	2⅞	2½	2½	2¼	#8	3.0
CL-6-12	12	6	0.15	3	12	0.038	B	3⅜	3 1/16	2 13/16	2 13/16	2½	#8	4.0
CL-12-24	4.8	12	0.052	1.2	24	0.013	B	3⅜	3 1/16	2 13/16	2 13/16	3	#8	5.3
CL-25-50	1.2	25	0.012	0.3	50	0.003	B	3¾	3⅜	3⅛	3⅛	2¾	#8	6.0
CL-50-100	0.5	50	0.0043	0.12	100	0.0011	B	4½	3¾	3¾	3¾	2½	#8	8.0

Signal's Dual Chokes are supplied with 2 windings which may be series or parallel connected with rating shown on chart. This line is basically designed for applications requiring lower inductance values at high currents, such as low voltage, DC supplies or SCR filters. Ideal for use to reduce ripple in our ferro-resonant (CDC) line.

MULTI-VOLT 1 to 54 VOLTS in 1 VOLT STEPS



"MV" LINE

MV (multi-voltage) secondaries may be series connected for any output from 1 to 54 volts, in 1 volt steps, at rated current. This is accomplished by using the small buck-boost secondary.

Part No.	Secondary Amps.	DIMENSIONS L	W	H	ML	MW	Appr. Wt.
MV-1	1	3⅜	2¾	2 13/16	2 13/16	2⅛	3.2
MV-2	2	3¾	3⅛	3⅛	3⅛	2⅜	5.0
MV-4	4	4½	3⅝	3¾	3¾	2½	7.5
MV-6	6	5¼	4	4⅜	4⅜	2⅞	12
M-12	12	5¼	6	4⅜	4⅜	4⅝	23

SIGNAL TRANSFORMER CO., INC
ENGINEERS • DESIGNERS • MANUFACTURERS
FACTORY: 1 JUNIUS STREET, BROOKLYN, NEW YORK 11212 — (212) 498-5111

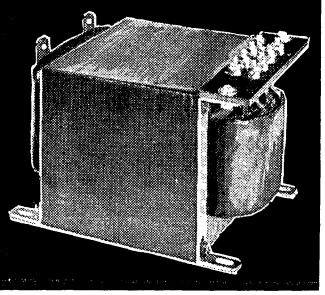
VERY HIGH CURRENT

STOCKED FOR SAME DAY SHIPMENT

TRANSFORMERS & CHOKES

250 to 1400 AMPERES

NEVER AVAILABLE BEFORE

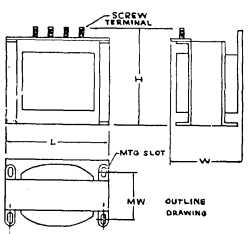


TRANSFORMERS

Part No.	Secondary Volts	Secondary Amps. Nominal (45°C rise)	Secondary Amps. Max. (100°C rise)	Dimensions L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.
6-250	6	250	350	7½	5	7¼	6¾	3⁹⁄₁₆	¼	32
9-250	9	250	350	7½	5¾	7¼	6¾	4⁵⁄₁₆	¼	40
12-250	12	250	350	7½	6¼	7¼	6¾	4¹³⁄₁₆	¼	48
6-500	6	500	700	7½	6	7¼	6¾	4⁹⁄₁₆	¼	40
9-500	9	500	700	7½	8½	7¼	6¾	6¹⁄₁₆	¼	60
12-500	12	500	700	7½	9	7¼	6¾	7³⁄₁₆	¼	80
3-1000	3	1000	1400	7½	6	7¼	6¾	4⁹⁄₁₆	¼	40
6-1000	6	1000	1400	7½	9	7¼	6¾	7³⁄₁₆	¼	80

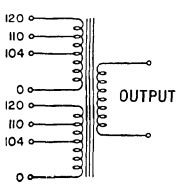
CHOKES

Part No.	Inductance (Milli-hy)	Current (Amperes)	Resis. (Ohms)	L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.
CH-250	.3	250	.00115	7½	8	6¼	6¾	5⅛	¼	56
CH-500	.055	500	.00027	7½	6½	6¼	6¾	4⅛	¼	50
CH-1000	.015	1000	.000065	7½	7½	6¼	6¾	5⅛	¼	70

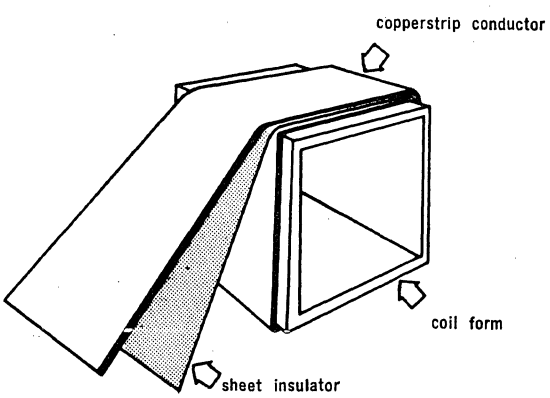


As shown on the schematic diagram dual primaries are provided. This permits parallel connection for 104, 110, or 120 volts or series connection for 208, 214, 220, 230, and 240 volts. Frequency range is 50 to 500 cps.

It is important to note that primary taps may be used to adjust the secondary voltages. Line voltages up to 125V (parallel) or 250V (series) may be used on the lowest primary tap. Nickel plated screw terminals are provided on a heavy phenolic board for easy primary connections.



WINDINGS OF HEAVY COPPER STRIP



STRIP-WOUND SECONDARIES

At the heavy current used in this line it becomes practical and desirable to use wide copper strip (as wide as the coil itself) for windings. Besides the obvious advantages of excellent winding space factor, the heat dissipation of the coil is improved. This improvement is due to the fact that the heat generated in the windings has a pure copper path to the coil ends, where it can be dissipated. In conventional windings of many turns per layer this heat flow is impeded by wire insulation and air spaces between turns. Therefore, the use of copper strip windings yields a dramatic reduction in size and weight.

GRAIN-ORIENTED STEEL CORE

These cores permit the use of higher peak flux densities for the same core loss. This results in a lower number of turns required and therefore, a smaller, more compact transformer.

CLASS F INSULATION USED THROUGHOUT

Class F insulation is rated for unlimited life at a total temperature of 155°C (ambient plus temperature rise).

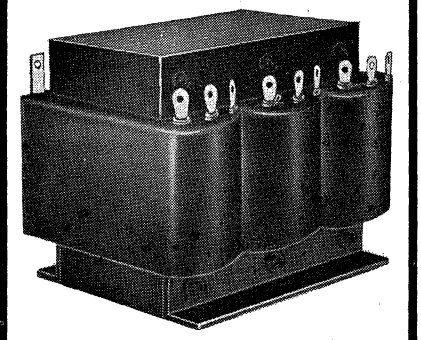
Class A insulation has a maximum temperature rating of 105°C. The "nominal" current ratings given to this series are for a temperature rise of 45°C above 55°C ambient (Class A). Since Class F insulation is used it is permissible to increase these ratings by 40% (700 and 1400 amperes) without reducing the reliability of the transformer. The temperature rise will be 100°C over a 55°C ambient. The only limitation is not the transformer, but the temperature rating of surrounding components which may be affected by the additional heat radiated by the transformer.

SIGNAL TRANSFORMER CO., INC

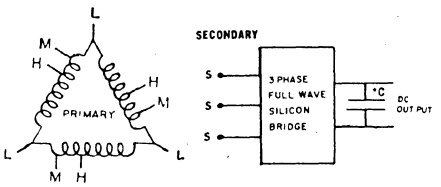
ENGINEERS • DESIGNERS • MANUFACTURERS

FACTORY: 1 JUNIUS STREET, BROOKLYN, NEW YORK 11212 — (212) 498-5111

3 PHASE HIGH CURRENT RECTIFIER TRANSFORMERS

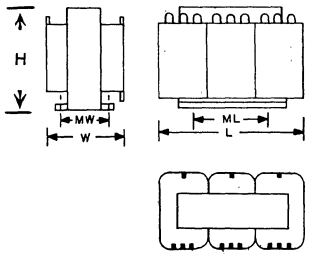


SCHEMATIC DIAGRAM



*C — Optional, no capacitor will give DC output shown at approx. 5% ripple.

MECHANICAL DIMENSIONS



DC OUTPUT VOLTAGE

PART NO.	PRI TAP "L" SUPPLY VOLTAGE 208	PRI TAP "L" SUPPLY VOLTAGE 220	PRI TAP "M" SUPPLY VOLTAGE 208	PRI TAP "M" SUPPLY VOLTAGE 220	PRI TAP "H" SUPPLY VOLTAGE 208	PRI TAP "H" SUPPLY VOLTAGE 220	DC RATED AMPS	APPROX. DIMENSIONS L	W	H	ML	MW	APX. LBS.
3PH 24-50	24	25	26	27.5	28	30	50	7¾	6	5½	4.8	4⅞	35
3PH 24-100	24	25	26	27.5	28	30	100	11½	5	8¼	7.2	4	62
3PH 24-200	24	25	26	27.5	28	30	200	11½	8⅝	8¼	7.2	6¼	90
3PH 48-30	42	44	47	50	52	55	30	7¾	6	5½	4.8	4⅞	35
3PH 48-60	42	44	47	50	52	55	60	11½	5	8¼	7.2	4	62
3PH 48-120	42	44	47	50	52	55	120	11½	8⅝	8¼	7.2	6¼	90

At higher power loads (above 2-3 KVA) it becomes inefficient to use single phase 115 or 230 volt standard lines. With this in mind, our engineering staff has developed a line of 3 phase transformers for use off 208 or 220V 3 phase power lines. These offer the significantly higher conversion efficiency and lighter power line drain of 3 phase systems.

Since the principal application of these items is in high power dc power supplies, output ratings are given in dc voltage and current assuming the use of a 3 phase full wave rectifier.

AUTO TRANSFORMERS 50/60 HZ

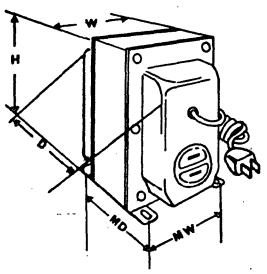
SEE OUR COMPLETE "FLEISHMAN ELECTRIC" LINE IN RADIO-ELECTRONIC MASTERS

STEP-DOWN 230 TO 115 V
"SD" SERIES — LINE CORD & RECEPTACLE

VA Rating	Part No.	W	D	H	MW	MD	Mtg. Screw	Appr. Lbs.
100	SD-100	2⅝	2⅞	3⅛	2	1 13/16	#8	2.3
150	SD-150	2⅝	3½	3⅛	2	2 7/16	#8	3.6
250	SD-250	3⅞	3½	4⅝	3	2⅜	#8	6.2
350	SD-350	3⅞	4¼	4⅝	3	3 1/16	#8	8.3
500	SD-500	3⅞	4¾	4⅝	3	3 5/16	#8	10.5
750	SD-750	4⅝	5⅜	5⅜	3½	3¾	¼	14.5
1000	SD-1000	4⅝	5⅞	5⅜	3½	4¼	¼	18
1500	SD-1500	4⅝	6⅝	5⅜	3½	5	¼	22
2000	SD-2000	4⅝	7⅛	5⅜	3½	5½	¼	26

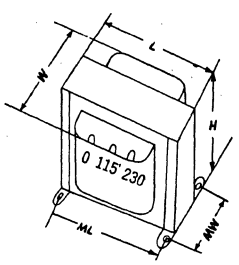
(100-2000 VA)
TYPE SD

Low Regulation • Fully encased — Black Finish • 45°C Temperature Rise • U/L Approved 2 prong line cord and receptacle.



STEP-UP OR DOWN 115/230 OR 230/115 V
"SDO" SERIES — OPEN FRAME • SOLDER LUGS

VA Rating	Part No.	L	W	H	ML	MW	Mtg. Screw	Appr. Lbs.
100	SDO-100	3	2½	2½	2½	2⅛	#8	2.3
150	SDO-150	3	3¼	2½	2½	2¾	#8	3.6
250	SDO-250	4½	2¾	3¾	3¾	2	#10	6.2
350	SDO-350	4½	3¾	3¾	3¾	2¾	#10	8.3
500	SDO-500	4½	4¼	3¾	3¾	3¼	#10	10.5
750	SDO-750	5¼	4½	4⅜	4⅜	3⅜	¼	14.5
1000	SDO-1000	5¼	5	4⅜	4⅜	3⅞	¼	18
1500	SDO-1500	5¼	5¾	4⅜	4⅜	4⅝	¼	22
2000	SDO-2000	5¼	6¼	4⅜	4⅜	5⅛	¼	26



TYPE SDO

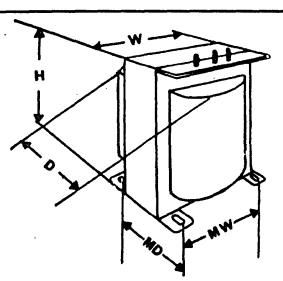
Same Electrically as Type SD. Open Frame • Black Enamel Finish • Solder Lugs • Inexpensive Version for Use in Equipment.

STEP-UP OR DOWN 115/230 OR 230/115
"HSD" SERIES
RUGGED • HEAVY DUTY • PHENOLIC TERMINAL BOARDS

VA Rating	Part No.	W	D	H	MW	MD	Mtg. Screw	Appr. Lbs.
3000	HSD-3000	7½	6	6¾	6¾	4⅛	¼	40
4000	HSD-4000	7½	6½	6¾	6¾	4⅝	¼	46
5000	HSD-5000	7½	7	6¾	6¾	5⅛	¼	52
6000	HSD-6000	7½	8	6¾	6¾	6⅛	¼	65

(3000-6000 VA)
TYPE HSD

Very low Regulation • 45°C Temperature Rise • Black High Gloss Enamel Fnish • Screw type terminals on phenolic board.



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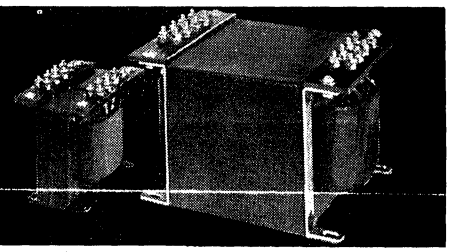
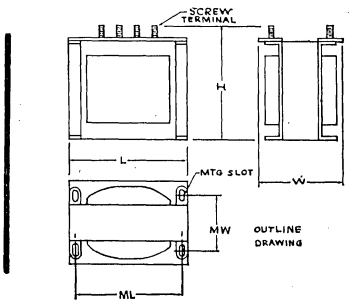
INDUSTRIAL GRADE
STEP-UP OR STEP-DOWN
POWER ISOLATION OR AUTO-TRANSFORMERS
HIGH DEGREE OF VERSATILITY OFFERS MANY POSSIBLE VOLTAGE RATINGS



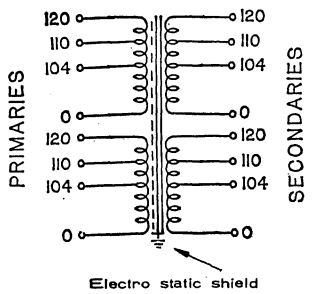
AVAILABLE FROM STOCK FOR IMMEDIATE SHIPMENT

The "DU", "SU", and "UP" lines are designed for a maximum of 55°C rise above ambient for use on standard power lines from 50 to 500 Cps. Only prime raw materials are used. Units are thoroughly impregnated and baked with Signal's own high gloss black baking varnish. The transformers are rugged in construction, well-insulated and have a consistently uniform appearance. All ratings are at full load current, continuous operation.

Heavy ¼ inch phenolic terminal boards are provided with plated brass screws and flat washers (10-32 on ¼ and ½ KVA, ¼-20 on larger sizes). Connections can be easily made with a nut driver. It is also simple to alter the inter-connections to change transformer ratings. **Electro static shields are provided grounded to the core.** The connection is made with a lug to ground and may be opened if an ungrounded shield is desired.



"DU SERIES" 110/220 Dual Primary To 110/220 Dual Sec. (Primary & Secondary may be reversed)

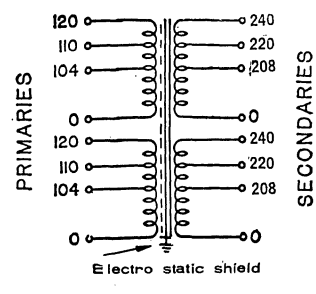


As shown on the schematic diagram the "DU" line is designed with dual primaries and secondaries. All four windings are identically rated at 0/104/110/120 volts. This permits series or parallel connections on either primary or secondary. Therefore, a nominal 110 to 110 volt, 220 to 220 volt, 110 to 220 volt, or 220 to 110 volt transformer can be set up. The winding taps permit intermediate series ratings such as 208, 214, or 230 volts.

It is also possible to make auto-transformer connections by connecting a primary group in series with a secondary group. Such nominal ratings as 440 to 220 volts or 220 to 440 volts can be set-up, in addition to the standard ratings described above. A further advantage to auto-transformer connection is the fact that the KVA rating of a particular type is **doubled.**

Part No.	KVA	Series Secondaries Volts	Series Secondaries Max. Amps	Parallel Secondaries Volts	Parallel Secondaries Max. Amps	Mechanical Dimensions L (Max.)	W (Max.)	H (Max.)	ML ± 1/32	MW ± 1/16	Mtg. & Term. Screw	Appr. Lbs.
DU-¼	¼	0/208/220/240	1.1	0/104/110/120	2.2	5 5/16	4¼	5¼	4⅜	2½	#10	12
DU-½	½	0/208/220/240	2.3	0/104/110/120	4.6	5 5/16	5 5/16	5¼	4⅜	3⅝	#10	18
DU-1	1	0/208/220/240	4.5	0/104/110/120	9	7 9/16	6¼	7¼	6¾	4⅛	¼	33
DU-2	2	0/208/220/240	9	0/104/110/120	18	7 9/16	8¼	7¼	6¾	6	¼	56
DU-3	3	0/208/220/240	14	0/104/110/120	28	7 9/16	9¼	7¼	6¾	7	¼	70
DU-5	5	0/208/220/240	23	0/104/110/120	46	7 9/16	10¾	7¼	6¾	8½	¼	89
DU-7.5	7.5	0/208/220/240	31	0/104/110/120	62	9	9	8	7½	6½	¼	105
DU-10	10	0/208/220/240	41	0/104/110/120	83	9	12	8	7½	9	¼	150

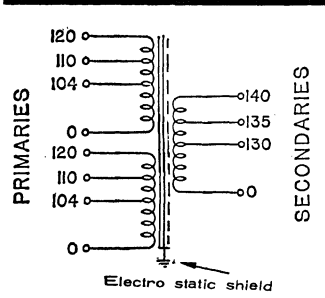
"SU SERIES" 110/220 Dual Primary to 220/440 V. Dual Sec. (Primary & Secondary may be reversed)



"SU" transformers are similar to "DU" types except that a 220/440 V secondary is provided.

Part No.	KVA	Series Secondaries Volts	Series Secondaries Max. Amps	Parallel Secondaries Volts	Parallel Secondaries Max. Amps	Mechanical Dimensions L (Max.)	W (Max.)	H (Max.)	ML ±1/32	MW ±1/16	Mtg. & Term. Screw	Appr. Lbs.
SU-¼	¼	0/416/440/480	0.55	0/208/220/240	1.1	5 5/16	4¼	5¼	4⅜	2½	#10	12
SU-½	½	0/416/440/480	1.15	0/208/220/240	2.3	5 5/16	5 5/16	5¼	4⅜	3⅝	#10	18
SU-1	1	0/416/440/480	2.25	0/208/220/240	4.5	7 5/16	6¼	7¼	6¾	4⅛	¼	33
SU-2	2	0/416/440/480	4.5	0/208/220/240	9	7 5/16	8¼	7¼	6¾	6	¼	56
SU-3	3	0/416/440/480	7	0/208/220/240	14	7 5/16	9¼	7¼	6¾	7	¼	70
SU-5	5	0/416/440/480	11.5	0/208/220/240	23	7 5/16	10¾	7¼	6¾	8½	¼	89
SU-7.5	7.5	0/416/440/480	15.5	0/208/220/240	31	9	9	8	7½	6½	¼	105
SU-10	10	0/416/440/480	20.5	0/208/220/240	41	9	12	8	7½	9	¼	150

"UP SERIES" 110/220 Dual Primary To 0/130/135/140 V. Sec. (Primary & Secondary may be reversed)



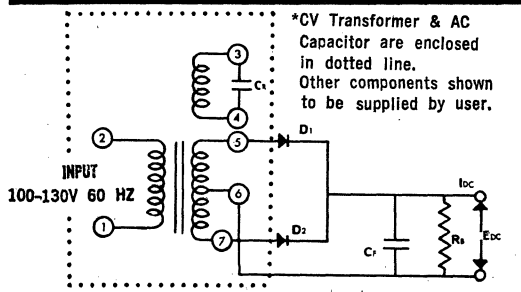
The "UP" line utilizes the same dual primary as the "DU" line. It has, however, a single secondary rated at 0/130/135/140 volts.

This type is quite useful to boost low line voltages or raise line voltages to compensate for drops in series elements. It also finds application in bridge rectifiers for DC voltage outputs of approximately 115 to 130 volts.

Part No.	KVA	Secondary Volts	Max. Secondary Amps	L (Max.)	W (Max.)	H (Max.)	ML ± 1/32	MW ± 1/16	Mtg. & Term. Screw	Appr. Lbs.
UP-2	¼	0/130/135/140	2	5 5/16	4¼	5¼	4⅜	2½	#10	12
UP-4	½	0/130/135/140	4	5 5/16	5 5/16	5¼	4⅜	3⅝	#10	18
UP-8	1	0/130/135/140	8	7 9/16	6¼	7¼	6¾	4⅛	¼	33
UP-15	2	0/130/135/140	15	7 9/16	8¼	7¼	6¾	6	¼	56
UP-25	3	0/130/135/140	25	7 9/16	9¼	7¼	6¾	7	¼	70
UP-40	5	0/130/135/140	40	7 9/16	10¾	7¼	6¾	8½	¼	89

CONSTANT VOLTAGE TRANSFORMERS

FOR USE IN DC POWER SUPPLIES (TYPE CDC)



Available with dual 115/230 50 Hz primaries. Add prefix "21-" to part no., e.g., 21-CV-24-11.

Signal's CDC Regulating Transformers are specifically manufactured for use in DC Power Supplies. They are designed and rated for use with a full wave center-tapped silicon rectifier. CDC transformers are operated in ferro-resonance and are used in conjunction with an AC **tuning capacitor** (Cr in schematic diagram), which is supplied with the transformer.

In order to construct a regulated power supply the only other parts necessary are two diodes (D_1 and D_2), an electrolytic computer grade capacitor (C_f) and a bleeder resistor (R_b). These are standard shelf items.

The specification chart lists specific outputs available and the recommended auxiliary components. Part numbers are coded in terms of DC outputs, e.g., CDC-15-2 will give an output of 15V DC at 2 amps DC.

Electrical performance is completely specified. The DC voltage is constant to ±1% over the line voltage range of 100 to 130V at 60 HZ. The nominal output is held to ±2%. Closer tolerance on nominal output (±1%) can be obtained on special order at slightly higher cost.

Load regulation is specified as the rise in dc voltage output (increase in E_{dc}) from full load to the no load, ¼ load, and ½ load points. The filter capacitor (C_f) specified should be used and will yield the values of ripple voltage shown.

A significant protection feature is the fact that the DC short circuit current is limited to a maximum of 2 times rated current (3 times in size "C-6" units). This protects the entire circuit against shorts.

OUTPUT D.C. VOLTS	DC Amps I_{dc}	Part Number	Load Regulation (Rise in DCV from FL) NL-FL	¼-FL	½-FL	Ripple Volts (RMS)	Recommended Diodes (D_1 & D_2) P.I.V.	I/Cell	Filter† Cap. (C_f) MFD.	DCWV	Bleeder‡ Resistor (R_b) Ohms	Watts	Style* & Size
5 vdc (OR ±5V)**	1	CDC-5-1	2.0	1.5	0.8	0.3	50	1	4K	10	50	2	C-6
	5	CDC-5-5	1.0	0.7	0.5	0.4	50	6	20K	10	10	5	B-25
	10	CDC-5-10	1.0	0.7	0.5	0.4	50	16	30K	10	5	10	B-50
	18	CDC-5-18	1.0	0.7	0.4	0.4	50	60	80K	10	4	10	B-120
	50	CDC-5-50	0.7	0.4	0.2	0.4	50	100	200K	10	3	20	B-250
6 vdc (OR ±6V)**	0.8	CDC-6-0.8	2.0	1.5	0.8	0.3	50	1	3K	10	50	2	C-6
	4.5	CDC-6-4.5	1.0	0.7	0.5	0.4	50	6	15K	10	10	5	B-25
	9.0	CDC-6-9	1.0	0.7	0.5	0.4	50	16	25K	10	6	10	B-50
	16	CDC-6-16	1.0	0.7	0.4	0.4	50	16	75K	10	5	10	B-120
	40	CDC-6-40	0.7	0.4	0.2	0.4	50	60	150K	10	3	20	B-250
	75	CDC-6-75	0.8	0.6	0.4	0.4	50	100	200K	10	1	40	B-500
12 vdc (OR ±12V)**	0.4	CDC-12-0.4	3.0	2.2	1.1	0.3	100	1	2K	15	150	2	C-6
	2.2	CDC-12-2.2	1.5	1.0	0.6	0.4	100	3	8K	15	25	10	B-25
	4.5	CDC-12-4.5	1.2	0.7	0.5	0.4	100	6	15K	15	25	10	B-50
	9.0	CDC-12-9	1.0	0.7	0.4	0.4	100	16	40K	15	10	20	B-120
	20	CDC-12-20	0.8	0.5	0.3	0.3	100	40	75K	15	5	40	B-250
	38	CDC-12-38	0.9	0.7	0.4	0.4	100	60	120K	15	4	50	B-500
15 vdc (OR ±15V)**	0.35	CDC-15-0.35	3.5	2.3	1.3	0.3	100	1	1.5K	20	200	2	C-6
	2.0	CDC-15-2	1.6	1.0	0.6	0.4	100	2	7K	20	50	5	B-25
	3.5	CDC-15-3.5	1.3	0.8	0.6	0.3	100	6	15K	20	25	10	B-50
	8	CDC-15-8	1.5	0.9	0.6	0.4	100	16	30K	20	15	20	B-120
	16	CDC-15-16	1.0	0.8	0.5	0.3	100	16	75K	20	10	30	B-250
	30	CDC-15-30	1.0	0.6	0.4	0.3	100	40	120K	20	5	50	B-500
18 vdc (OR ±18V)**	0.32	CDC-18-0.32	3.7	2.3	1.3	0.4	100	1	1K	20	300	2	C-6
	1.8	CDC-18-1.8	2.0	1.2	0.7	0.4	100	2	7K	20	100	5	B-25
	3	CDC-18-3	1.7	1.2	0.7	0.3	100	3	12K	20	50	10	B-50
	6	CDC-18-6	1.7	0.9	0.6	0.3	100	6	30K	20	25	20	B-120
	13	CDC-18-13	1.3	1.0	0.7	0.3	100	16	50K	20	15	30	B-250
	26	CDC-18-26	1.5	0.6	0.5	0.3	100	40	120K	20	10	50	B-500
24 vdc (OR ±24V)**	0.25	CDC-24-0.25	4.0	3.4	1.5	0.3	200	1	1K	25	350	2	C-6
	1.2	CDC-24-1.2	2.0	1.2	0.7	0.4	200	2	5K	25	100	10	B-25
	2.1	CDC-24-2.1	1.8	1.5	1.0	0.3	200	3	10K	25	50	20	B-50
	4.5	CDC-24-4.5	2.0	1.0	0.7	0.3	200	6	25K	25	50	20	B-120
	11	CDC-24-11	1.3	1.0	0.5	0.3	200	16	50K	25	25	30	B-250
	20	CDC-24-20	1.5	0.7	0.3	0.3	200	40	75K	25	15	50	B-500
28 vdc (OR ±28V)**	0.22	CDC-28-0.22	5.6	4.0	2.3	0.3	200	1	1K	35	500	2	C-6
	1.0	CDC-28-1	2	1.5	0.6	0.3	200	1	5K	35	100	10	B-25
	2.0	CDC-28-2	2.5	1.5	1.0	0.3	200	2	10K	35	100	10	B-50
	4.0	CDC-28-4	2.0	1.2	0.8	0.3	200	6	25K	35	50	20	B-120
	9.0	CDC-28-9	1.3	1.0	0.5	0.3	200	16	50K	35	25	40	B-250
	16	CDC-28-16	1.7	0.8	0.3	0.3	200	16	75K	35	15	60	B-500
36 vdc (OR ±36V)**	0.18	CDC-36-0.18	7.0	5.5	3.5	0.3	200	1	1K	50	1K	2	C-6
	0.9	CDC-36-0.9	2.0	1.4	0.8	0.3	200	1	5K	50	150	10	B-25
	1.8	CDC-36-1.8	3.0	2.0	1.3	0.3	200	2	8K	50	100	20	B-50
	3.2	CDC-36-3.2	2.5	1.4	0.7	0.3	200	3	20K	50	100	20	B-120
	6	CDC-36-6	2.0	1.5	1.0	0.3	200	16	25K	50	25	60	B-250
	12	CDC-36-12	1.8	1.0	0.7	0.3	200	16	50K	50	25	60	B-500
48 vdc (OR ±48V)**	0.12	CDC-48-0.12	8.0	6.0	4.0	0.2	200	1	1K	50	1.5K	2	C-6
	0.6	CDC-48-0.6	2.5	2.0	1.0	0.3	200	1	3K	50	300	10	B-25
	1.5	CDC-48-1.5	3.0	1.5	1.0	0.3	200	2	6K	50	250	10	B-50
	2.5	CDC-48-2.5	3.0	1.5	1.0	0.2	200	2	15K	50	200	20	B-120
	5.0	CDC-48-5	2.0	1.0	0.6	0.3	200	6	15K	50	50	50	B-250
	10	CDC-48-10	2.0	1.0	0.5	0.4	200	16	25K	50	50	50	B-500
60 vdc (OR ±60V)**	0.1	CDC-60-0.1	8.0	6.0	4.0	0.2	400	1	1K	75	2.5K	2	C-6
	0.5	CDC-60-0.5	3.0	2.0	1.2	0.4	400	1	2K	75	500	10	B-25
	1.2	CDC-60-1.2	4.2	3.0	2.0	0.3	400	2	5K	75	400	10	B-50
	2.0	CDC-60-2	3.5	2.0	1.0	0.3	400	2	10K	75	300	20	B-120
	4	CDC-60-4	1.5	1.2	1.0	0.4	400	6	12K	75	75	50	B-250
	8	CDC-60-8	3.0	2.0	0.6	0.4	400	16	20K	75	75	50	B-500
120 vdc (OR ±120V)**	0.05	CDC-120-0.05	9.0	8.0	5.0	0.2	400	1	0.5K	150	10K	2	C-6
	0.3	CDC-120-0.3	6.0	4.0	2.5	0.3	400	1	2K	150	2K	10	B-25
	0.6	CDC-120-0.6	5.5	3.5	2.5	0.3	400	1	3K	150	1.5K	10	B-50
	1.0	CDC-120-1	5.5	3.2	2.0	0.4	400	1	4K	150	1K	20	B-120
	2	CDC-120-2	4.0	3.0	2.0	0.3	400	2	9K	150	250	60	B-250
	4	CDC-120-4	4.0	2.0	0.8	0.4	400	6	15K	150	150	100	B-500

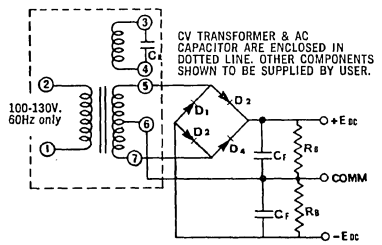
* See mechanical dimensions on opposite page.

† May be reduced if ripple requirements are less severe.

‡ Bleeder resistor may be eliminated if load current does not fall to zero. DC amp rating may be increased accordingly.

** If used in dual complementary supply — see opposite page.

CONSTANT VOLTAGE TRANSFORMERS
FOR USE IN DC POWER SUPPLIES (TYPE CDC)



CDC Transformers may also be used in complementary power supplies and will provide dual outputs at ± the rated voltage.

Each output voltage will be the same as in the single supply, **except that the DC current rating is ½ that in a single supply.**

It is also necessary to adjust the circuit parameters as follows:
C_F — ½ value in MFD, same DCWV.
R_B — 2 x value in ohms, ½ wattage rating.
DIODES — ½ P.I.V., ½ I/Cell.

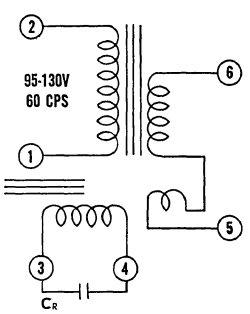
PART NO.	VOLTS AC	AMPS AC	STYLE & SIZE
6 ACV-6.4	6.4	1	C-6
6 ACV-12.8	12.8	0.5	C-6
6 ACV-26	26	0.25	C-6
6 ACV-118	118	0.05	C-6
25 ACV-6.4	6.4	4	B-25
25 ACV-12.8	12.8	2	B-25
25 ACV-26	26	1	B-25
25 ACV-118	118	0.25	B-25
50 ACV-6.4	6.4	8	B-50
50 ACV-12.8	12.8	4	B-50
50 ACV-26	26	2	B-50
50 ACV-118	118	0.43	B-50
120 ACV-6.4	6.4	20	B-120
120 ACV-12.8	12.8	10	B-120
120 ACV-26	26	5	B-120
120 ACV-118	118	1	B-120
250 ACV-12.8	12.8	20	B-250
250 ACV-26	26	10	B-250
250 ACV-118	118	2.2	B-250
500 ACV-118	118	4.5	B-500

CONSTANT VOLTAGE TRANSFORMERS
FOR AC APPLICATIONS (TYPE ACV)

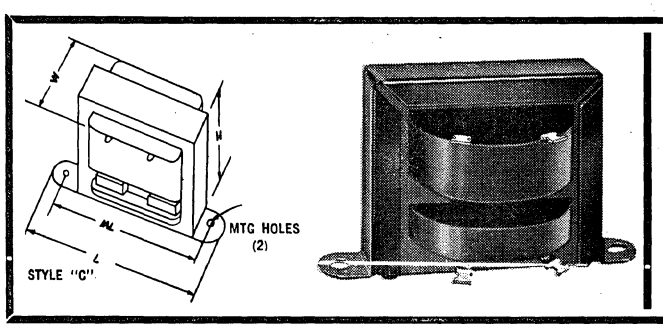
Signal ACV Transformers are manufactured for use with AC loads. They are simple, rugged designs and will regulate to ±1% for input variations from 95-130V at 60Hz **only.** 50Hz versions are available on special order. If regulation to ±½% or better is desired, special units can be made to your order.

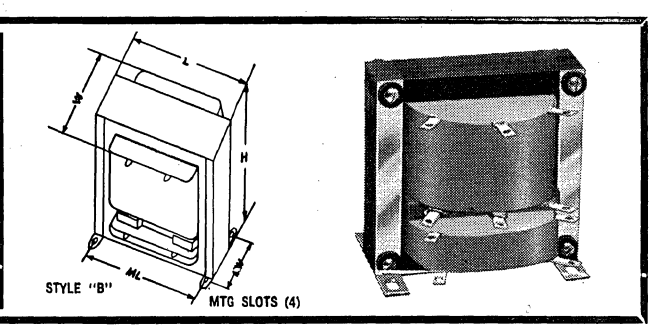
Full regulation is maintained at any load from about 20 to 100%. Short circuit current is limited to a maximum of 200% of rated current (300% in size C-6 units). ACV Transformers are "normal" harmonic type with approximately a square wave output.

The 6.4 and 12.8V ratings are ideal for use with tube or lamp loads since the short circuit rating limits the inrush current to cold filaments. Stabilization of the voltage results in longer filament life.

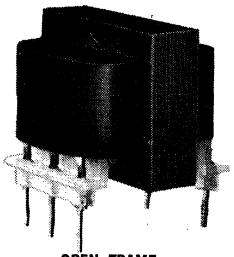


STYLE & SIZE	L	W	H	ML	MW	MTG. SCREW
C-6	3¼	1⅞	1 15/16	2 13/16	—	#8
B-25	3	2⅝	3⅛	2⅝	1 15/16	#8
B-50	3	3⅝	3⅛	2⅝	2 9/16	#8
B-120	4	3⅞	4 1/16	3½	2⅜	#10
B-250	4	5¾	4 1/16	3½	3 15/16	#10
B-500	5	5¾	5 1/16	4⅜	3 15/16	#10

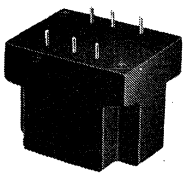




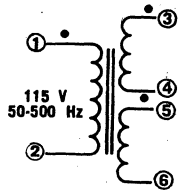
SIGNAL TRANSFORMER CO., INC
ENGINEERS • DESIGNERS • MANUFACTURERS
FACTORY: 1 JUNIUS STREET, BROOKLYN, NEW YORK 11212 — (212) 498-5111



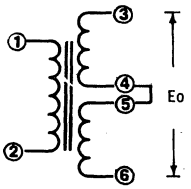
OPEN FRAME



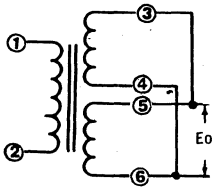
EPOXY MOULDED



BASIC SCHEMATIC



SERIES CONNECTED



PARALLEL CONNECTED

MINIATURE PLUG-IN POWER TRANSFORMERS

FOR PRINTED CIRCUIT APPLICATIONS — OPEN FRAME OR EPOXY MOULDED

low profile • low regulation • 50-500 Hz

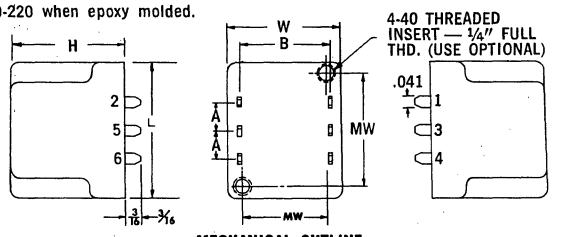
AVAILABLE WITH EITHER 115V OR 230V — 50/60HZ PRIMARY.
For 230V primary add prefix "2" to part no., e.g., 2-PC-24-180.

SECONDARY VOLTS	Part † No.	Secondary ‡ Milliamps Series	Secondary ‡ Milliamps Parallel	Size*	SECONDARY VOLTS	Part † No.	Secondary‡ Milliamps Series	Secondary‡ Milliamps Parallel
10 V.C.T. or 5 V.	PC-10-120	120	240	37	**40 V.C.T. or 20 V.**	PC-40-30	30	60
SERIES 10 V.C.T.	PC-10-440	440	880	50	SERIES 40 V.C.T.	PC-40-110	110	220
PARALLEL 5 V @ 2 x CURRENT	PC-10-1000	1000	2000	62	PARALLEL 20 V @ 2 x CURRENT	PC-40-250	250	500
12.6 V.C.T. or 6.3 V.	PC-12-100	100	200	37	**56 V.C.T. or 28 V.**	PC-56-20	20	40
SERIES 12.6 V.C.T.	PC-12-350	350	700	50	SERIES 56 V.C.T.	PC-56-80	80	160
PARALLEL 6.3 V @ 2 x CURRENT	PC-12-800	800	1600	62	PARALLEL 28 V @ 2 x CURRENT	PC-56-180	180	360
16 V.C.T. or 8 V.	PC-16-75	75	150	37	**88 V.C.T. or 44 V.**	PC-88-15	15	30
SERIES 16 V.C.T.	PC-16-260	260	520	50	SERIES 88 V.C.T.	PC-88-50	50	100
PARALLEL 8 V @ 2 x CURRENT	PC-16-640	640	1280	62	PARALLEL 44 V @ 2 x CURRENT	PC-88-120	120	240
20 V.C.T. or 10 V.	PC-20-60	60	120	37	**120 V.C.T. or 60 V.**	PC-120-10	10	20
SERIES 20 V.C.T.	PC-20-220	220	440	50	SERIES 120 V.C.T.	PC-120-35	35	70
PARALLEL 10 V @ 2 x CURRENT	PC-20-500	500	1000	62	PARALLEL 60 V @ 2 x CURRENT	PC-120-85	85	170
24 V.C.T. or 12 V.	PC-24-50	50	100	37	**180 V.C.T. or 90 V.**	PC-180-6	6	12
SERIES 24 V.C.T.	PC-24-180	180	360	50	SERIES 180 V.C.T.	PC-180-24	24	48
PARALLEL 12 V @ 2 x CURRENT	PC-24-450	450	900	62	PARALLEL 90 V @ 2 x CURRENT	PC-180-55	55	110
34 V.C.T. or 17 V.	PC-34-35	35	70	37	**230 V.C.T. or 115 V.**	PC-230-5	5	10
SERIES 34 V.C.T.	PC-34-125	125	250	50	SERIES 230 V.C.T.	PC-230-20	20	40
PARALLEL 17 V @ 2 x CURRENT	PC-34-300	300	600	62	PARALLEL 115 V @ 2 x CURRENT	PC-230-40	40	80

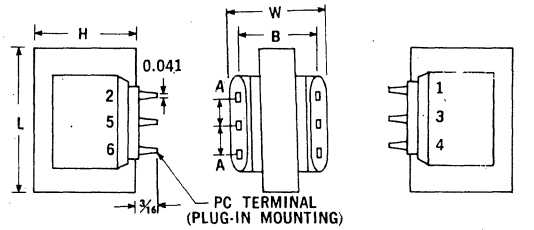
‡ Secondary current rating based on 20% regulation. Higher currents may be drawn without over-heating. Check with our Engineering Dept. on specific units.

† Use prefix "EP-" for epoxy molded units rather than "PC-", e.g., PC-10-220 becomes EP-10-220 when epoxy molded.

*Size shown applies to both right and left hand units which are on same horizontal line.



MECHANICAL OUTLINE



EPOXY MOLDED (Part Nos. with Prefix EP-, EN-, EC-)

Size	VA	L	W	H	A	B	ML	MW	Wt. Oz.
37	1.2	1.476	1.250	1.222	0.312	1.000	1.250	0.900	4
50	4.4	1.721	1.380	1.417	0.400	1.100	1.500	1.000	6
62	10	1.986	1.550	1.674	0.400	1.300	1.600	1.000	11

OPEN FRAME (Part Nos. with Prefix PC-, PCN-, PCC-)

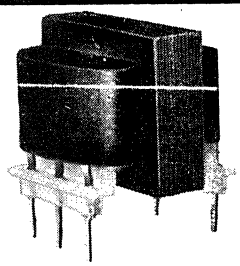
37	1.2	1⅜	1⅛	1 3/16	0.312	1.000			3
50	4.4	1⅝	1¼	1⅜	0.400	1.100			5
62	10	1⅞	1 1/16	1⅝	0.400	1.300			9

SPECIAL PC TRANSFORMERS OR CHOKES — PROMPT QUOTATIONS

IGNAL TRANSFORMER CO., INC

FACTORY: 1 JUNIUS ST., BROOKLYN, N. Y. 11212 • (212) 498-5111

MINIATURE PLUG-IN POWER TRANSFORMERS



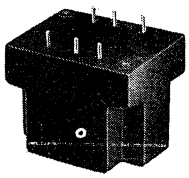
FOR PRINTED CIRCUIT APPLICATIONS

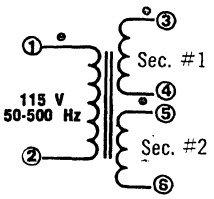
low profile • low regulation • 50-500 Hz

SHIPPED FROM STOCK IMMEDIATELY

FOR INDICATOR TUBE & I.C. APPLICATIONS

"PCN" transformers provide ideal outputs for use in indicator tube and I.C. applications. 175 or 130 V. can be used for DC supplies for "Nixies" and 6.3 or 12.6 V. can supply power for associated I.C. circuitry or supplies.





SECONDARY VOLTS	Part † No.	Secondary ‡ Milliamps Sec. #1 (3-4)	Secondary ‡ Milliamps Sec. #2 (5-6)	Size *	SECONDARY VOLTS	Part † No.	Secondary‡ Milliamps Sec. #1 (3-4)	Secondary‡ Milliamps Sec. #2 (5-6)
175 V. & 6.3 V.	PCN-37-1	4	80	37	**130 V. & 6.3 V.**	PCN-37-3	5.5	80
SEC. #1 (3-4) 175 V.	PCN-50-1	12	350	50	SEC. #1 (3-4) 130 V.	PCN-50-3	16	350
SEC. #2 (5-6) 6.3 V.	PCN-62-1	20	1000	62	SEC. #2 (5-6) 6.3 V.	PCN-62-3	27	1000
175 V. & 12.6 V.	PCN-37-2	4	40	37	**130 V. & 12.6 V.**	PCN-37-4	5.5	40
SEC. #1 (3-4) 175 V.	PCN-50-2	12	175	50	SEC. #1 (3-4) 130 V.	PCN-50-4	16	175
SEC. #2 (5-6) 12.6 V.	PCN-62-2	20	500	62	SEC. #2 (5-6) 12.6 V.	PCN-62-4	27	500

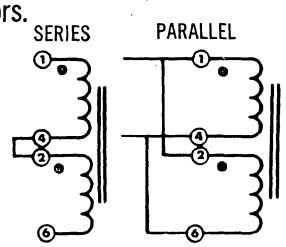
* Size shown applies to both right and left hand units which are on same horizontal line.
† Use prefix "EN-" for epoxy molded units rather than "PCN-", e.g., PCN-37-1 becomes EN-37-1 when epoxy molded.
‡ Secondary current rating based on 20% regulation. Higher currents may be drawn without over-heating. Check with our Engineering Dept. on specific units.

DUAL INDUCTORS FOR SMOOTHING & SCR SURGE LIMITING

"PCC" dual filter chokes find use in DC supply filters or as inductive elements in switching circuits. Another application is to limit current surge (di/dt) in SCR circuits. These chokes may also be used as AC reactors.

Part** No.	Series Connected Ind. (MHY)	Series Connected Curr. (Amps)	Series Connected Resis. (Ohms)	Parallel Connected Ind. (MHY)	Parallel Connected Curr. (Amps)	Parallel Connected Resis (Ohms)	E-T* (Volt-Millisec)	Size
PCC-1-37	120	0.375	6.0	30	0.75	1.5	25	37
PCC-2-37	80	0.5	3.8	20	1.0	0.95	20	37
PCC-1-50	88	0.75	3.2	22	1.5	0.80	30	50
PCC-2-50	40	1.0	2.0	10	2.0	0.5	25	50
PCC-1-62	32	1.5	1.0	8	3.0	0.25	25	62
PCC-2-62	20	2.0	0.64	5	4.0	0.16	20	62

* Based on maximum flux density of 5,000 gauss. (approx. value series connection).
** Use prefix "EC"-, for epoxy molded units rather than "PCC-", e.g., PCC-1-37 becomes EC-1-37 when epoxy molded.



Note Pins 3 & 5 are Dummy Terminals

SPECIAL "PC" COMPONENTS

Signal maintains a unique department which specializes in the design and production of "PC" type transformers and chokes.

It is equipped with the most modern automated coil winding and lamination stacking machinery. Specialized production test equipment assures uniform, high quality transformers at the most economical price. This facility is being constantly improved and expanded to meet the growing demand for our designs.

The "PC" items shown here are stocked in depth at our factory for immediate delivery. However, they represent only a small fraction of our total shipments. The major portion consists of custom designs or variations for our customer's special requirements.

Please contact us for prompt quotations on any of your special requirements for "PC" or other bobbin wound components.

METHOD OF DETERMINING SECONDARY CURRENT RATINGS

RECTIFIER TYPE	FILTER TYPE	RMS SECONDARY CURRENT
Full Wave Center-Tap	Choke Input	.7 X DC amps
Full Wave Center-Tap	Capacitor Input	1.2 X DC amps
Full Wave Bridge	Choke Input	= to DC amps
Full Wave Bridge	Capacitor Input	1.8 X DC amps

Signal's PC Transformers are constructed of prime raw materials using Class S insulation and nylon bobbins with PC pins molded directly in the bobbin wall. They are black varnish impregnated and 100% tested for all parameters before shipment.

Units are available with either 115V or 230V primaries, 50-500HZ. Dual secondaries provide two outputs, or secondaries may be series or parallel connected. This results in a wide variety of output combinations. Load regulation is limited to a maximum of 20%.

SPECIAL PC TRANSFORMERS OR CHOKES — PROMPT QUOTATIONS

SIGNAL TRANSFORMER CO., INC

FACTORY: 1 JUNIUS ST., BROOKLYN, N. Y. 11212 • (212) 498-5111

PRICE LIST

Part No.	User Net
10-0.1	3.74
10-0.25	3.96
10-0.5	4.13
10-1	4.57
10-2	5.72
10-4	7.15
10-6	9.24
10-8	9.90
10-12	11.55
10-25	20.02
10-50	29.15
10-100	47.30
12.8-0.1	3.74
12.8-0.25	4.02
12.8-0.5	4.40
12.8-1	4.90
12.8-2A	5.67
12.8-2	6.99
12.8-4	8.47
18.8-6	9.90
12.8-8	10.56
12.8-12	12.10
12.8-25	24.64
12.8-50	33.55
12.8-100	48.40
16-0.1	3.85
16-0.25	4.07
16-0.5	4.35
16-1	4.73
16-2	5.89
16-4	8.91
16-6	10.45
16-8	11.33
16-12	14.03
16-25	26.40
16-50	41.80
16-100	70.40
24-0.1	3.85
24-0.25	4.51
24-0.5	4.95
24-1A	5.39
24-1	6.99
24-2	8.03
24-4	10.07
24-6	12.10
24-8	16.72
24-12	19.58
24-20	24.64
24-25	33.00
24-50	48.40
24-100	77.00
36-0.1	3.96
36-0.25	4.40
36-0.5	5.01
36-1A	6.22
36-1	7.26
36-2	8.58
36-4	11.99
36-6	17.16
36-8	18.37
36-12	22.00
36-20	37.07
36-25	43.56
36-30	48.40
36-50	60.50
36-100	118.80
56-0.1	4.18
56-0.25	4.90
56-0.5	5.50
56-1	8.80
56-2	9.79
56-4	16.39
56-6	23.65
56-8	29.15
56-12	38.50
56-25	62.70
56-50	112.20
56-100	166.10
68-01	4.29
68-025	4.84
68-0.5A	5.61
68-0.5	7.43
68-1	8.69
68-2	11.00
68-4	20.68
68-6	23.65
68-8	28.38
68-12	41.80
68-25	62.70
68-50	113.30
80-01	4.40
80-0.25	5.06
80-0.5A	6.16
80-0.5	7.43
80-1	9.35
80-2	13.97
80-4	23.10
80-6	29.70
80-8	35.75
80-12	45.10
80-25	76.45
80-50	136.40
88-0.1	4.51
88-0.25	5.28
88-0.5	6.27
88-1	9.68
88-2	14.19
88-4	24.20
88-6	30.25
88-8	36.85
88-12	46.20
88-25	79.20
88-50	140.80
120-0.5	9.02
120-1	11.44
120-2	16.17
120-4	30.80
120-6	37.40
120-8	46.75
120-12	57.75
120-20	84.15
160-0.5	9.57
160-1	14.19
160-2	19.80
160-4	34.10
160-8	53.35
160-12	71.50
180-0.5	10.01
180-1	15.62
180-2	22.00
180-4	39.60
180-6	46.75
180-8	57.20
180-12	85.80
230-0.5	11.55
230-1	16.50
230-2	23.65
230-4	46.20
230-6	55.00
300-0.5	12.10
300-1	21.67
300-2	34.10
300-4	53.35
CH-0.1	2.48
CH-0.2	2.86
CH-0.25	3.30
CH-0.5	4.18
CH-1	6.27
CH-2	7.26
CH-4	9.68
CH-6	12.10
CH-8	15.40
CH-12	19.80
CH-16	22.00
CH-20	21.45
CH-25	30.25
CH-30	36.30
CH-50	41.80
CH-100	47.30
CH-200	74.80
CH-250	84.00
CH-500	101.20
CH-1000	112.20
CL-1-2	3.45
CL-2-4	4.35
CL-4-8	7.35
CL-6-12	8.40
CL-12-24	12.50
CL-25-50	14.00
CL-50-100	18.00
E-10-0.1	5.61
E-10-0.25	5.97
E-10-0.5	6.38
E-10-1	6.99
E-10-2	8.80
E-10-4	12.21
E-10-6	14.30
E-10-8	15.40
E-10-12	18.21
E-10-25	29.48
E-10-50	46.42
E-10-100	75.90
E-12.8-0.1	5.61
E-12.8-0.25	6.06
E-12.8-0.5	6.66
E-12.8-1	7.43
E-12.8-2A	8.64
E-12.8-2	10.73
E-12.8-4	13.04
E-12.8-6	15.29
E-12.8-8	16.39
E-12.8-12	18.92
E-12.8-25	38.94
E-12.8-50	53.46
E-12.8-100	77.55
E-16-0.1	5.78
E-16.025	6.13
E-16-0.5	6.56
E-16-1	7.17
E-16-2	8.98
E-16-4	13.70
E-16-6	16.17
E-16-8	17.66
E-16-12	22.00
E-16-25	41.80
E-16-50	67.10
E-16-100	112.20
E-24-0.1	5.78
E-24-0.25	6.82
E-24-0.5	7.54
E-24-1A	8.25
E-24-1	10.75
E-24-2	12.34
E-24-4	16.28
E-24-6	18.76
E-24-8	25.96
E-24-12	30.58
E-24-20	38.50
E-24-25	51.81
E-24-50	76.45
E-24-100	122.10
E-36-0.1	5.94
E-36-0.25	6.63
E-36-0.5	7.57
E-36-1A	9.41
E-36-1	11.06
E-36-2	13.09
E-36-4	18.48
E-36-6	26.62
E-36-8	28.60
E-36-12	34.32
E-36-20	58.08
E-36-25	68.42
E-36-30	76.45
E-36-50	96.25
E-36-100	190.30
E-56-0.1	6.27
E-56-0.25	7.37
E-56-0.5	8.31
E-56-1	13.31
E-56-2	14.85
E-56-4	25.08
E-56-6	36.41
E-56-8	45.21
E-56-12	59.95
E-56-25	98.45
E-56-50	177.10
E-56-100	264.00
E-68-0.1	6.44
E-68-0.25	7.28
E-68-0.5A	8.47
E-68-0.5	11.24
E-68-1	13.20
E-68-2	16.83
E-68-4	31.68
E-68-6	36.41
E-68-8	44.00
E-68-12	65.45
E-68-25	99.00
E-68-50	181.50
E-80-0.1	6.60
E-80-0.25	7.65
E-80-0.5A	9.35
E-80-0.5	11.33
E-80-1	14.41
E-80-2	21.56
E-80-4	35.86
E-80-6	46.20
E-80-8	56.10
E-80-12	71.17
E-80-25	121.00
E-80-50	217.80
E-88-0.1	6.77
E-88-0.25	7.95
E-88-0.5	9.52
E-88-1	14.80
E-88-2	21.89
E-88-4	37.51
E-88-6	47.08
E-88-8	57.75
E-88-12	72.93
E-88-25	125.40
E-88-50	224.40
E-120-0.5	13.53
E-120-1	17.27
E-120-2	24.64
E-120-4	47.41
E-120-6	57.86
E-120-8	72.38
E-120-12	91.30
E-120-20	134.20
E-160-0.5	14.36
E-160-1	21.45
E-160-2	30.14
E-160-4	52.47
E-160-8	83.16
E-160-12	113.30
E-180-0.5	15.02
E-180-1	23.54
E-180-2	33.44
E-180-4	61.05
E-180-6	72.38
E-180-8	89.10
E-180-12	135.30
E-230-0.5	17.33
E-230-1	25.08
E-230-2	36.30
E-230-4	71.50
E-230-6	85.25
E-300-0.5	18.15
E-300-1	33.00
E-300-2	52.80
E-300-4	83.16
E-CH-0.1	3.19
E-CH-0.2	3.74
E-CH-0.25	4.35
E-CH-0.5	5.50
E-CH-1	8.36
E-CH-2	9.68
E-CH-4	12.98
E-CH-6	16.28
E-CH-8	20.79
E-CH-12	26.95
E-CH-16	30.14
E-CH-20	29.48
E-CH-25	41.80
E-CH-30	50.27
E-CH-50	57.97
E-CH-100	66.00
E-CH-200	105.60
E-CH-500	145.20
E-CH-1000	162.80
H-10-0.1	10.84
H-10-0.25	11.55
H-10-0.5	12.05
H-10-1	13.31
H-10-2	16.78
H-10-4	21.23
H-10-6	27.72
H-10-8	29.81
H-10-12	34.87
H-10-25	60.72
H-10-50	85.58
H-10-100	146.30
H-12.8-0.1	10.84
H-12.8-0.25	11.66
H-12.8-0.5	12.82
H-12.8-1	14.30
H-12.8-2A	16.61
H-12.8-2	20.63
H-12.8-4	25.08
H-12.8-6	29.37
H-12.8-8	31.68
H-12.8-12	36.52
H-12.8-25	75.13
H-12.8-50	103.07
H-12.8-100	150.70
H-16-0.1	11.22
H-16-0.25	11.83
H-16-0.5	12.65
H-16-1	13.86
H-16-2	17.27
H-16-4	26.18
H-16-6	30.80
H-16-8	33.55
H-16-12	41.80
H-16-25	79.20
H-16-50	125.40
H-16-100	211.20
H-24-0.1	11.22
H-24-0.25	13.09
H-24-0.5	14.41
H-24-1A	15.79
H-24-1	20.57
H-24-2	23.65
H-24-4	29.92
H-24-6	36.08
H-24-8	50.27
H-24-12	58.85
H-24-20	74.14
H-24-25	99.55
H-24-50	147.40
H-24-100	235.40
H-36-0.1	11.50
H-36-0.25	12.76
H-36-0.5	14.58
H-36-1A	18.15
H-36-1	21.29
H-36-2	25.19
H-36-4	35.31
H-36-6	50.60
H-36-8	54.45
H-36-12	65.34
H-36-20	110.00
H-36-25	129.80
H-36-30	144.10
H-36-50	181.50
H-36-100	358.60
H-56-0.1	12.10
H-56-0.25	14.19
H-56-0.5	16.01
H-56-1	25.63
H-56-2	28.60
H-56-4	47.96
H-56-6	69.41
H-56-8	86.24
H-56-12	114.40
H-56-25	187.00
H-56-50	335.50
H-56-100	500.50
H-68-0.1	12.43
H-68-0.25	14.06
H-68-0.5A	16.39
H-68-0.5	21.67
H-68-1	25.30
H-68-2	32.23
H-68-4	61.05
H-68-6	70.18
H-68-8	84.70
H-68-12	124.85
H-68-25	191.40
H-68-50	347.60
H-80-0.1	12.76
H-80-0.25	14.69
H-80-0.5A	18.10
H-80-0.5	22.00
H-80-1	27.61
H-80-2	41.47
H-80-4	68.75
H-80-6	89.10
H-80-8	107.58
H-80-12	136.40
H-80-25	233.20
H-80-50	418.00
H-88-0.1	13.09
H-88-0.25	15.35
H-88-0.5	18.43
H-88-1	28.60
H-88-2	42.13
H-88-4	72.05
H-88-6	90.75
H-88-8	111.10
H-88-12	139.70
H-88-25	240.90
H-88-50	431.20
H-120-0.5	26.18
H-120-1	33.44
H-120-2	47.52
H-120-4	91.30
H-120-6	110.00
H-120-8	139.70
H-120-12	172.70
H-120-20	255.20
H-160-0.5	27.72
H-160-1	41.47
H-160-2	58.08
H-160-4	101.20
H-160-8	159.50
H-160-12	214.50
H-180-0.5	29.04
H-180-1	45.65
H-180-2	64.57
H-180-4	116.60
H-180-6	138.60
H-180-8	170.50
H-180-12	257.40
H-230-0.5	33.55
H-230-1	48.18
H-230-2	69.41
H-230-4	136.40
H-230-6	163.90
H-300-0.5	35.09
H-300-1	63.25
H-300-2	100.10
H-300-4	157.30
H-CH-0.1	7.15
H-CH-0.2	8.31
H-CH-0.25	9.63
H-CH-0.5	12.21
H-CH-1	18.37
H-CH-2	21.45
H-CH-4	28.82
H-CH-6	36.30
H-CH-8	46.42
H-CH-12	59.95
H-CH-16	66.88
H-CH-20	65.23
H-CH-25	92.18
H-CH-30	111.10
H-CH-50	128.70
H-CH-100	146.30
6-250	78.00
9-250	100.00
12-250	110.00
6-500	107.80
9-500	139.70
12-500	173.80
3-1000	114.40
6-1000	184.80
MV-1	14.85
MV-2	17.60
MV-4	23.10
MV-6	31.90
MV-12	44.00
3PH-24-50	99.00
3PH-24-100	139.70
3PH-24-200	227.70
3PH-48-30	99.00
3PH-48-60	139.70
3PH-48-120	227.70
SD-100	8.03
SD-150	9.46
SD-250	11.00
SD-350	14.30
SD-500	16.61
SD-750	21.18
SD-1000	25.30
SD-1500	29.70
SD-2000	38.50
SDO-100	5.50
SDO-150	6.60
SDO-250	8.14
SDO-350	11.55
SDO-500	13.64
SDO-750	18.15
SDO-1000	22.22
SDO-1500	25.85
SDO-2000	34.98
HSD-3000	60.50
HSD-4000	66.00
HSD-5000	75.90
HSD-6000	83.60
DU-¼	30.58
DU-½	37.95
DU-1	60.50
DU-2	82.50
DU-3	117.70
DU-5	158.40
DU-7½	203.50
DU-10	258.50
SU-¼	31.50
SU-½	39.00
SU-1	62.00
SU-2	84.00
SU-3	120.00
SU-5	160.00
SU-7.5	205.00
SU-10	260.00
UP-2	30.80
UP-4	35.75
UP-8	58.30
UP-15	84.70
UP-25	108.90
UP-40	151.80
CDC-5-1	15.60
CDC-5-5	22.10
CDC-5-10	26.10
CDC-5-18	32.70
CDC-5-50	50.00
CDC-6-0.8	15.40
CDC-6-4.5	21.89
CDC-6-9	25.85
CDC-6-16	32.45
CDC-6-40	48.84
CDC-6-75	74.80
CDC-12-0.4	15.35
CDC-12-2.2	21.78
CDC-12-4.5	25.74
CDC-12-9	32.34
CDC-12-20	48.51
CDC-12-38	74.58
CDC-15-0.35	15.29
CDC-15-2	21.67
CDC-15-3.5	25.63
CDC-15-8	32.12
CDC-15-16	48.29
CDC-15-30	74.36
CDC-18-0.32	15.24
CDC-18-1.8	21.56
CDC-18-3	25.52
CDC-18-6	32.01
CDC-18-13	48.29
CDC-18-26	74.25
CDC-24-0.25	15.18
CDC-24-1.2	21.45
CDC-24-2.1	25.41
CDC-24-4.5	31.90
CDC-24-11	48.18
CDC-24-20	74.03
CDC-28-0.22	15.13
CDC-28-1	21.34
CDC-28-2	25.30
CDC-28-4	31.79
CDC-28-9	48.07
CDC-28-16	73.92
CDC-36-0.18	15.02
CDC-36-0.9	21.23
CDC-36-1.8	25.19
CDC-36-3.2	31.68
CDC-36-6	47.85
CDC-36-12	73.70
CDC-48-0.12	14.96
CDC-48-0.6	21.12
CDC-48-1.5	25.08
CDC-48-2.5	31.57
CDC-48-5	47.74
CDC-48-10	73.48
CDC-60-0.1	14.74
CDC-60-0.5	21.34
CDC-60-1.2	24.97
CDC-60-2	31.35
CDC-60-4	47.63
CDC-60-8	73.37
CDC-120-0.5	14.74
CDC-120-0.3	20.90
CDC-120-0.6	24.86
CDC-120-1	31.24
CDC-120-2	47.52
CDC-120-4	73.15
6ACV-6.4	15.51
6ACV-12.8	15.32
6ACV-26	15.07
6ACV-118	14.74
25-ACV-6.4	22.00
25-ACV-12.8	21.78
25-ACV-26	21.45
25-ACV-118	20.90
50-ACV-6.4	25.96
50-ACV-12.8	25.52
50-ACV-26	24.97
50-ACV-118	24.42
120-ACV-6.4	32.01
120-ACV-12.8	31.79
120-ACV-26	31.46
120-ACV-118	31.02
250-ACV-12.8	48.40
250-ACV-26	47.30
250-ACV-118	46.09
500-ACV-118	74.80
PC-10-120	3.92
PC-10-440	4.11
PC-10-1000	4.34
PC-12-100	3.96
PC-12-350	4.14
PC-12-800	4.36
PC-16-75	4.00
PC-16-260	4.16
PC-16-640	4.38
PC-20-60	4.02
PC-20-220	4.18
PC-20-500	4.40
PC-24-50	4.13
PC-24-180	4.29
PC-24-450	4.51
PC-34-35	4.24
PC-34-125	4.40
PC-34-300	4.62
PC-40-30	4.29
PC-40-110	4.46
PC-40-250	4.68
PC-56-20	4.32
PC-56-80	4.48
PC-56-180	4.70
PC-88-15	4.35
PC-88-50	4.51
PC-88-120	4.73
PC-120-10	4.40
PC-120-35	4.57
PC-120-85	4.79
PC-180-6	4.46
PC-180-24	4.60
PC-180-55	4.82
PC-230-5	4.50
PC-230-20	4.62
PC-230-40	4.84
PCN-37-1	4.70
PCN-50-1	4.80
PCN-62-1	5.00
PCN-37-2	4.70
PCN-50-2	4.80
PCN-62-2	5.00
PCN-37-3	4.70
PCN-50-3	4.80
PCN-62-3	5.00
PCN-37-4	4.70
PCN-50-4	4.80
PCN-62-4	5.00
PCC-1-37	3.86
PCC-2-37	3.90
PCC-1-50	4.06
PCC-2-50	4.10
PCC-1-62	4.26
PCC-2-62	4.30
EP-10-120	5.90
EP-10-440	6.30
EP-10-1000	6.75
EP-12-100	5.96
EP-12-350	6.33
EP-12-800	6.77
EP-16-75	6.00
EP-16-260	6.35
EP-16-640	6.79
EP-20-60	6.02
EP-20-220	6.37
EP-20-500	6.81
EP-24-50	6.12
EP-24-180	6.47
EP-24-450	6.90
EP-34-35	6.23
EP-34-125	6.58
EP-34-300	7.00
EP-40-30	6.28
EP-40-110	6.63
EP-40-250	7.05
EP-56-20	6.30
EP-56-80	6.66
EP-56-180	7.07
EP-88-15	6.33
EP-88-50	6.70
EP-88-120	7.10
EP-120-10	6.38
EP-120-35	6.75
EP-120-85	7.15
EP-180-6	6.44
EP-180-24	6.80
EP-180-55	7.20
EP-230-5	6.50
EP-230-20	6.85
EP-230-40	7.25
EN-37-1	6.70
EN-50-1	7.00
EN-62-1	7.40
EN-37-2	6.70
EN-50-2	7.00
EN-62-2	7.40
EN-37-3	6.70
EN-50-3	7.00
EN-62-3	7.40
EN-37-4	6.70
EN-50-4	7.00
EN-62-4	7.40
EC-1-37	5.85
EC-2-37	5.90
EC-1-50	6.25
EC-2-50	6.30
EC-1-62	6.65
EC-2-62	6.70

OEM DISCOUNT SCHEDULE

QTY.	DISCOUNT	QTY.	DISCOUNT
1-9	NET	50-99	33⅓%
10-24	15%	100-199	40%
25-49	25%	200 Over	QUOTE

TERMS: NET 30 DAYS ON APPROVED CREDIT
F.O.B. FACTORY, N. Y.

120 VOLT SINGLE PHASE PANEL MOUNTING

Cased and uncased units designed for mounting on panels 1/4" thick to 5/8" thick. Most panel mounting units can also be bench mounted.

Mfr's Type No.	Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
171	*0-132	1.75	.23	$2^{13}/_{16} \times 2^{1}/_{32}$	3	12.00
201	*0-132	2.0	.26	$2^{13}/_{16} \times 2^{1}/_{16}$	3	12.25
221	*0-132	2.25	.30	$2^{13}/_{16} \times 2^{1}/_{16}$	3.3	12.50
251	*0-132	2.5	.33	$2^{13}/_{16} \times 2^{9}/_{16}$	3.5	13.00
291	*0-132	3.0	.40	$2^{13}/_{16} \times 2^{9}/_{16}$	3.5	13.25
371	*0-120/140	3.75	.53	$3\frac{3}{4} \times 3\frac{3}{4} \times 3\frac{1}{4}$	5	18.00
501	0-120/140	5.0	.70	$3\frac{3}{4} \times 3\frac{3}{4} \times 3^{5}/_{16}$	6	19.00
1010	0-120/140	10.0	1.4	$5^{5}/_{16} \times 5 \times 4^{3}/_{16}$	12	25.00
1010CT	0-120/140	*10.0	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12	33.00
1210	**0-120	12.5	1.4	$5^{5}/_{16} \times 5 \times 4^{3}/_{16}$	12	27.00
1210CT	**0-120	12.5	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12	35.00
1510	0-120/140	15.0	2.1	$6^{1}/_{8} \times 6^{5}/_{8} \times 4^{3}/_{8}$	20	48.00
2510	0-120/140	25.00	3.5	$8^{3}/_{16} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23	65.00
2510CT	0-120/140	25.0	3.5	$9^{5}/_{8} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23	78.00
5010	0-140	50.0	7.0	$12\frac{1}{2} \times 12\frac{1}{2} \times 6\frac{1}{2}$	60	162.00
5010CT	0-140	50.0	7.0	$15^{5}/_{8} \times 14 \times 6\frac{1}{2}$	60	182.00

*60 cycle operation only at overvoltage.
**60 cycle operation only.

120 VOLT SINGLE PHASE MODELS WITH CORD & RECEPTACLE

All models housed in rugged cases include pilot light, switch fuse, line cord, plug and matching receptacle.
2 PF models are equipped with 2-wire cords, plugs and receptacles.
3PN models are equipped with 3-wire grounded cords, plugs, and receptacles.

Mfr's Type No.	Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
2PF171	**0-132	1.75	.23	$3^{7}/_{8} \times 3^{7}/_{8} \times 3\frac{1}{2}$	3.5	23.00
3PN171	**0-132	1.75	.23	$3^{7}/_{8} \times 3^{7}/_{8} \times 3\frac{1}{2}$	3.5	25.00
2PF371	*0-120/140	3.75	.53	$6\frac{1}{2} \times 6^{1}/_{8} \times 6\frac{1}{2}$	7.0	26.00
3PN371	*0-120/140	3.75	.53	$6\frac{1}{2} \times 6^{1}/_{8} \times 6\frac{1}{2}$	7.0	28.00
2PF501	0-120/140	5.0	.70	$6\frac{1}{2} \times 6^{1}/_{8} \times 6\frac{1}{2}$	9.0	28.00
3PN501	0-120/140	5.0	.70	$6\frac{1}{2} \times 6^{1}/_{8} \times 6\frac{1}{2}$	9.0	30.00
2PF1010	0-120/140	10.0	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	34.00
3PN1010	0-120/140	10.0	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	40.00
2PF1210	**0-120	12.5	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	40.00
3PN1210	**0-120	12.5	1.4	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	44.00
3PN2210	0-140	22.0	2.4	$10^{3}/_{4} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23.0	94.00

*60 cycle operation only on overvoltage. **60 cycle operation only.

240 VOLT SINGLE PHASE PANEL MOUNTING

Cased and uncased units designed for mounting on panels 1/4" thick to 5/8" thick. Most panel mounting units can also be benched mounted.

Mfr's Type No.	Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
1020	0-240/280	3.5	.98	$5^{5}/_{16} \times 5 \times 4^{3}/_{16}$	12.0	30.00
1020CT	0-240/280	3.5	.98	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	37.00
1220	0-240	5.0	1.2	$5^{5}/_{16} \times 5 \times 4^{3}/_{16}$	12.0	32.00
1220CT	0-240	5.0	1.2	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	40.00
1520	0-240/280	9.5	2.7	$6^{1}/_{8} \times 6^{5}/_{8} \times 4^{13}/_{16}$	20.0	48.00
2520	0-240/280	10.0	2.8	$8^{3}/_{8} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23.0	65.00
2520CT	0-240/280	10.0	2.8	$9^{5}/_{8} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23.0	78.00
5020	0-240/280	28.0	7.8	$12\frac{1}{2} \times 12\frac{1}{2} \times 6\frac{1}{2}$	60.0	162.00
5020CT	0-240/280	28.0	7.8	$15^{5}/_{8} \times 14 \times 6\frac{1}{2}$	60.0	182.00

240 VOLT SINGLE PHASE MODELS WITH CORD & RECEPTACLE

All models housed in rugged cases include pilot light, switch, fuse, line cord, plug and matching receptacle.
2 PF models are equipped with 2-wire cords, plugs and receptacles.
3 PN models are equipped with 3-wire grounded cords, plugs, and receptacles.

Mfr's Type No.	Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
2PF1020	0-280	3.5	.98	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	39.00
3PN1020	0-280	3.5	.98	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	46.00
2PF1220	**0-240	5.0	1.2	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	45.00
3PN1220	**0-240	5.0	1.2	$6^{7}/_{8} \times 5 \times 4^{7}/_{16}$	12.0	47.00
3PN2520	0-240	10.0	2.8	$9^{5}/_{8} \times 7^{5}/_{8} \times 4^{1}/_{8}$	23.0	94.00

**60 cycle operation only.

120 VOLT VARIABLE ISOLATION TRANSFORMERS

STACO isolated variable autotransformers provide a means for smooth control of an electrically isolated AC voltage output. Uncased models offer isolated, non-isolated voltage doubler, and series connections with proper external hook-up. Cased models feature circuit breaker, switch pilot light, output voltmeter 3-wire grounded cord, plug, and matching receptacles. Cased models available in isolated connection only. Ratings shown are for isolated connections.

Mfr's Type No.	Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
J401	0-140	4.0	.56	$6^{1}/_{8} \times 6^{5}/_{8} \times 4^{7}/_{8}$	13.0	82.00
J901	0-140	9.0	1.26	$8^{9}/_{32} \times 7\frac{3}{4} \times 5^{1}/_{8}$	25.0	110.00
EJ401V	0-140	4.0	.56	$9\frac{1}{2} \times 12^{15}/_{16} \times 6^{3}/_{8}$	26.0	110.00
EJ901V	0-140	9.0	1.26	$11\frac{1}{4} \times 14^{9}/_{16} \times 6^{5}/_{8}$	36.0	155.00

EJ201V, EJ401V, EJ901V have a 0-140 VAC and 0-120 VDC at full rated current available at isolated banana receptacles.

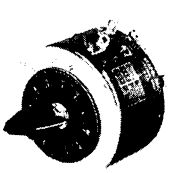
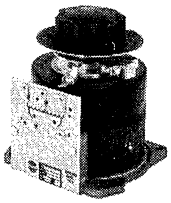
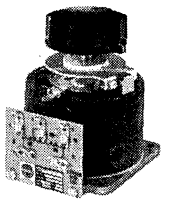
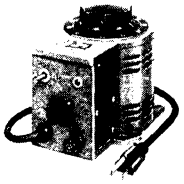
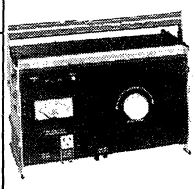
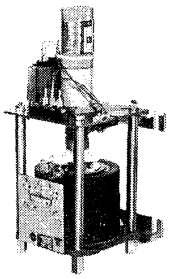
DELUXE VARIABLE AUTOTRANSFORMERS

STACO offers a selected group of variable autotransformers with new style, broad applications, and a unique combination of practical features. Suitable for use in any industrial application, classroom or laboratory. All units provide continuous voltage control over a wide range, and all are protected against short circuit. Convenient controls provide error-free operation and distortionless adjustment of AC voltage.

Mfr's Type No.	Input Volts	Output Volts	Output Amps	KVA	Size	Weight (Lbs.)	Price
E171	120	0-132	1.75	.23	$5^{7}/_{8} \times 9^{9}/_{16} \times 3^{5}/_{8}$	8.0	29.00
E371	120	0-140	3.75	.52	$7^{3}/_{8} \times 11^{3}/_{16} \times 4^{7}/_{8}$	11.0	30.00
E501	120	0-140	5.0	.7	$7^{3}/_{8} \times 11^{3}/_{16} \times 4^{7}/_{8}$	12.0	36.00
E501V	120	0-140	5.0	.7	$7^{3}/_{8} \times 15^{7}/_{16} \times 5^{7}/_{8}$	13.0	65.00
E501VA	120	0-140	5.0	.7	$11\frac{1}{4} \times 12^{9}/_{16} \times 5^{7}/_{8}$	17.0	105.00
E501VAW	120	0-140	5.0	.7	$11\frac{1}{4} \times 14^{9}/_{16} \times 5^{7}/_{8}$	18.0	165.00
E1010	120	0-140	10.0	1.4	$7^{3}/_{8} \times 11^{15}/_{16} \times 5^{7}/_{8}$	18.0	65.00
E1010V	120	0-140	10.0	1.4	$7^{3}/_{8} \times 15^{7}/_{16} \times 5^{7}/_{8}$	19.0	85.00
E1010VA	120	0-140	10.0	1.4	$11\frac{1}{4} \times 12^{9}/_{16} \times 5^{7}/_{8}$	23.0	125.00
E1010VAW	120	0-140	10.0	1.4	$11\frac{1}{4} \times 14^{9}/_{16} \times 5^{7}/_{8}$	23.0	200.00
E1210	120	0-120	12.0	1.44	$7^{3}/_{8} \times 11^{15}/_{16} \times 5^{7}/_{8}$	18.0	63.00
E1020	240	0-280	3.5	.98	$7^{3}/_{8} \times 11^{15}/_{16} \times 5^{7}/_{8}$	18.0	63.00
E1710	120	0-140	17.0	2.38	$11\frac{1}{4} \times 14^{9}/_{16} \times 5^{7}/_{8}$	31.0	100.00
E1720	240	0-280	10.0	2.8	$11\frac{1}{4} \times 14^{9}/_{16} \times 5^{7}/_{8}$	30.0	100.00

E501V, E501VA, E501VAW, E1010V, E1010VA, E1010VAW have isolated AC and DC outputs of 10% of the output current rating of the unit. Outputs are available at isolated banana receptacles.
V = Voltmeter A = Ammeter W = Wattmeter

STACO Variable Autotransformers

STACO Variable Autotransformers are precision built to exacting tolerances from the finest materials available.

Staco's new improved design provides long life with negligible maintenance, high efficiency and regulation, greater power to size ratio. Staco designs permit replacement of competitive equipment or previous Staco models without modification.

Models are available in various configurations from 1.75 to 300 amperes output. Choose from panel mounted units, cord and plug types or deluxe fully enclosed portable models, with or without metering. Staco products represent 25 years experience in providing safe and dependable control of power.

Contact your local representative for full details or write the factory for our new Product Guide.

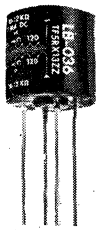
STACO INCORPORATED
2240 EAST THIRD STREET
DAYTON, OHIO 45403 USA
513/253-1191 • TWX: 810/459-1798

TOROTEL INC

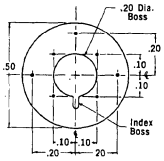
13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030

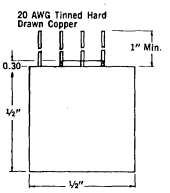
PHONE: 816 SO 1-6314 TWX-910-777-7037

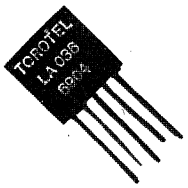
MINIATURE AUDIO TRANSFORMERS — LA & LB SERIES

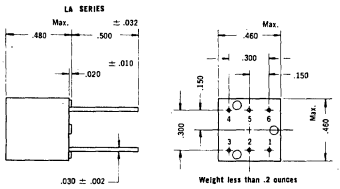


DIMENSIONS WITH SHIELD
O.D. 9/16 MAX.
H.T. 17/32 MAX.









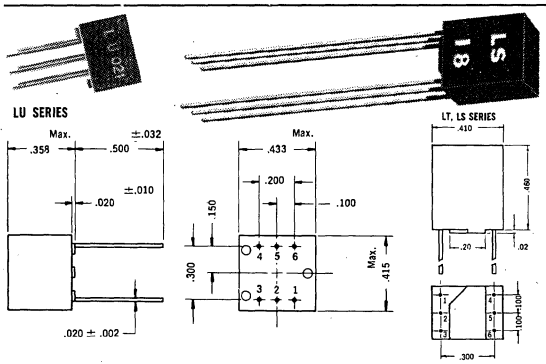
Torotel "LB" Transformers are manufactured to MIL-T-27B, Grade 5, Class S specifications. This Series of "LB" Transformers have 0.1 grid spacing for printed circuit applications and .030 mounting surface to avoid a moisture trap. Leads are made of 20AWG tinned hard drawn copper. Unitizing Dumet wire are available on special request.

DELIVERY AVAILABLE FROM STOCK

LB #	Mil Type	Application	Pri. Imp.	D.C. MA In Pri.	Sec. Imp.	Nom. Pri. Res.	MW Lev @1KC
001	TF5SX13ZZ	Interstage	20,000 30,000	.5 .5	800 1200	850	50
002	TF5SX17ZZ	Output	300 600	3 3	50 60	60	100
003	TF5SX13ZZ	Output.	1000 1200	3 3	50 60	115	100
004	TF5SX17ZZ	Output	600	3	3.2	60	100
005	TF5SX13ZZ	Output	1200	2	3.2	115	100
006	TF5SX13ZZ	Output	10,000	1	3.2	790	100
007	TF5SX16ZZ	Input Other Applications	200,000 500	0 0	1000 100,000	8500 —	25
008	TF5SX20ZZ	Reactor 3.5HY @ 2MADC, 1HY @ 5MADC				630	
009	TF5SX13ZZ	Output or Driver	10,000 12,000	1 1	500CT 600CT	800	100
010	TF5SX13ZZ	Driver	10,000 12,000	1 1	1200CT 1500CT	800	100
011	TF5SX13ZZ	Driver	10,000 12,000	1 1	2000CT 2500CT	800	100
012	TF5SX17ZZ	Single or PP Output	150CT 200CT	10 10	12 16	11	500
013	TF5SX17ZZ	Single or PP Output	300CT 400CT	7 7	12 16	20	500
014	TF5SX17ZZ	Single or PP Output	600CT 800CT	5 5	12 16	43	500
015	TF5SX17ZZ	Single or PP Output	800CT 1070CT	4 4	12 16	51	500
016	TF5SX13ZZ	Single or PP Output	1000CT 1330CT	3.5 3.5	12 16	71	500
017	TF5SX13ZZ	Single or PP Output	1500CT 2000CT	3 3	12 16	108	500
018	TF5SX13ZZ	Single or PP Output	7,500CT 10,000CT	1 1	12 16	505	500
019	TF5SX17ZZ	Output to Line	3COCT	7	600	19	500
020	TF5SX17ZZ	Output or Line to Line or Mixing	500CT	5.5	600	31	500
021	TF5SX17ZZ	Output to Line	900CT	4	600	53	500
022	TF5SX13ZZ	Output to Line	1500CT	3	600	86	500
023	TF5SX13ZZ	Interstage	20,000CT 30,000CT	.5 .5	800CT 1200CT	850	100
024	TF5SX16ZZ	Input Other Application	200,000CT 500CT	0 0	1000CT 100,000CT	8500 —	25
025	TF5SX13ZZ	Interstage	10,000CT 12,000CT	1 1	1500CT 1800CT	800	100
026	TF5SX20ZZ	Reactor 6HY @ 2MADC 1.5HY @ 5MADC				2100	
027	TF5SX20ZZ	Reactor 1.25HY @ 2MADC, .5HY@ 11MADC				100	
028	TF5SX20ZZ	Reactor .3HY @ 4MADC, .15HY @ 20MADC				31	
029	TF5SX17ZZ	Single or PP Output	120CT 150CT	10 10	3.2 4	10	500
030	TF5SX17ZZ	Single or PP Output	320CT 400CT	7 7	3.2 4	20	500

LB #	Mil Type	Application	Pri. Imp.	D.C. MA In Pri.	Sec. Imp.	Nom. Pri. Res.	MW Lev @1KC
031	TF5SX17ZZ	Single or PP Output	640CT 800CT	5 5	3.2 4	43	500
032	TF5SX17ZZ	Single or PP Output	800CT 1000CT	4 4	3.2 4	51	500
033	TF5SX13ZZ	Single or PP Output	1060CT 1330CT	3.5 3.5	3.2 4	71	500
034	TF5SX13ZZ	Single or PP Output	1600CT 2000CT	3 3	3.2 4	109	500
035	TF5SX13ZZ	Single or PP Output	8000CT 10,000CT	1 1	3.2 4	505	100
036	TF5SX13ZZ	Isolation or Interstage	10,000CT 12,000CT	1 1	10,000CT 12,000CT	950	100
037	TF5SX13ZZ	Driver	10,000CT 12,000CT	1 1	1200CT 1500CT	800	100
038	TF5SX13ZZ	Driver	10,000CT 12,000CT	1 1	2000CT 2500CT	800	100
039	TF5SX13ZZ	Driver	10,000CT 12,000CT	1 1	500CT 600CT	800	100
040	TF5SX16ZZ	Input	100,000	0	1000	1700	70
041	TF5SX13ZZ	Driver	20,000	.5	1000	1000	100
042	TF5SX13ZZ	Driver	20,000	.5	1200CT	1000	100
043	TF5SX17ZZ	Output	1000	3	50	60	100
044	TF5SX17ZZ	Output	400	3	50	30	100
045	TF5SX17ZZ	Output	400	3	11	30	100
046	TF5SX17ZZ	Single or PP Output	400CT	3	11	30	500
047	TF5SX20ZZ	Reactor 10HY @ 0 MADC 8HY @ .5MADC				650	
048	TF5SX13ZZ	Isolation or Interstage Ratio 1:1:1	2000CT 2500CT	3 3	8000 split 10,000 split	195	100
049	TF5SX13ZZ	Interstage	10,000CT 12,000CT	1 1	2000 split 2400 split	560	100
050	TF5SX13ZZ	Interstage	20,000CT 30,000CT	.5 .5	1000 split 1500 split	800	100
051	TF5SX13ZZ	Interstage	40,000CT 50,000CT	.25 .25	400 split 500 split	1700	50
C52	TF5SX17ZZ	Interstage or Output	400CT 500CT	8 6	400 split 500 split	46	500
053	TF5SX17ZZ	Interstage	400CT 500CT	8 6	120 split 150 split	46	500
054	TF5SX17ZZ	Interstage	400CT 500CT	8 6	40 split 50 split	46	500
055	TF5SX17ZZ	Interstage	80CT 100CT	12 10	32 split 40 split	9.8	500
056	TF5SX16ZZ	Input	50,000CT	.3	1000CT	1900	50
057	TF5SX17ZZ	Output	600CT 750CT	4.5	3.2 4.0	40	500
058	TF5SX13ZZ	Output	1200CT 1500CT	3	3.2 4	100	500
500		Magnetic Shielding Case					

SUB-MINIATURE AUDIO TRANSFORMERS — LT, LS & LU SERIES



LS, LT, and LU Series transformers have successfully passed the rigid requirements of MIL-T-27B, Class R, Grade 5.

Subminiature in size, weighting less than 0.1 ounce, these transformers have tenth inch grid spacing between terminals and are ideally suited for transistor circuit applications which utilize printed circuit board design. All three series have risers on mounting surfaces to facilitate inspection and board cleaning, and also to prevent moisture traps.

MAGNETIC SHIELDING

LS and LT Series transformers are available with magnetic shields when required. Overall dimensions of transformers with the magnetic shield added are .365 max x .465 max x .531 max.

To order transformers with shields installed add 500 to dash numbers shown in the table. For example: to order an LS-22 with shield, specify LS-522.

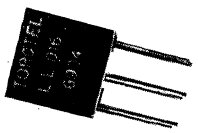
LS, LT or LU No.	Type	MIL-T-27A Designation	Primary Impedance	D.C. Res. Ohms	D.C. Ma. Pri.	Secondary Impedance	Max. Power MW.	Term. Layout
2	Input	TF5RX16ZZ	50000 c.t.	3800	.2	1000 c.t.	25	E
4	Interstage	TF5RX13ZZ	20000/30000	1700	.5	800/1200	40	B
5	Interstage	TF5RX13ZZ	20000/30000 c.t.	1700	.5	800/1200 c.t.	40	E
6	Interstage	TF5RX13ZZ	10000/12000 c.t.	1050	1	1500/1800 c.t.	50	E
7	Driver	TF5RX13ZZ	10000/12000 c.t.	1050	1	1200/1500 c.t.	50	E
8	Driver	TF5RX13ZZ	10000/12000 c.t.	1050	1	2000/2500 c.t.	50	E
9	Driver	TF5RX13ZZ	10000/12000 c.t.	1050	1	500/600 c.t.	50	E
10	Output	TF5RX17ZZ	500/600	60	3	50/60	50	B
11	Output	TF5RX17ZZ	1000/1200	145	3	50/60	50	B
12	Output	TF5RX17ZZ	600	70	3	3.2	50	B
13	Output	TF5RX13ZZ	1200	120	2	3.2	50	B
14	Output	TF5RX13ZZ	10000	1160	1	3.2	50	B
15	Output	TF5RX17ZZ	150/200 c.t.	18	10	12/16	50	D
16	Output	TF5RX17ZZ	300/400 c.t.	38	7	12/16	50	D
17	Output	TF5RX17ZZ	600/800 c.t.	75	4.5	12/16	50	D
18	Output	TF5RX17ZZ	1000/1330 c.t.	120	3.5	12/16	50	D
19	Output	TF5RX13ZZ	1500/2000 c.t.	180	3	12/16	50	D
20	Output	TF5RX13ZZ	7500/10000 c.t.	820	1	12/16	50	D
21	Output	TF5RX13ZZ	300 c.t.	37	7	600	50	D
22	Output	TF5RX17ZZ	500 c.t.	60	3	600	50	D
23	Output	TF5RX17ZZ	900 c.t.	100	4	600	50	D
24	Output	TF5RX17ZZ	1500 c.t.	170	3	600	50	D
25	Output	TF5RX17ZZ	120/150 c.t.	15	10	3.2/4	50	D
26	Output	TF5RX17ZZ	320/400 c.t.	40	6	3.2/4	50	D
27	Output	TF5RX17ZZ	600/750 c.t.	70	4.5	3.2/4	50	D
28	Output	TF5RX17ZZ	800/1000 c.t.	100	4	3.2/4	50	D
29	Output	TF5RX13ZZ	1200/1500 c.t.	125	3	3.2/4	50	D
30	Output	TF5RX13ZZ	1600/2000 c.t.	190	2.5	3.2/4	50	D
31	Output	TF5RX13ZZ	8000/10000 c.t.	820	1	3.2/4	50	D
32	Output	TF5RX13ZZ	10000 c.t.	1000	1	10000 c.t.	50	E
33	Driver	TF5RX13ZZ	10000/12000	1050	1	500/600 c.t.	50	C
34	Driver	TF5RX13ZZ	20000	1700	.3	1000	50	B
35	Output	TF5RX17ZZ	1000	135	3	50	50	B
36	Output	TF5RX17ZZ	400 c.t.	40	3	11	50	D
37	Driver	TF5RX13ZZ	10000/12000	1050	1	2000/2500 c.t.	50	C
38	Output	TF5RX17ZZ	600 c.t.	72	3	600 c.t.	50	E
39	Output	TF5RX13ZZ	10000	1000	1	10000 split	50	*
40	Output	TF5RX17ZZ	600	72	3	600 split	50	*
41	Input	TF5RX13ZZ	25000 c.t.	4300	0.6	1000 c.t.	30	E
42	Isolation	TF5RX17ZZ	600 c.t.	90	4	600 c.t.	30	E
101	Choke	TF5RX20ZZ	6 hy. @ 2 ma.	1700	—	—	—	A
102	Choke	TF5RX20ZZ	1.25 hy. @ 2 ma.	180	—	—	—	A
103	Choke	TF5RX20ZZ	3.5 hy. @ 2 ma.	1100	—	—	—	A
104	Choke	TF5RX20ZZ	.3 hy. @ 4 ma.	42	—	—	—	A

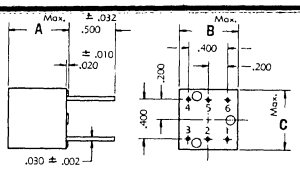
TOROTEL INC.

13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030

PHONE: 816 SO 1-6314 TWX-910-777-7037

AUDIO TRANSFORMERS LL & LR SERIES





Series	A	B	C
LL	.600	.590	.590
LR	.925	.800	.710

These tiny, versatile "LL" transformers are provided with .020 risers and 0.1 grid spacing for printed circuit board applications and are manufactured to MIL-T-27, Grade 5, Class S specifications.

RESPONSE: ±1 DB 200 to 50,000 HZ
DISTORTION: 10% Max. at rated power, 200 to 50,000 HZ
WEIGHT: 0.4 OZ

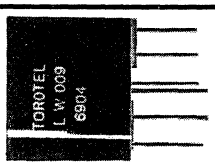
LL No.	MIL-T-27 Designation	Application	Impedance Ohms Pri	Impedance Ohms Sec.	DC Resistance Ohms Pri	DC Resistance Ohms Sec	Max. Pri DC (ma)	Max. 200 Hz Pwr* (mw)
001	TF5SX16ZZ	Input	100K-CT	1000-CT	6000	60	0	150
002	TF5SX16ZZ	Interstage	25K-CT	1000-CT	2800	120	0	150
003	TF5SX13ZZ	Interstage	10K-CT	10K-CT	1100	1200	1	150
004	TF5SX13ZZ	Driver	10K-CT	1500-CT	1100	200	1	150
005	TF5SX13ZZ	Output to Line	10K-CT	600-CT	1100	75	1	150
006	TF5SX13ZZ	Interstage	4000-CT	10K-CT	440	1200	1.5	150
007	TF5SX17ZZ	Output to Line	1000-CT	600-CT	100	60	3	150
008	TF5SX17ZZ	Output	1000-CT	4	100	0.4	3	150
009	TF5SX11ZZ	Input	600-CT	25K-CT	65	3500	4	150
010	TF5SX17ZZ	Isolation	600-CT	600-CT	65	75	4	150
011	TF5SX17ZZ	Output	600-CT	60	65	7	4	150
012	TF5SX17ZZ	Output	600-CT	4	65	0.5	4	150
013	TF5SX13ZZ	Driver	10K-CT	2000-CT	1100	240	1	150
014	TF5SX13ZZ	Driver	10K-CT	500-CT	1100	65	1	150
015	TF5SX17ZZ	Line to Line	500-CT	600-CT	55	75	4.5	150
016	TF5SX17ZZ	Output to Line	300-CT	600-CT	33	75	5.5	150

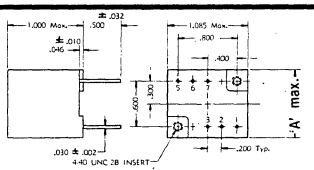
These miniaturized "LR" transformers are manufactured to MIL-T-27, Grade 5, Class S specifications and are ideally suited for a wide range of printed circuit applications.

RESPONSE: ±1 DB 200 to 20,000 HZ
DISTORTION: 10% Max. at rated power, 200 to 20,000 HZ
WEIGHT: 1.0 OZ

LR No.	MIL-T-27 Designation	Application	Impedance Ohms Pri	Impedance Ohms Sec.	DC Resistance Ohms Pri	DC Resistance Ohms Sec	Max. Pri DC (ma)	Max. 200 Hz Pwr* (mw)
001	TF5SX13ZZ	Interstage	25K-CT	1000-CT	2600	110	0.5	750
002	TF5SX13ZZ	Interstage	10K-CT	10K-CT	1000	1100	1	750
003	TR5SX13ZZ	Driver	10K-CT	1500-CT	1000	165	1	750
004	TF5SX13ZZ	Output to Line	10K-CT	600-CT	1000	70	1	750
005	TF5SX13ZZ	Output	10K-CT	4	1000	0.5	1	750
006	TF5SX13ZZ	Interstage	4000-CT	10K-CT	400	1100	1.5	750
007	TF5SX13ZZ	Output	1500-CT	15	150	2	2.5	750
008	TF5SX17ZZ	Output to Line	1000-CT	600-CT	100	70	3	750
009	TF5SX17ZZ	Output	1000-CT	4	100	0.5	3	750
010	AF5SX11ZZ	Input	600-CT	25K-CT	60	2900	4	750
011	TF5SX17ZZ	Isolation	600-CT	600-CT	60	70	4	750
012	TF5SX17ZZ	Output	600-CT	60	60	6.5	4	750
013	TF5SX17ZZ	Output	600-CT	15	60	2	4	750
014	TF5SX17ZZ	Output	600-CT	4	60	0.5	4	750
015	TF5SX17ZZ	Output to Line	250	600-CT	25	70	7	750
016	TF5SX13ZZ	Driver	10K-CT	2000-CT	1000	110	1	750
017	TF5SX13ZZ	Driver	10K-CT	500-CT	1000	110	1	750
018	TF5SX17ZZ	Line to Line	500-CT	600-CT	50	70	4.5	750
019	TF5SX17ZZ	Output to Line	300-CT	600-CT	30	70	5.5	750

AUDIO TRANSFORMERS LW & LY SERIES





Series	A
LW	.900
LY	1.125

"LW" series transformers are manufactured to MIL-T-27, Grade 5, Class S specifications. Riser areas and 0.1 grid spacing make these units ideal for printed circuit board applications.

RESPONSE: ±1 DB 100 to 10,000 HZ
DISTORTION: 1.5% Max. at 60 MW, 100 TD 10,000 HZ
WEIGHT: 2.4 OZ

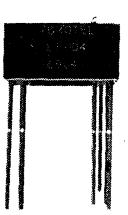
LW No.	MIL-T-27 Designation	Application	Impedance Ohms Pri	Impedance Ohms Sec.	DC Resistance Ohms Pri	DC Resistance Ohms Sec	Max. Pri DC (ma)	Max. 200 Hz Pwr* (mw)
001	TF5SX13ZZ	Interstage	10K-CT	10K-CT	800	1050	1	3.5
002	TF5SX13ZZ	Output to Line	10K-CT	600-CT	800	60	1	3.5
003	TF5SX13ZZ	Output	10K-CT	4	800	0.5	1	3.5
004	TF5SX13ZZ	Output	1500-CT	15	110	1.5	2.5	3.5
005	TF5SX17ZZ	Output to Line	1000-CT	15	75	60	3	3.5
006	TF5SX17ZZ	Output	1000-CT	4	75	0.5	3	3.5
007	TF5SX11ZZ	Input	600-CT	25K-CT	45	2700	4	2.5
008	TF5SX17ZZ	Isolation	600-CT	600-CT	45	60	4	3.5
009	TF5SX17ZZ	Output	600-CT	60	45	6.5	4	3.5
010	TF5SX17ZZ	Output	600-CT	15	45	1.5	4	3.5
011	TF5SX17ZZ	Output	600-CT	4	45	0.5	4	3.5
012	TF5SX17ZZ	Output to Line	250	600-CT	20	60	7	3.5
013	TF5SX13ZZ	Interstage	25K-CT	1000-CT	2500	85	0.5	2.5
014	TF5SX13ZZ	Driver	10K-CT	2000-CT	800	170	1	3.5
015	TF5SX13ZZ	Driver	10K-CT	500-CT	800	50	1	3.5
016	TF5SX17ZZ	Line to Line	500-CT	600-CT	50	60	4.5	3.5
017	TF5SX17ZZ	Output to Line	300-CT	600-CT	30	60	5.5	3.5
018	TF5SX13ZZ	Interstage	2500-CT	10K-Split	200	900	1.5	3.5

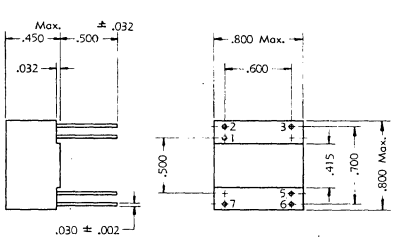
"LY" series transformers are highly compact, efficient units with power output ratings to 7.5 watts. These transformers are manufactured to MIL-T-27, Grade 5, Class S specifications.

RESPONSE: ±1 DB 60 to 10,000 HZ
DISTORTION: 1% Max. at 250 MW, 60 to 10,000 HZ
10% Max. at rated power, 200 to 10,000 HZ
WEIGHT: 2.5 OZ.

LY No.	MIL-T-27 Designation	Application	Impedance Ohms Pri	Impedance Ohms Sec.	DC Resistance Ohms Pri	DC Resistance Ohms Sec	Max. Pri DC (ma)	Max. 200 Hz Pwr* (mw)
001	TF5SX13ZZ	Interstage	10K-CT	10K-CT	700	900	1	6
002	TF5SX13ZZ	Output to Line	10K-CT	600-CT	700	55	1	6
003	TF5SX13ZZ	Output	10K-CT	4	700	0.4	1	6
004	TF5SX13ZZ	Output	1500-CT	15	100	1.5	2.5	7.5
005	TF5SX17ZZ	Output to Line	1000-CT	600-CT	65	55	3	7.5
006	TF5SX17ZZ	Output	1000-CT	4	65	0.4	3	7.5
007	TF5SX17ZZ	Isolation	600-CT	600-CT	40	55	4	7.5
008	TF5SX17ZZ	Output	600-CT	60	40	6	4	7.5
009	TF5SX17ZZ	Output	600-CT	15	40	1.5	4	7.5
010	TF5SX17ZZ	Output	600-CT	4	40	0.4	4	7.5
011	TF5SX17ZZ	Output to Line	250	600-CT	16	55	7	7.5
012	TF5SX13ZZ	Driver	10K-CT	2000-CT	700	150	1	6
013	TF5SX13ZZ	Driver	10K-CT	500-CT	700	45	1	6
014	TF5SX17ZZ	Line to Line	500-CT	600-CT	45	55	4.5	7.5
015	TF5SX17ZZ	Output to Line	300-CT	600-CT	27	55	5.5	7.5
016	TF5SX13ZZ	Interstage	2500-CT	10K-Split	170	800	1.5	7.5

AUDIO TRANSFORMERS — LJ SERIES





"LJ" Series transformers are the ultimate in compactness and their .450 HT and 0.1 grid spacing provide a most efficient .5" board spacing unit. Designed to meet MIL-T-27B, Grade 5, Class S.

RESPONSE: ±1 DB 200 to 10,000 HZ
DISTORTION: 10% Max. at rated power, 200 to 10,000 HZ
WEIGHT: 0.75 OZ

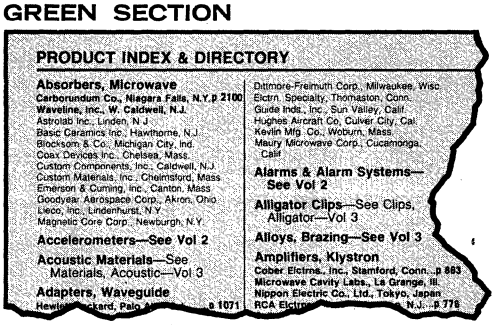
LJ No.	Application	Impedance Ohms Pri	Impedance Ohms Sec	DC Resistance Ohms Pri	DC Resistance Ohms Sec	Max. Pri DC (ma)	Max. 200 Hz Pwr* (mw)
001	Interstage	25K-CT	1000-CT	1325	53	0.5	300
002	Interstage	10K-CT	10K-CT	510	525	1	375
003	Driver	10K-CT	1500-CT	510	80	1	375
004	Output to Line	10K-CT	600-CT	510	31	1	375
005	Output	10K-CT	4	510	0.3	1	375
006	Interstage	4000-CT	10K-CT	200	525	1.5	375
007	Output	1500-CT	15	75	1	2.5	375
008	Output to Line	1000-CT	600-CT	50	31	3	375
009	Output	1000-CT	4	50	0.3	3	375
010	Input	600-CT	25K-CT	30	1500	4	300
011	Isolation	600-CT	600-CT	30	31	4	375
012	Output	600-CT	60	30	3	4	375
013	Output	600-CT	15	30	1	4	375
014	Output	600-CT	4	30	0.3	4	375
015	Output to Line	250	600-CT	13	31	7	375
016	Driver	10K-CT	2000-CT	510	106	1	375
017	Driver	10K-CT	500-CT	510	26	1	375
018	Line to Line	500-CT	600-CT	25	31	4.5	375
019	Output to Line	300-CT	600-CT	15	31	5.5	375
020	Isolation-Ratio 1:1:1	2000-CT	8K Split	100	425	2	300
021	Isolation	10K-CT	2K Split	510	106	1	300

* These power ratings are based upon lowest frequency operation. Much higher ratings are possible at higher operating frequencies.

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

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Blocksom & Co., Michigan City, Ind.
Coax Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
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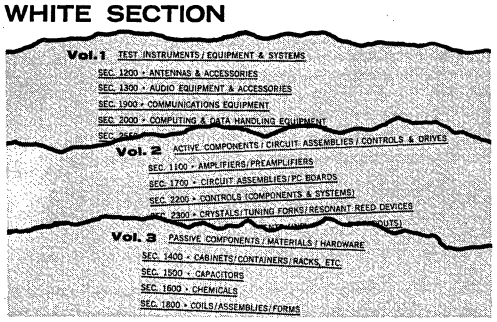
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
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SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
SEC. 2500 ...
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
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SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

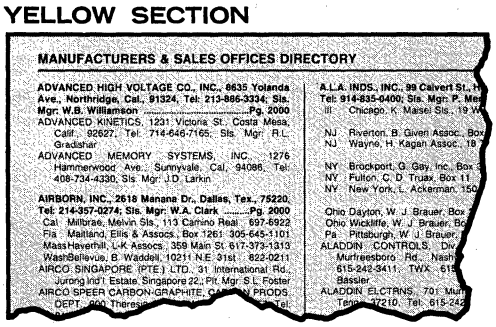
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson .....Pg. 2000
ADVANCED KINETICS, 1221 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330; Sls. Mgr: J.D. Larkin
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark .....Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real ... 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261 ... 305-645-1101
Mass: Haverhill, L-K Assocs., 359 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st ... 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22; Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, ... PRODS. DEPT., 900 Theresia ... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-6400; Sls. Mgr: P. Me...
Ill: Chicago, K. Masel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box ...
NJ: Wayne, H. Kagan Assoc., 18 ...
NY: Brockport, G. Gay, Inc., Box ...
NY: Fulton, C. D. Truax, Box 11 ...
NY: New York, L. Ackerman, 150 ...
Ohio: Dayton, W. J. Brauer, Box ...
Ohio: Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nash... 615-242-3411; TWX 615... Bassler
ALADDIN ELCTRNS., 70 ... Mur... Tenn. 37210, Tel: 615-242-...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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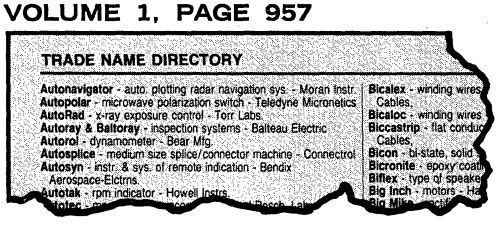

TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
Autotec ... - Bosch ...
Bicalex - winding wires ... Cables.
Bicaloc - winding wires ...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid ...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
Big Mike ...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

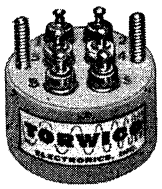
contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

TORWICO ELECTRONICS

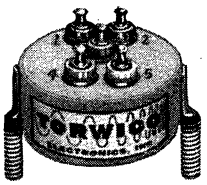
LEADER IN MAGNETIC COMPONENTS

TINYMAX

Miniature 400 Cycle Power Transformers



This Case style available in 1.5 through 250 VA



This Case style available in 1.5 through 9 VA

TINYMAX

CONDENSED PERFORMANCE DATA FOR STANDARD TINYMAX 400 CYCLE POWER TRANSFORMERS

VA Rating	Secondary Voltage-VRMS* (Choose any one voltage within limits listed)	O.D. ±1/32	Height ±1/32	Nominal Weight	Nominal Regulation	Nominal Temp. Rise MIL-T-27 (with no heat sink)
1.5	6.0 to 300	1"	15/32"	0.89 oz.	20%	13°C
1.5 (with electrostatic shield)	6.0 to 300	1"	19/32"	1.1 oz.	15%	13°C
3	6.0 to 300	1"	19/32"	1.1 oz.	15%	15°C
3 (with electrostatic shield)	6.0 to 300	1"	13/16"	1.5 oz.	10%	15°C
6	6.0 to 300	1"	13/16"	1.5 oz.	10%	18°C
6 (with electrostatic shield)	6.0 to 300	1"	1 1/16"	2 oz.	8%	18°C
9	6.0 to 300	1"	1 1/16"	2 oz.	8%	23°C
9 (with electrostatic shield)	6.0 to 300	1 3/8"	1 1/8"	3.5 oz.	7%	23°C
16	6.0 to 300	1 3/8"	1 1/8"	3.5 oz.	7%	25°C
25	6.0 to 300	1 3/8"	1 3/8"	4.5 oz.	6%	36°C
50	6.0 to 300	2"	1 1/2"	10 oz.	2.5%	26°C
75	10 to 300	2"	1 3/4"	12 oz.	2.5%	32°C
100	12 to 300	2 1/4"	2"	17 oz.	2%	35°C
250	26 to 300	2 7/8"	2"	27.5 oz.	1.5%	47°C

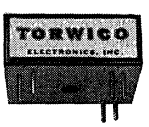
*with primary 115V, 400 cps

TINYMAX Power Transformers are hermetically sealed in drawn steel cases and shall meet all requirements of MIL-T-27; Military Designation: TF4S01YY.

24 hour delivery for prototype quantities. Don't settle for less—Prices on these custom-engineered transformers equal those of competitive shelf items—Phone today for your comprehensive TINYMAX catalog.

TINYMAX

POWER TRANSFORMERS FOR PRINTED CIRCUIT APPLICATIONS



VA Rating	Secondary Voltage—VRMS* (Choose any one voltage within limits listed)	Dimensions ±1/32"	Nominal Weight	Nominal Regulation	Nominal Temp. Rise
1.5	6.0 to 300	1 1/16" square x 7/16" tall	0.75 oz.	20%	13°C
3	6.0 to 300	1 1/16" square x 9/16" tall	1.0 oz.	15%	15°C
6	6.0 to 300	1 1/16" square x 3/4" tall	1.25 oz.	10%	18°C
9	6.0 to 300	1 1/16" square x 1" tall	1.63 oz.	8%	23°C

*with primary 115V, 400 cps

TINYMAX Power Transformers for printed circuit applications are hermetically sealed in thermoset plastic and shall meet all requirements of MIL-T-27; Military Designation: TF5SX01ZZ.

TORWICO ELECTRONICS INC. LAKEWOOD, N.J.

TRANSFORMERS

STANDARD PULSE TRANSFORMER SELECTION GUIDE

In the pulse generating application, the characteristics of the circuit elements other than the transformer are effective in determining the pulse characteristics. Consequently, the design engineer must know the circuit in which it will be used.

As can be seen below the given transformer will have the same rise time regardless of the pulse width impressed on it. The droop characteristic, in percent will be a linear function of the pulse width. A given transformer, having a 10% droop at 1 microsecond, will have a 20% droop at 2 microseconds.

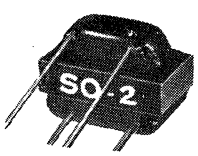
The repetition rate and the pulse width determine the duty cycle which the transformer will see. This is important in the design for temperature rise consideration. Core loss energy is lost on each pulse due to eddy currents and hysteresis. The repetition rate determines the power loss in the core as well as in the windings. The voltage level as well as the pulse width determines the flux density of the transformer. This is usually stated as the ET constant and expressed in volt-microseconds.

Type No.	Ratio	Pulse Width Micro-Seconds	Rise Time Micro-Seconds	Droop in %	Hi-Pot Voltage RMS	Size	Wt. Grams	MIL Designation	Service	Page
BIT-P	4:4:1	.05-100	.01-.40	0-30	200	1/4" x 1/4" Dia.	1.1	TP6RX4410CZ	Coupling and Blocking Oscillator	54, 55
PIP	4:4:1 & 5:3:1	.05-10	.018-.40	0-15	100	3/16" x 5/16" Dia.	1.5	TP6RX4410CZ	Coupling and Blocking Oscillator	56
H-60 to H-69 **H-611** **H-641** **H-671**	4:4:1 & 5:3:1	.05-10	.012-.40	0-25	100	3/8" x 3/8" Dia.	1	TP7SX4410AZ	Coupling and Blocking Oscillator	58
H-45 to H-58 **H-461** **H-501** **H-531** **H-561**	1:1:1 & 5:3:1	.05-25	.01-2	0-30	1250	*	*	TP7SX1110(*)	Coupling and Blocking Oscillator Higher voltage, Tube, SCR, etc.	57

*(AZ): 3/8"x3/8" Dia., 1 gram; (AC): 5/16"x5/16" Dia., 4 grams; (AN): 5/8"x5/8" Dia., 6 grams. **Kits Avail.:** PIP-100 (PIP-1 thru PIP-9); H-69 (H-60 thru H-68); H-58 (H-45 thru H-57).

MINIATURE, OUNCER, SUBOUNCER AND SUB-SUBOUNCER UNITS

SUB-SUBOUNCERS* AND SUBOUNCERS*

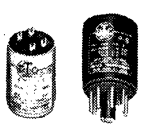


Lead mounted (channel available as separate item) miniature iron core units for transistor or vacuum tube circuits. Plastic mounted leads. SSO Sub-Subouncers: Approx. 2 db, 140-10,000 Hz; +20 VU except inputs +7 VU. (7/16" x 3/4" x 43/64"; wt., .02 lb.) SO Subouncers: Approx. 2 db., 100-10,000 Hz; +24 VU except inputs +10 VU. (1 9/32" x 43/64" x 7/8"; wt., .03 lbs.)

UTC SSO-	Application	Pri. Imp., Ohms	Sec. Imp., Ohms	UTC SO-
1	Input	50/200	62.5K/250K	1
2	Interstage	10K, .25 ma	90K	2
3	Pl. to line	10K/25K, 1.5 ma	200/500	3
4	Output	30K, 1 ma	50	4
5	Inductor	50 hys. @ 1 ma	440 ohms#	5‡
6	Output	100K, .5 ma	60	6
7	Tr. Intrstg.	20K/30K†	80/1200	7
8	Tr. Intrstg.	10K, 1 ma	2K CT	8
9	Tr. to V.C.	10K, 2 ma	16	—
—	Tr. to V.C.	500 CT	3.2	9
10	Tr. to V.C.	10K, 2 ma	3.2	—
—	Tr. to V.C.	2K/4K CT	8/16	10
11	Tr. Output	500/600§	50/60	—
—	Transist. Int.	400/500 CT	400/500 Split	11
12	Tr. Output	1K/1.2K††	50/60	—
—	Transist. Int.	400/500 CT	120/150 Split	12
13	Input	200K	1K	—
—	Transist. Int.	400/500 CT	40/50 Split	13
14	Tr. Intrstg.	10K/25K CT	200/500 CT	—
—	Transist. Int.	80/100 CT	32/40 Split	14
15	Tr. Intrstg.	20K/30K CT	.8K/1.2K CT	—
—	Tr. Output	600 CT, 5 ma	600 Split	15
16	Tr. Output	1.2K/1.5K††	3.2/4	—
—	Tr. Intrstg.	2.5K CT, 4 ma	2500 Split	16
17	Output	10K/12.5K**	500/600 CT	—
—	Inductor: 16 hy at 2 ma, 1.1K ohms, series; 4 hy at 4 ma, 275 ohms, parallel			17
18	Output	10K/12.5K CT	3.2/4	—
—	Tr. Output	50K CT	600 Split	18
19	Matching	500 CT	600 CT	—
20	Output	1.5K CT	600 CT	—
21	Chopper	200K CT	1K CT	—
22	Tr. Intrstg.	10K/12K CT	1.5K/1.8K CT	—
23	Inductor: 4 hys @ 5 ma, 650 ohms			—
24	Inductor: 1.5 hys @ 5 ma, 160 ohms			—
25	Transist. Int.	10K/12K CT	10K/12 CT	—
26	Transist. Int.	40K/50K CT	400/500 Split	—
27	Tr. Output	4K CT, 2.5 ma	600 Split	—
CH	Mounting channel for any of above			CH

†0.5 ma. ‡Resis., 2675 ohms. §3.5 ma. **2 ma. ††3 ma. #DC resis.

OUNCER AUDIO UNITS* Standard and Plug-in Types.



UTC ouncer components provide wide range ±1 db, 30 to 20,000 Hz (except Nos. 0-14 and 0-15). O unit case: 7/8" Dia. x 1 3/16" H, Wt: 1 oz. (except 0-16; heavy shielding case 1 1/16" Dia. x 1 1/2" H, Wt: 3 oz.) P unit case: 1 3/32" Dia. x 1 15/32" H, Wt: 2 oz. (except P-16: heavy shielding case 1 3/16" Dia. x 2 3/4" H, Wt: 4 oz.)

UTC No.	Application	Pri. Imp., Ohms	Sec. Imp., Ohms	UTC No.
O-1	Input	50, 200, 500	50K	P-1
O-2	P-P Input	50, 200, 500	50K CT	P-2
O-3	Input	7.5/30	50K	—
O-4	Pl. to Grid	15K	60K	—
O-5	Pl. to Grid	15K, 2 ma	60K	—
O-6	Pl. to P-P	15K	95K CT	P-6
O-7	Pl. to P-P	15K, 2 ma	95K CT	P-7
O-8	Pl. to Line	15K	50, 200, 500	P-8
O-9	Pl. to Line	15K, 2 ma	50, 200, 500	P-9
O-10	P-P to Line	30K CT	50, 200, 500	P-10
O-11	Cryst. Out.	50K	50, 200, 500	P-11
O-12	Mixing	50, 200	50, 200, 500	P-12
O-13	Inductor 300 Hys-0 ma; 6000 ohms			—
O-14	50:1 Input	200	500K	—
O-15	10:1 P/G	15K	1 meg.	P-15
O-16	Shld. Input	250 CT	50K	P-16
O-17	Hipermalloy Shield, 25 db, for Ouncers			—
O-18	Tr. Intrstg.	10K Split	2K Split	—
O-19	Tr. Intrstg.	10K Split	4K Split	—
O-20	Tr. to Line	1.5K CT	500 Split	—
O-21	Tr. to V.C.	2K/4K CT	8/16	—
O-22	Tr. to V.C.	500/400 CT	4/3.2	—
O-23	Inductor 7 Hys-3 ma; 230 ohms			—
O-24	Inductor 1.6 Hys-3 ma; 25 ohms			—
O-25	Transist. Input	600/150 Split	2K/500 Split	—
O-26	Transist. Int.	10K CT 4 ma	10K CT	—
O-27	Transist. Int.	10K CT 4 ma	500/125 Split	—
O-28	Transist. Int.	50K CT 2 ma	500/125 Split	—
O-29	Transist. Int. or Chopper	100K CT 1 ma	500/125 Split	—
O-30	Transist. Int.	500/125 Split	500/125 Split	—
O-31	Transist. Int.	500/125 Split	150/37.5 Split	—
O-32	Transist. Int.	500/125 Split	50/12.5 Split	—
O-33	Transist. Int.	100/25 Split	40/10 Split	—
O-34	Split Inductor Parallel: 15 Mhy-160 ma; 1 ohm	Series: 60 Mhy-80 ma; 4 ohms		—
O-36	Split Inductor Parallel: .25 Hy-40 ma; 15 ohms	Series: 1 Hy-20 ma; 60 ohms		—
O-37	Tr. to line 4K/1K spl., 4 ma 650/150 Split			—
O-38	Spkr. Match 0, 4, 8, 16 ODC			—
O-BR	Mounting U-bracket for Ouncers			—

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TRANSFORMERS

NEW "PIL"* AUDIO TRANSFORMERS

DESIGNED, MANUFACTURED AND SUCCESSFULLY TESTED TO COMPLETE MIL-T-27C SPECIFICATIONS.

All units are subjected to a 500 volt dielectric strength test, instead of the usual 100 volts, for higher safety margins and reliability.

The units are terminated in weldable and solderable, insulated Gold plated Dumet leads. Dim.: 5/16" dia. x 3/16" h., 1/20 oz.

All units are metal encased to Grade 4. Units made to Class S are available on special order. U.S. Patent No. 2,949,591.

Type No.	MIL Type	Pri. Imp.	Unbal. D.C. ma In Pri.	Sec. Imp.	Pri. DCR	Max. MW Level	±3 db Frequency Range @ 1 Mw
PIL-50	TF4RX17YY	500 CT	3	500 CT	40	100	800 cps-250KC
PIL-70	TF4RX13YY	10K CT	1	500 CT	530	100	800 cps-250KC
PIL-75	TF4RX13YY	10K CT	1	2K CT	530	100	800 cps-250KC

Type No.	Connection	Ind. Hys. Min. @ IV, 1KV	DC ma	DCR Ohms
PIL-5	Series	.12	0	43
	Parallel	.03	0	10.7
	Series	.10	10	
	Parallel	.025	10	
PIL-8	Series	.32	0	115
	Parallel	.08	0	28
	Series	.16	10	
	Parallel	.06	10	
PIL-12	Series	.8	0	300
	Parallel	.2	0	75
	Series	.4	5	
	Parallel	.15	5	

BALANCED MODULATOR TRANSFORMER w/ELECTROSTATIC SHIELD

Type No.	Mil Type	Pri. Imp. Ω	Sec. Imp. Ω	Pri. DCR Ω ±25%	Sec. DCR Ω ±25%	Frequency Range
PIL-850	TF4RX16YY	150	600 CT	3	7	300 kHz-450 kHz

DO-T* AND DI-T* TRANSISTOR TRANSFORMERS

DO-T (Actual Size) DI-T

Revolutionary transistor transformers hermetically sealed to MIL-T-27C specs. Plastic insulated solderable leads, firmly anchored to withstand 10 pound pull. Ideal for printed circuits. DO-T: 5/16" dia. x 13/32" long, wt., 1/10 oz. DI-T: 5/16" dia. x 1/4" long, wt., 1/15 oz. these compact units provide frequency response, high efficiency and low distortion. U.S. Pat. No. 2,949,591.

DO-T Type	DI-T Type	Application	Pri. Imped., Ohms	Sec. Imped., Ohms
DO-T1	DI-T1	a	20K/30K, 0.5 ma	800/1200
DO-T2	DI-T2	b	500/600, 3 ma	50/60
DO-T3	DI-T3	b	1K/1.2K, 3 ma	50/60
DO-T4	—	b	600, 3 ma	3.2
DO-T5	DI-T5	b	1.2K, 2 ma	3.2
DO-T6	—	b	10K, 1 ma	3.2
DO-T7	—	c	200K	1K
DO-T8	DI-T8	d•	3.5 hys. @ 2 ma	2.5 hys.‡‡
DO-T9	DI-T9	e	10K/12K, 1 ma	500/600 CT
DO-T10	DI-T10	f	10K/12.5K, 1 ma	1.2K-1.5K CT
DO-T11	DI-T11	f	10K/12.5K, 1 ma	2K/2.5K CT
DO-T12	—	b	150/200 CT, 10 ma	12/16
DO-T13	—	b	300/400 CT, 7 ma	12/16
DO-T14	—	b	600/800 CT, 5 ma	12/16
DO-T15	—	b	800/1070 CT, 4 ma	12/16
DO-T16	—	b	1K/1330 CT, 3.5 ma	12/16
DO-T17	—	b	1.5K/2K CT, 3 ma	12/16
DO-T18	—	b	7.5K/10K CT, 1 ma	12/16
DO-T19	DI-T19	b	300 CT, 7 ma	600
DO-T20	DI-T20	b	500 CT, 5.5 ma	600
DO-T21	DI-T21	b	900 CT, 4 ma	600
DO-T22	DI-T22	b	1500 CT, 3 ma	600
DO-T23	DI-T23	a	20K/30K CT, .5 ma	0.8K/1.2K CT
DO-T24	—	c	200K CT	1K CT
DO-T25	DI-T25	a	10K/12K CT, 1 ma	1.5K/1.8K CT
DO-T26	DI-T26	d†	6 hys. @ 2 ma	4.5 hys.‡‡

DO-T Type	DI-T Type	Application	Pri. Imped., Ohms	Sec. Imped., Ohms
DO-T27	DI-T27	d‡	1.25 hys. @ 2 ma	0.9 hy. ‡‡
DO-T28	DI-T28	d§	0.3 hy. @ 4 ma	0.1 hy.‡‡
DO-T29	—	b	120/150 CT, 10 ma	3.2/4
DO-T30	—	b	320/400 CT, 7 ma	3.2/4
DO-T31	—	b	640/800 CT, 5 ma	3.2/4
DO-T32	—	b	800/1K CT, 4 ma	3.2/4
DO-T33	—	b	1060/1330 CT, 3.5 ma	3.2/4
DO-T34	—	b	1.6K/2K CT, 3 ma	3.2/4
DO-T35	—	b	8K/10K CT, 1 ma	3.2/4
DO-T36	DI-T36	d	10K/12K CT, 1 ma	10K/12K CT
DO-T37	DI-T37	a	2K/2.5K CT, 3 ma	8K/10K Split
DO-T38	DI-T38	a	10K/12K CT, 1 ma	2K/2.4 Split
DO-T39	—	a	20K/30K CT, .5 ma	1K/1.5K Split
DO-T40	—	a	40K/50K CT, .25 ma	400/500 Split
DO-T41	DI-T41	a	400/500 CT, 8/6 ma	400/500 Split
DO-T42	—	a	400/500 CT, 8/6 ma	120/150 Split
DO-T43	DI-T43	a	400/500 CT, 8/6 ma	40/50 Split
DO-T44	DI-T44	a	80/100 CT, 12/10 ma	32/40 Split
DO-T45	—	a	1K/1.25K CT, 3.5 ma	16K/20K Split
DO-T46	—	c	100 CT	500 CT
DO-T47	—	c	9K/10K, 1 ma	9K/10K CT
DO-T48	—	a	8K/10K, 1 ma	1.2K/1.5K CT
DO-T49	—	d§§	Series—20 hys " 1 ma, 5100Ω Parallel—5 hys " 2 ma, 1275Ω	
DO-T50	—	d§§	Series—.075 hys @ 10 ma, 10.5Ω Parallel—.018 hys @ 20 ma, 2.6Ω	
DO-T51	DI-T51	a	2K/2.5K CT, 3 ma	2K/2.5K split
DO-T52	DI-T52	a	4K/5K CT, 2 ma	8K/10K CT
DO-T53	DI-T53		400/500 CT, 8 ma	4K/5K CT
DO-T54	—		40K/50K CT, .25 ma	4K/5K CT
DO-T400	—	h	28V, 380-1 kHz	6.3V, 60 ma
DO-T410	—	h	28V, 380-1 kHz	Two 6.3V, 30 ma
DO-T420	—	h	28V, 380-1 kHz	28V, 10 ma
DO-TSH	DI-TSH		High mu shield and cover; 25 db	

•630 ohms. †2100 ohms. ‡100 ohms. §25 ohms.
‡‡DI-T primary impedance. §§2 Wdgs.

a—Interstage; b—Output; c—Input; d—Inductor; e—Driver or Output; f—Driver; g—matching; h—Power Unit.

NEW DI-T200* SERIES TRANSISTOR TRANSFORMERS

These revolutionary transistor transformers embody the same rugged reliable construction afforded by the unique winding techniques and physical construction found in the DO-T and DI-T transformers. DI-T200 series differ by having straight pin, 1" long, .017 d. Dumet wire, gold plated leads. To MIL-T-27C, size 5/16" x 3/8", wt. 1/15 oz. U.S. Pat. No. 2,949,591.

Type No.	Application	Pri. Imped., Ohms	Sec. Imped., Ohms
DI-T225	Interstage	80 CT 100 CT	32 Split 40 Split
DI-T230	Output Matching	300 CT	600 Split
DI-T235	Interstage	400 CT 500 CT	40 Split 50 Split
DI-T240	Interstage or Output (Ratio 2:1:1)	400 CT 500 CT	400 Split 500 Split
DI-T245	Output or Matching	500 CT	50 CT
DI-T250	Output or Mixing	600 CT 500 CT	60 CT 600 CT
DI-T255	Output or Matching	1,000 CT 1,200 CT	50 CT 60 CT
DI-T260	Output	1,500 CT	600 CT

Type No.	Application	Pri. Imped., Ohms	Sec. Imped., Ohms
DI-T265	Isolation or Interstage	2,000 CT 2,500 CT	8,000 Split 10,000 Split
DI-T270	Output or Driver	10,000 CT 12,000 CT	500 CT 600 CT
DI-T273	Output or Driver	10,000 CT 12,500 CT	1,200 CT 1,500 CT
DI-T276	Interstage or Driver	10,000 CT 12,000 CT	2,000 CT 2,400 CT
DI-T278	Interstage or Driver	10,000 CT 12,500 CT	2,000 Split 2,500 Split
DI-T283	Isolation or Interstage	10,000 CT 12,000 CT	10,000 CT 12,000 CT
DI-T288	Interstage or Driver	20,000 CT 30,000 CT	800 CT 1,200 CT
DI-T204	Split Inductor (2 wdgs)	Series: .1 hy @ 4 ma DC, 25Ω Parallel: .025 hy @ 8 ma DC, 6Ω	
DI-T208	Split Inductor (2 wdgs)	Series: .9 hy @ 2 ma DC, 105Ω Parallel: .2 hy @ 4 ma DC, 26Ω	
DI-T212	Split Inductor (2 wdgs)	Series: 2.5 hy @ 2 ma DC, 630Ω Parallel: .6 hy @ 4 ma DC, 157Ω	
DI-T216	Split Inductor (2 wdgs)	Series: 4.5 hy @ 2 ma DC, 2300Ω Parallel: 1.1 hy @ 4 ma DC, 575Ω	

DI-T200SH Drawn Hipermalloy shield provides 15 to 20 db shielding through side of case

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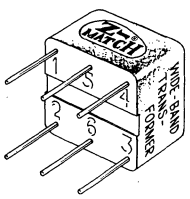
Z-MATCH

MINIATURE WIDEBAND TRANSFORMER



Used For:
Impedance Matching
Phase Detector
Wideband Interstage Coupling
Pulse Transformer
Voltage/Current Step-up or Step-down
Numerous other Applications

Time tested principles are combined with 20 years experience in the design and construction of inductive components in this series of transformers. The broad line of transformers listed below solves circuit coupling problems in today's transistorized equipment, and Z-Match transformers are standard components in many critical applications. They have been qualified to MIL-C-15305C. Operating temperature range is —50°C to +85°C. VSWR is less than 1.3:1 and insertion loss is .5 db max. on all types. Power handling ability is 2W from the lowest frequency specified up to mid range and about 4 W over the high portion. Applicable bulletins are 567, 101 and 103.

TYPES AVAILABLE FROM STOCK

MODEL	DESCRIPTION	RANGE OF FREQUENCY RESPONSE=—1dB. max.	SCHEMATIC NUMBER	PRICE
5012.5A	50 ohm unbal./12.5 ohm unbal.	100 KHz—1 GHz	4G(N=4)	$20.80
*5025A	50 ohm unbal./25 ohm unbal.	100 KHz—200 MHz	4G(N=2)	20.80
5050A	50 ohm unbal./50 ohm unbal.	100 KHz—1 GHz	4A	12.90
*50100A	50 ohm unbal./100 ohm unbal.	100 KHz—200 MHz	4G(N=.5)	20.80
5050B	50 ohm unbal./50 ohm unbal. ph. rev.	100 KHz—1 GHz	4B(N=1)	12.90
5050C	50 ohm unbal./50 ohm bal. symmetrical	50 KHz—700 MHz	4E	15.55
5050F	50 ohm unbal./50 ohm unbal. ph. rev. DC isol.	100 KHz—500 MHz	4C	15.55
5075B	50 ohm unbal./75 ohm unbal. ph. rev.	4 MHz—300 MHz	4B(N=1.5)	20.80
50200A	50 ohm unbal./200 ohm unbal.	250 KHz—500 MHz	4F(N=4)	15.55
50200D	50 ohm unbal./200 ohm bal. unsymmetrical	250 KHz—500 MHz	4H	15.55
50200E	50 ohm unbal./200 ohm bal. symmetrical	100 KHz—1 GHz	4I	20.80
50200F	50 ohm unbal./200 ohm unbal. ph. rev. DC isol.	200 KHz—500 MHz	4D	15.55
50200K	50 ohm bal./200 ohm bal. symmetrical	250 KHz—1 GHz	4J	20.80
50450A	50 ohm unbal./450 ohm unbal.	50 KHz—50 MHz	4F(N=9)	20.80
*50200H	50 ohm unbal./200 ohm bal. symmetrical DC isol.	100 KHz—200 MHz**	4K(N=4)	20.80
*50600H	50 ohm unbal./600 ohm bal. DC isol.	100 KHz—100 MHz	4K(N=12)	20.80
7575B	75 ohm unbal./75 ohm unbal. ph. rev.	150 KHz—1 GHz	4B(N=1)	12.90
7575C	75 ohm unbal./75 ohm bal.	100 KHz—1 GHz	4E	15.55
*75124H	75 ohm unbal./124 ohm bal. DC isol.	50 KHz—25 MHz	4K(N=1.65)	20.80
75300A	75 ohm unbal./300 ohm unbal.	250 KHz—500 MHz	4F(N=4)	15.55
75300D	75 ohm unbal./300 ohm bal. unsymmetrical	250 KHz—500 MHz	4H	15.55
75300E	75 ohm unbal./300 ohm bal. symmetrical	250 KHz—900 MHz	4I	20.80
75300K	75 ohm bal./300 ohm bal. symmetrical	400 KHz—900 MHz	4J	20.80
100100B	100 ohm unbal./100 ohm unbal. ph. rev.	200 KHz—1 GHz	4B(N=1)	12.90
100100C	100 ohm unbal./100 ohm bal.	100 KHz—1 GHz	4E	15.55

*.5 watt max. types **For a 50200H model for higher frequency, see type HYB-1

For dimensions see figure 4L

LOW FREQUENCY SERIES

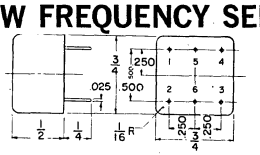


Fig. 1 LF Outline drawing

Slightly larger than the series above but usable at much lower frequencies is the LF line listed in the table directly below. These new units, which were designed at the request of our customers, utilize the proven construction techniques of the original Z-Match line and are produced with the same void-free encapsulation methods. The approximate constants as given above apply to the LF units. Applicable bulletin is 105.

LOW FREQUENCY TRANSFORMER SPECIFICATIONS

MODEL	DESCRIPTION	RANGE OF FREQUENCY RESPONSE=—1dB max.	SCHEMATIC NUMBER	PRICE 1-9
LF5012.5A	50 ohm unbal./12.5 ohm unbal.	10 KHz—100 MHz	4G(N=4)	$20.80
LF5050B	50 ohm unbal./50 ohm unbal. ph. rev.	10 KHz—100 MHz	4B(N=1)	12.90
LF5050C	50 ohm unbal./50 ohm bal. symmetrical	10 KHz—100 MHz	4E	15.55
LF5050F	50 ohm unbal./50 ohm unbal. ph. rev. DC isol.	10 KHz—100 MHz	4C	15.55
LF50200A	50 ohm unbal./200 ohm unbal.	10 KHz—100 MHz	4F(N=4)	15.55
LF50200E	50 ohm unbal./200 ohm bal. symmetrical	10 KHz—100 MHz	4I	20.80
LF50200F	50 ohm unbal./200 ohm unbal. ph. rev. DC isol.	10 KHz—50 MHz	4D	15.55
LF50450A	50 ohm unbal./450 ohm unbal.	10 KHz—25 MHz	4F(N=9)	20.80
LF50200H	50 ohm unbal./200 ohm bal. DC isol.	10 KHz—50 MHz	4K(N=4)	20.80
LF50600H	50 ohm unbal./600 ohm bal. DC isol.	10 KHz—25 MHz	4K(N=12)	20.80
LF50800H	50 ohm unbal./800 ohm bal. DC isol.	10 KHz—10 MHz	4K(N=16)	22.50
LF501800H	50 ohm unbal./1800 ohm bal. DC isol.	10 KHz—5 MHz	4K(N=36)	25.00
LF7575B	75 ohm unbal./75 ohm unbal. ph. rev.	15 KHz—100 MHz	4B(N=1)	12.90
LF7575C	75 ohm unbal./75 ohm bal.	15 KHz—100 MHz	4E	15.55
LF75124H	75 ohm unbal./124 ohm bal. DC isol.	10 KHz—10 MHz	4K(N=1.65)	20.80
LF75300A	75 ohm unbal./300 ohm unbal.	15 KHz—75 MHz	4F(N=4)	15.55
LF75300E	75 ohm unbal./300 ohm bal. symmetrical	15 KHz—75 MHz	4I	20.80
LF100100B	100 ohm unbal./100 ohm unbal. ph. rev.	10 KHz—100 MHz	4B(N=1)	12.90
LF100100C	100 ohm unbal./100 ohm bal.	10 KHz—100 MHz	4E	15.55

WIDEBAND HYBRID JUNCTION/TRANSFORMER

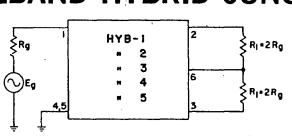


Fig. 2 Hybrid as a conventional wideband transformer

These are true center-tapped, dc isolated transformers which can be used to design or construct singly or doubly balanced mixers and phase detectors. Other applications include vectoral addition and subtraction and power division and addition. They of course also give excellent performance as conventional wide band transformers where dc isolation is necessary. All have 4:1 impedance ratio with 50 Ohms unbal. primary to 200 Ohms balanced secondary. Physical size is shown in figure 4L of the schematic section on page 3. Applicable bulletin 368 gives comprehensive circuit information.

For other Vari-L products see Sections 1800 and 3400.

VARI-L CO., INC. / 3883 MONACO PARKWAY/DENVER, COLORADO 80207
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Z-MATCH

HYBRID APPLICATIONS

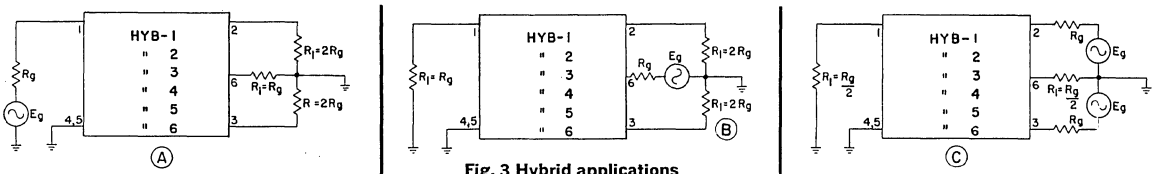


Fig. 3 Hybrid applications

3A: Signal applied at Terminal 1 appears at Terminals 2 and 3. Phase relationship 2 to 3 is 180°. Terminal 6 is isolated.

3B: Signal applied at Terminal 6 appears at Terminals 2 and 3. Phase relationship 2 to 3 is 0°. Terminal 1 is isolated.

3C: By reciprocity it can be correctly assumed from the above that the loads at Terminals 2 and 3 can be replaced by generators, and when the generators are in phase their combined outputs will appear at Terminal 6, and when they are 180° out of phase their combined outputs will appear at Terminal 1.

As illustrated, any of the six HYB transformer types may be used in the circuits in Figures 3A, 3B, and 3C.

HYBRID/TRANSFORMER SPECIFICATIONS

MODEL	USEFUL RANGE, MHz	SCHEMATIC FIGURE 4	H DIMENSION	PRICE 1-9
HYB-1	.250-500	K	19/64	$24.50
HYB-2	.250-300	K	19/64	20.80
HYB-3	.100-200	K	19/64	20.80
HYB-4	2.5 -250	K	19/64	19.00
HYB-5	3.5 -250	K	19/64	19.00
HYB-6	.002-15	K	9/16	24.50

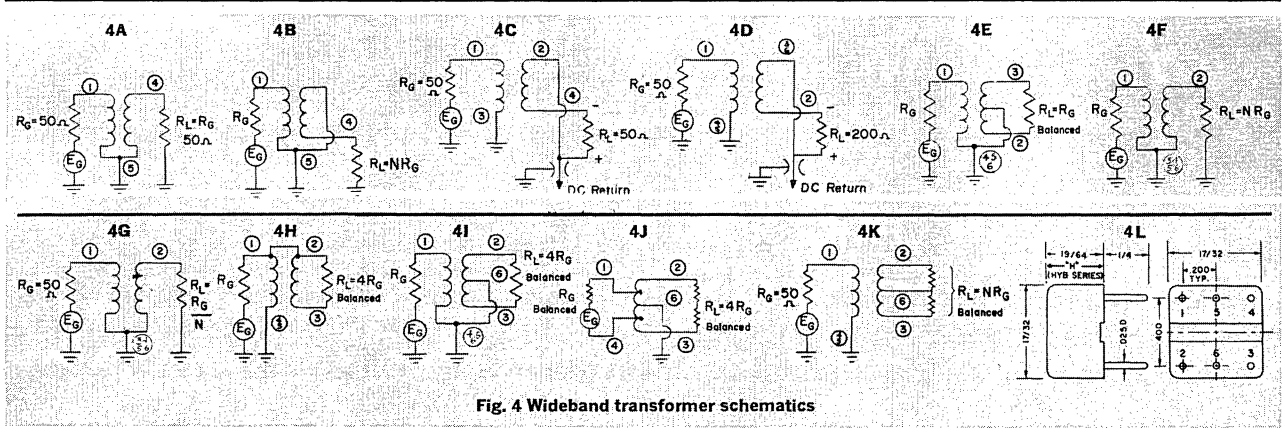
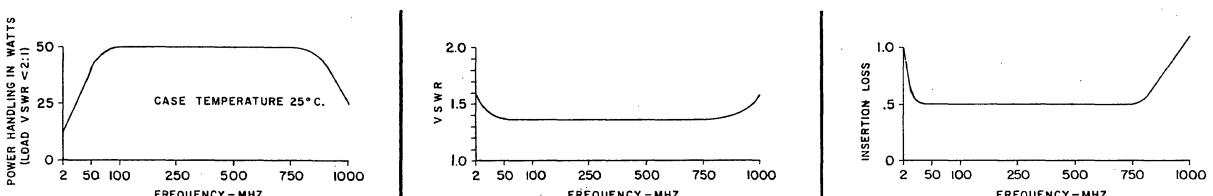


Fig. 4 Wideband transformer schematics

POWER WIDEBAND TRANSFORMER

50 Watts (up to 1KW peak for pulses) power handling ability is provided in this series of rugged microstrip-compatible wideband transformers. Operating temperature range is —55 to +125°C, derated per figure 5 linearly at ½% per °C of the 25°C value. They are reciprocal and may be used for impedance/voltage step-up or step-down. Internal conductors will handle steady-state currents up to 4 amps. Applicable bulletins are 100 and 101.



Ⓐ Power handling vs. frequency

Ⓑ VSWR vs. frequency

Ⓒ Insertion loss vs. frequency

Fig. 5

TYPES AVAILABLE FROM STOCK:

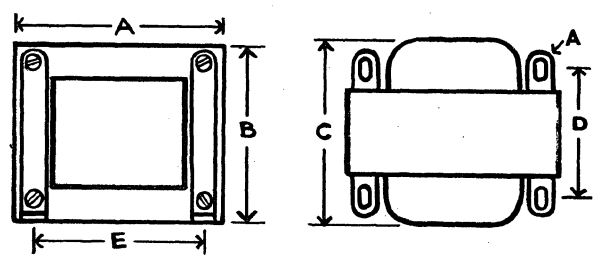
MODEL	DESCRIPTION	RANGE OF FREQUENCY RESPONSE = —1dB. max.	PRICE 1-9
50W5012.5A	50 ohm unbal./12.5 ohm unbal.	2 MHz-1 GHz	$ 90.00
50W5050C	50 ohm unbal./50 ohm bal. symmetrical	2 MHz-1 GHz	90.00
50W505A	50 ohm unbal./5 ohm unbal.	2 MHz-750 MHz	110.00
50W50200E	50 ohm unbal./200 ohm bal. symmetrical	2 MHz-1.5 GHz	110.00
50W50200A	50 ohm unbal./200 ohm unbal.	2 MHz-750 MHz	110.00

For other Vari-L products see Sections 1800 and 3400.

Zaring Industries, Inc.

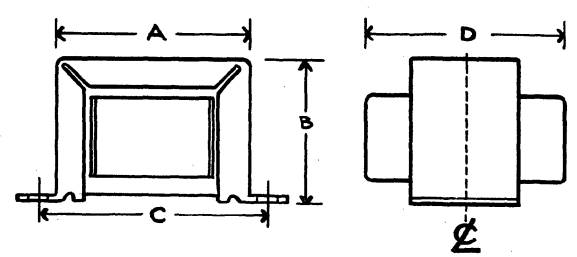
Carmel, Indiana 46032
P.O. Box 477

VA	A	B	C	D	E
75	3⅜	2 13/16	2⅜	2⅛	2 13/16
100	3¾	3⅛	2 5/16	2¼	3⅛
125	3¾	3⅛	3.0	2⅝	3⅛
150	4⅛	3 7/16	3.0	2½	3 7/16
175	4½	3¾	3¼	2½	3¾
200	4½	3¾	3½	2¾	3¾
225	4½	3¾	3¾	3.0	3¾
250	4½	3¾	4.0	3¼	3¾
275	5¼	4 7/16	3⅝	4¾	4⅜
300	5¼	4 7/16	3¾	2⅞	4⅜
350	5¼	4 7/16	4.0	3¼	4⅜
400	5¼	4 7/16	4⅜	3⅝	4⅜
450	5¼	4 7/16	4⅞	4⅛	4⅜
500	5¼	4 7/16	5½	4⅝	4⅜
550	6⅜	5⅜	4½	3¾	5 5/16
600	6⅜	5⅜	4¾	4.0	5 5/16
700	6¾	5⅝	5.0	3¾	6⅛
800	6¾	5⅝	5¾	4½	6⅛
900	6¾	5⅝	6⅜	5⅛	6⅛
1,000	7⅝	6⅜	5½	4.0	6¾



- OPEN CONSTRUCTION
- VARNISH IMPREGNATION
- LEADS OR LUG TERMINALS
- ALSO AVAILABLE IN VERTICAL MOUNTED CONFIGURATION

VA	A	B	C	D
5	1 1/16	1⅜	2.0	1⅛
10	1 5/16	1⅝	2⅜	1 5/16
15	1 5/16	1⅝	2⅜	1 5/16
20	2 5/16	1 5/16	2 13/16	1 5/16
25	2 5/16	1 5/16	2 13/16	1 13/16
30	2 11/16	2¼	3⅛	1 11/16
35	2 11/16	2¼	3⅛	1 13/16
40	2 11/16	2¼	3⅛	1 15/16
50	3 1/16	2 9/16	3 9/16	2⅛



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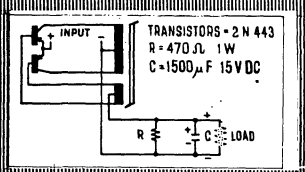
DC TO DC CONVERTER TRANSFORMERS

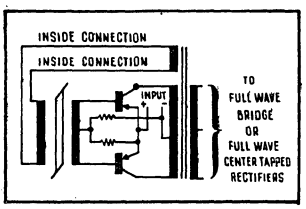
Permits conversion of low voltage direct current to high voltage for operating mobile electronic equipment.

CATALOG NO.	DC INPUT VOLTS	DC OUTPUT VOLTS	DC LOAD AMPS
DD01001	6	12	4
DD01002	9	12	4
DD01003	6	9	4

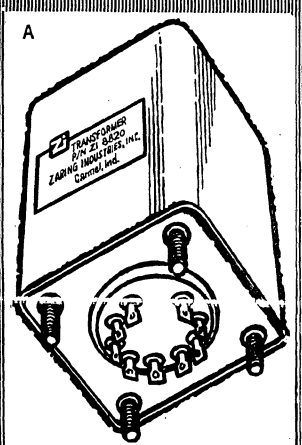
These transformers are used in an efficient circuit using minimum components as it can be seen from the circuit diagram. Transformer used with this circuit gives a safe operation within −60° C to +70° C. The circuit remains highly efficient in either full load or fractional full load operation.



CATALOG NO.	DC INPUT VOLTS	TOTAL VA OUTPUT	TRANSISTORS	OUTPUT Bridge Volt	Bridge mA	CT Volt	CT mA	CONSTRUCTION
DD02004	28	125	Delco 2N174	500	250	250	420	GA
DD02005	12	125	Delco 2N442	500	250	250	420	GA
DD02006	12	40	Delco 2N442	450	90	225	155	FA



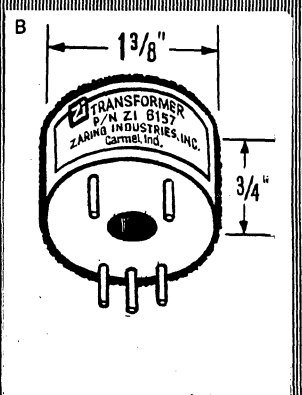
A



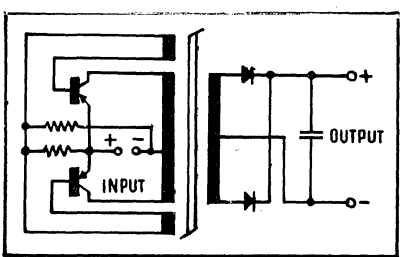
These transformers are used with relatively high load currents. With a low power saturating transformer the high power transformer can be linear so the circuit will prevent high collector current spikes. Recommended transistors are listed in the table. Feed back and starting resistor values will be supplied with every transformer.

These transformers are hermetically sealed and meet MIL-T-27B TF4RX09, electrical schematic diagram is legible on gray finished cans.

B



CATALOG NO.	DC INPUT VOLTS	DC OUTPUT VOLTS	DC LOAD mA	TRANSISTORS	CONSTRUCTION
DD02007	6.3	250	10	2N1038	Fig. A
DD02008	6.3	200	15	2N1038	Fig. A
DD02009	6.3	150	20	2N1038	Fig. A
DD02010	6.3	120	30	2N1038	Fig. A
DD02011	6.3	250	50	2N1038	Fig. A
DD02012	6.3	200	70	2N1038	Fig. A
DD02013	6.3	150	85	2N1168	Fig. B
DD02014	6.3	120	125	2N1168	Fig. B
DD02015	12.6	250	10	2N1168	Fig. B
DD02016	12.6	200	15	2N1168	Fig. B
DD02017	12.6	150	20	2N1168	Fig. B
DD02018	12.6	120	30	2N1168	Fig. B
DD02019	12.6	250	50	2N1168	Fig. B
DD02020	12.6	200	70	2N1168	Fig. B
DD02021	12.6	150	85	2N1168	Fig. B
DD02022	12.6	120	125	2N1168	Fig. B
DD02023	28	250	10	2N174	Fig. C
DD02024	28	200	15	2N174	Fig. C
DD02025	28	150	20	2N174	Fig. C
DD02026	28	120	30	2N174	Fig. C
DD02027	28	250	50	2N174	Fig. C
DD02028	28	200	70	2N174	Fig. C
DD02029	28	150	85	2N174	Fig. C
DD02030	28	120	125	2N174	Fig. C
DD02031	6	12	500	2N1168	Fig. A
DD02032	6	24	250	2N1168	Fig. B
DD02033	12	24	250	2N1168	Fig. B
DD02034	6	12	1000	2N1168	Fig. C
DD02035	6	24	500	2N1168	Fig. C
DD02036	6	28	500	2N1168	Fig. C
DD02037	12	24	250	2N1168	Fig. C



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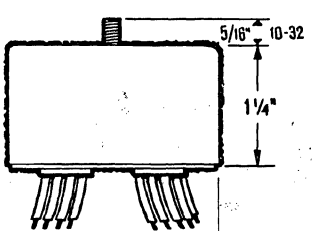
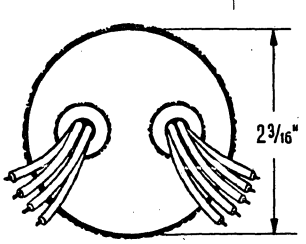
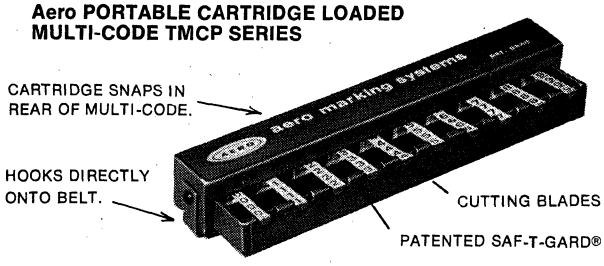




Aero PORTABLE CARTRIDGE LOADED MULTI-CODE TMCP SERIES

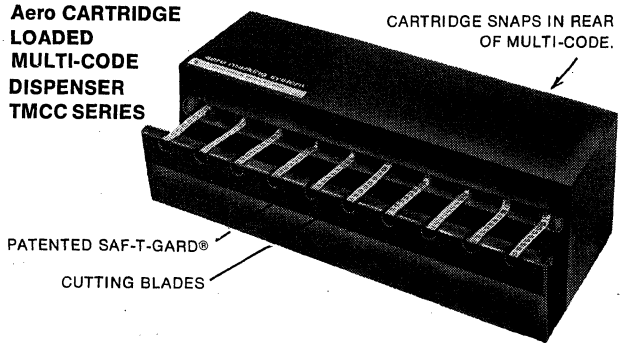


This is the NEW IMPROVED PORTABLE CARTRIDGE LOADED MULTI-CODE. The unit comes pre-packed with ten rolls of white acetate fiber tape with numbers from 0 to 9.

The unit conatins enough tape for 720 markings. The CARTRIDGE LOADED MULTI-CODE cartridges can be instantly loaded by snapping into the rear of the unit.

This tool is used exclusively by electrical contractors and plant electricians. The dispenser can be carried on the contractors pouch or clipped onto the belt, and only weighs 12 oz. fully loaded.

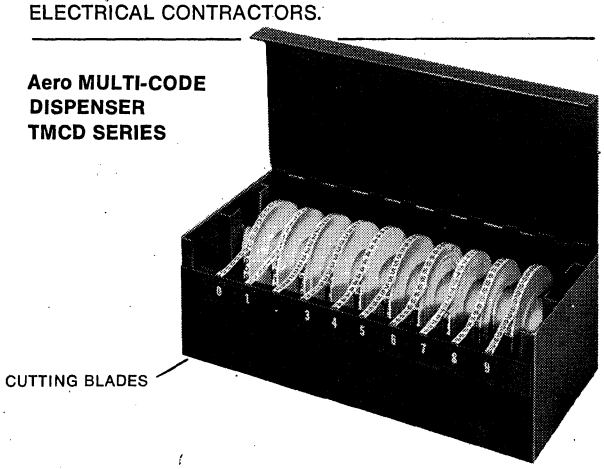
Aero CARTRIDGE LOADED MULTI-CODE DISPENSER TMCC SERIES



AERO DEVICES introduces this new CARTRIDGE LOADED MULTI-CODE DISPENSER. The very streamline design makes this bench unit extremely easy to use. All the numbers or letters are easily visible for quick identification and application. The tape cartridges snap in the rear of the unit in seconds.

This NEW CARTRIDGE LOADED MULTI-CODE can be used in AIRCRAFT, MISSILES, ELECTRONICS, MOTOR REPAIR SHOPS, FACTORY ELECTRICAL MAINTENANCE and ELECTRICAL CONTRACTORS.

Aero MULTI-CODE DISPENSER TMCD SERIES



This MULTI-CODE DISPENSER offers the easiest and fastest way to code your wires. The cabinet is constructed of heavy steel, finished in black baked coritex. The top is secured with a piano hinge which closes flush — no dust or drying of tape to worry about.

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Specify the tape you need . . . or tell us the specific job its needed for — let our research department help you.

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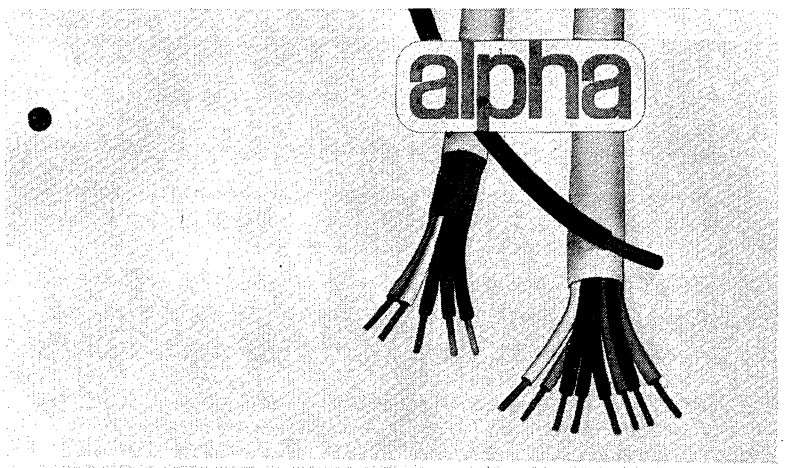

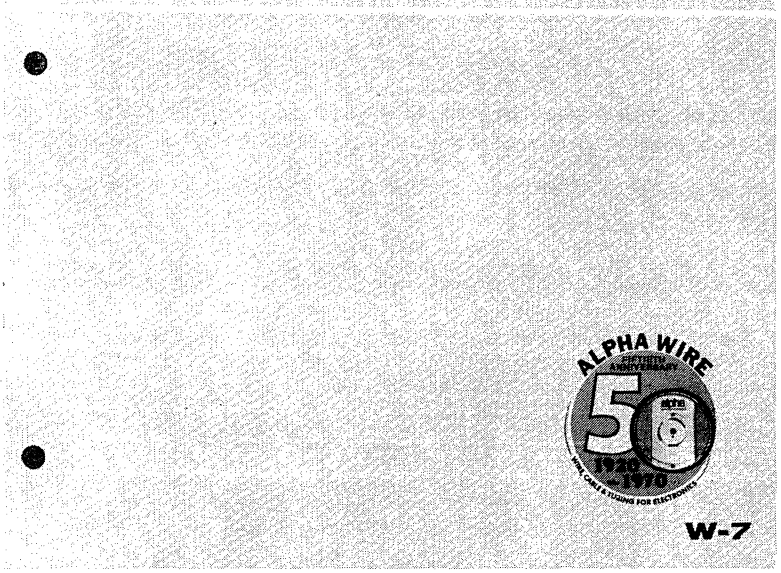

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- TEFLON® WIRE AND CABLE
- AIRCRAFT WIRE TO MIL-W-5086A
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- LACING CORD & TAPES
- FIT® SHRINKABLE TUBING

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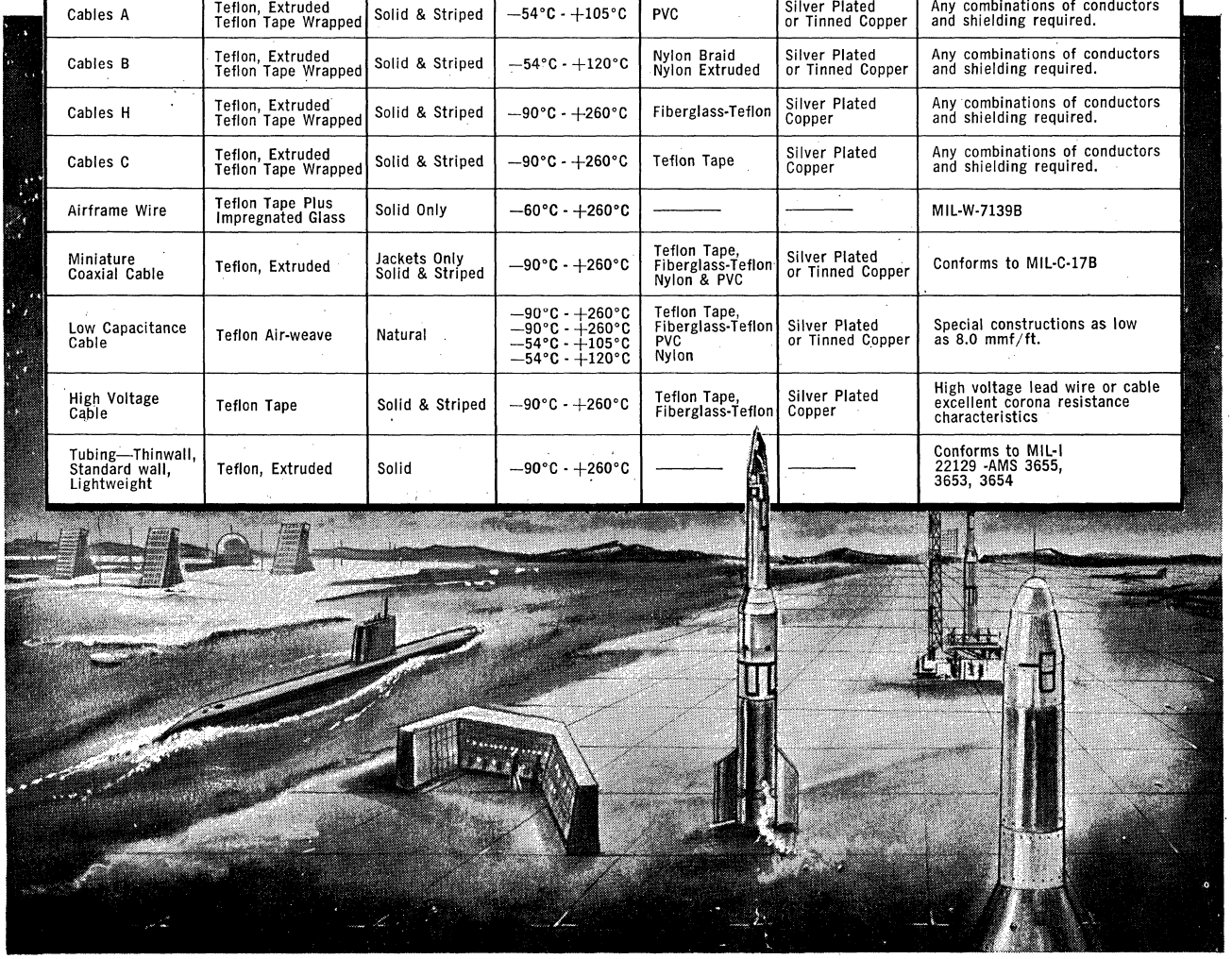
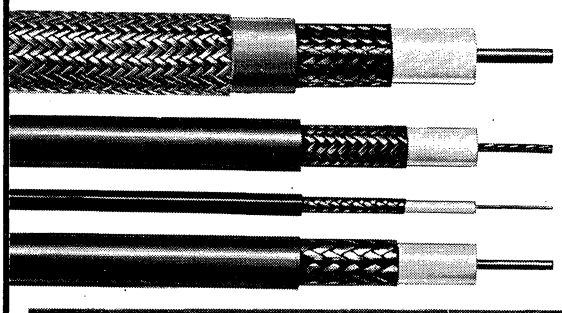
S P E C I F I C A T I O N S

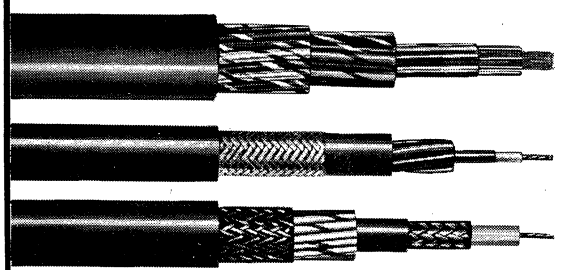
WIRE, CABLE OR TUBING	PRIMARY INSULATION	COLORS MIL-STD-104	OPERATING TEMPERATURE	JACKETS	SHIELDING	REMARKS
High Temperature Hook-up Wire	Teflon, Extruded	Solid & Striped	—90°C - +260°C	———	Nickel Plated Silver Plated or Tinned Copper	Conforms to MIL-W-16878 Types E, EE & ET or other special specifications as required.
Cables A	Teflon, Extruded Teflon Tape Wrapped	Solid & Striped	—54°C - +105°C	PVC	Silver Plated or Tinned Copper	Any combinations of conductors and shielding required.
Cables B	Teflon, Extruded Teflon Tape Wrapped	Solid & Striped	—54°C - +120°C	Nylon Braid Nylon Extruded	Silver Plated or Tinned Copper	Any combinations of conductors and shielding required.
Cables H	Teflon, Extruded Teflon Tape Wrapped	Solid & Striped	—90°C - +260°C	Fiberglass-Teflon	Silver Plated Copper	Any combinations of conductors and shielding required.
Cables C	Teflon, Extruded Teflon Tape Wrapped	Solid & Striped	—90°C - +260°C	Teflon Tape	Silver Plated Copper	Any combinations of conductors and shielding required.
Airframe Wire	Teflon Tape Plus Impregnated Glass	Solid Only	—60°C - +260°C	———	———	MIL-W-7139B
Miniature Coaxial Cable	Teflon, Extruded	Jackets Only Solid & Striped	—90°C - +260°C	Teflon Tape, Fiberglass-Teflon Nylon & PVC	Silver Plated or Tinned Copper	Conforms to MIL-C-17B
Low Capacitance Cable	Teflon Air-weave	Natural	—90°C - +260°C —90°C - +260°C —54°C - +105°C —54°C - +120°C	Teflon Tape, Fiberglass-Teflon PVC Nylon	Silver Plated or Tinned Copper	Special constructions as low as 8.0 mmf/ft.
High Voltage Cable	Teflon Tape	Solid & Striped	—90°C - +260°C	Teflon Tape, Fiberglass-Teflon	Silver Plated Copper	High voltage lead wire or cable excellent corona resistance characteristics
Tubing—Thinwall, Standard wall, Lightweight	Teflon, Extruded	Solid	—90°C - +260°C	———	———	Conforms to MIL-I 22129 -AMS 3655, 3653, 3654



PLASTICOTE WIRE & CABLE BY CHESTER



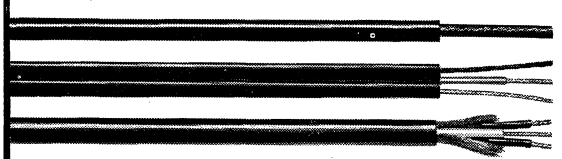
COAXIAL CABLE — Chester Cable Corp. offers a complete line of coaxial cable for military and commercial applications. Manufactured in accordance with MIL-C-17, JAN-C-17 and commercial specifications. Constructions include solid, air-spaced and foam dielectrics with conventional braid shields or flat copper tape shields, having PVC or polyethylene jackets. Custom designed constructions of triaxial cable and high frequency-high voltage cable are also available.



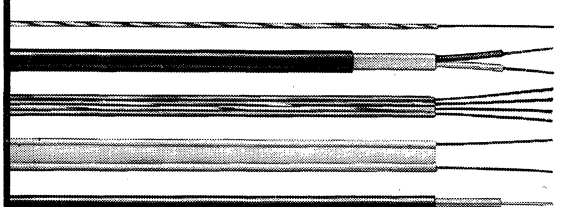
MULTI-CONDUCTOR CABLE -- Wide range of custom designs available, manufactured in accordance with such industry standards as MIL specs., U/L, CSA, IPCEA, EIA, IMSA, ASTM, etc.

Chester Cable Corp. is a preferred source for quality electronic and electrical cable, insulated and jacketed with thermoplastic materials such as polyvinylchloride, polyethylene and nylon. Custom designs of shielded or unshielded cable include: Control Cable • TV Camera Cable • Missile Cable • Intercom Cable • Computer Cable • Special Hi-Voltage Cable and Parallel Bonded Ribbon Cable.

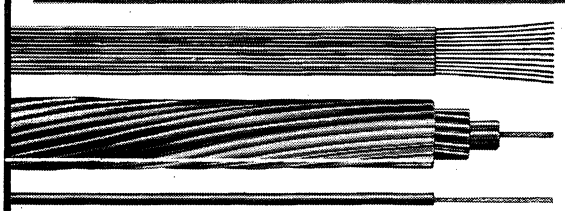
MIL-SPEC WIRE — Made in accordance with specifications MIL-W-16878 (Types B, C & D), MIL-W-76B (Types LW, MW & HW) and MIL-W-5086A for electronic systems. Available in single or multiple constructions, shielded or unshielded, with or without nylon or PVC jackets.



WIRE AND CORD FOR THE APPLIANCE INDUSTRY — U/L and CSA approved, 60°C — 80°C — 90°C — 105°C appliance wiring material — SVT, SJT, ST cord, SJTO & STO oil-resistant cord, SJT & ST oil-proof cord, SPT cord with or without individually insulated ground wire. Used for washers, dryers, refrigerating, air conditioning, vending, heating, X-ray and other electrical and electronic equipment.



RADIO AND TV CIRCUIT WIRE AND CABLE — U/L and CSA approved, 60°C — 80°C — 90°C — 105°C appliance and radio circuit wire, microphone cable, shielded and unshielded audio circuit wire, twin lead antenna wire, phonograph cable, parallel-bonded color convergence ckt. cable, braided hook-up wire, hi-anode wire, hot chassis lead, balun-coil wire, shielded constructions with spiral, braided, aluminum-Mylar tape and conductive materials; all available in Thrif-T-Bond® tinned over-coated conductors.



MISCELLANEOUS WIRE AND CABLE—Machine Tool Wire • Bus Drop Cable • Flexible Test Lead Wire • Municipal Signal Cable • Low Energy Circuit Control Cable • Station Control Cable • Inter-Office Communication and Signaling Cable • Deep-Well Submersible Water Pump Cable • Gas Tube Sign and Oil Burner Ignition Cable • Intercom Cable • Gasoline and Oil Resistant Wire • Computer Cable • Uninsulated Bus Wire • Parallel and Jacketed Cord • Braided Ground Strap, and special custom designed cable for your applications.

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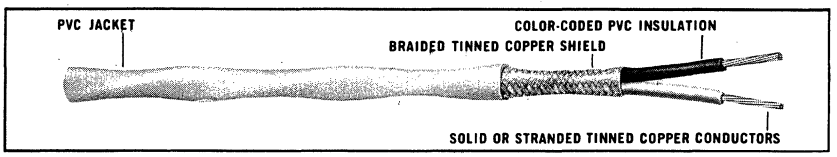
Audio Cable Braid Shielded PVC Jacket



Stock Color:
Chrome gray jacket.

Construction:
Tinned copper conductors, color-coded PVC insulation, conductors cabled, tinned copper braid shield, PVC jacket overall.

Specifications:
−20°C to +60°C.

Applications:
Shielded cable for recording studios, radio transmitters, sound systems and electronic circuits where shielding is required.

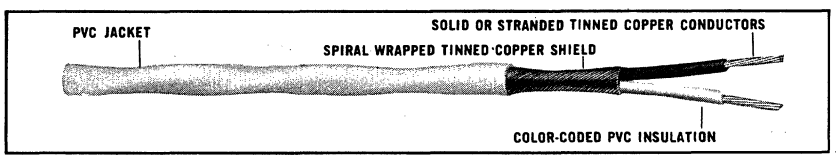
Put-up:
100', 500' and 1000' spools. (Other put-ups also available.)

COLOR CODE OF CONDUCTORS

CONDUCTOR	COLOR
1	Black
2	Red
3	White
4	Green

CATALOG NUMBER	NO. OF COND.	COND. SIZE	COND. STRAND.	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	APPROX. PERCENT SHIELD COVERAGE	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)
SOLID CONDUCTORS								
02695	2	20	Solid	.015	.020	75	200V	.210
02696	2	18	Solid	.015	.020	75	200V	.220
STRANDED CONDUCTORS								
02679	2	22	7/30	.015	.020	75	200V	.185
02678	3	22	7/30	.015	.020	75	200V	.200
02680	4	22	7/30	.015	.020	75	200V	.210
02681	2	20	10/30	.015	.020	75	200V	.204
01332	3	20	10/30	.015	.020	75	200V	.214
02683	4	20	10/30	.015	.020	75	200V	.232
02686	2	18	16/30	.018	.020	75	300V	.224
02687	3	18	16/30	.018	.020	75	300V	.236
02688	4	18	16/30	.018	.020	75	300V	.257
02689	2	16	26/30	.018	.020	75	300V	.250
02690	3	16	26/30	.018	.020	75	300V	.259
02691	2	14	41/30	.020	.020	75	250V	.290
02692	3	14	41/30	.020	.020	75	250V	.295
02693	2	12	65/30	.020	.020	75	250V	.335
02694	3	12	65/30	.020	.020	75	250V	.340

Audio Cable Spiral Shielded PVC Jacket



Stock Color:
Chrome gray jacket.

Construction:
Tinned copper conductors, color-coded PVC insulation, conductors cabled, tinned copper spiral wrapped shield, PVC jacket overall.

Specifications:
−20°C to +60°C.

Applications:
Cable for recording studios, radio transmitters, sound systems and electronic circuits where shielding is required. Spiral shield allows ease of pigtail soldering.

Put-up:
100', 500' and 1000' spools. (Other put-ups also available.)

COLOR CODE OF CONDUCTORS

CONDUCTOR	COLOR
1	Black
2	Red
3	White
4	Green
5	Yellow
6	Blue

CATALOG NUMBER	NO. OF COND.	COND. SIZE	COND. STRAND.	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	APPROX. PERCENT SHIELD COVERAGE	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)
SOLID CONDUCTORS								
02884	2	22	Solid	.015	.020	94	200V	.170
02885	3	22	Solid	.015	.020	76	200V	.178
STRANDED CONDUCTORS								
02882	2	22	7/30	.015	.020	85	200V	.175
01335	3	22	7/30	.015	.020	85	200V	.190
01337	4	22	7/30	.015	.020	85	200V	.200
01341	6	22	7/30	.015	.020	85	200V	.235
02888	2	20	10/30	.015	.020	85	200V	.195
02893	3	20	10/30	.015	.020	85	200V	.210
02769	4	20	10/30	.015	.020	85	200V	.225
02770	6	20	10/30	.015	.020	85	200V	.265
02892	2	18	16/30	.018	.020	85	200V	.230
02768	3	18	16/30	.018	.020	85	200V	.235
02894	4	18	16/30	.018	.020	85	200V	.245
02895	2	16	26/30	.018	.020	85	200V	.240
02896	3	16	26/30	.018	.020	85	200V	.245
02897	2	14	41/30	.020	.020	85	250V	.285
02898	3	14	41/30	.020	.020	85	250V	.290
02899	2	12	65/30	.020	.020	85	250V	.325
02900	3	12	65/30	.020	.020	85	250V	.330

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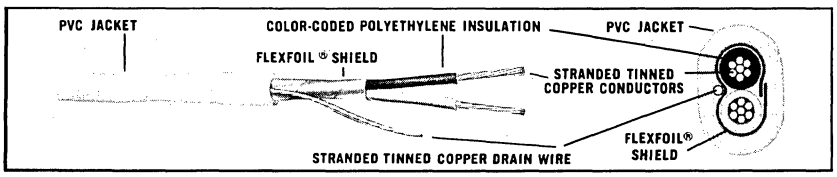


Audio Cable Mylar® /Aluminum Foil Shielded PVC Jacket

Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded polyethylene insulation, conductors cabled, wrapped with Flexfoil® mylar supported aluminum foil shield with foil facing to outside, stranded tinned copper drain wire, PVC jacket overall.

Specifications: −20°C to +60°C.

Applications: 100% shielded cable for recording studios, broadcast sound systems and electronic circuits where RF shielding is required.

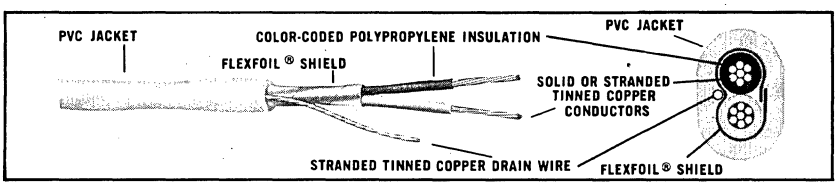
Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

CATALOG NUMBER	NO. OF COND.	COND. SIZE	COND. STRAND.	SIZE OF DRAIN WIRE	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	PERCENT SHIELD COVERAGE	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)
02513	2	24	7/32	24	.015	.025	100	350V	.160
02514	2	22	7/30	22	.015	.025	100	350V	.170
02526	3	22	7/30	22	.015	.025	100	350V	.175
02523	4	22	7/30	22	.015	.025	100	350V	.190
02524	2	20	10/30	20	.015	.025	100	350V	.195
02525	3	20	10/30	20	.015	.028	100	350V	.200
02534	2	18	16/30	20	.018	.028	100	450V	.222
02535	3	18	16/30	20	.018	.028	100	450V	.236
02536	2	16	26/30	18	.025	.030	100	600V	.274
02537	3	16	26/30	18	.025	.030	100	600V	.300
02538	2	14	41/30	16	.032	.035	100	750V	.340
02539	2	12	65/30	14	.037	.040	100	1000V	.400

COLOR CODE OF CONDUCTORS

CONDUCTOR	COLOR
1	Black
2	Clear
3	Red
4	Green

*T.M. DuPont



Miniature Audio Cable Mylar® /Aluminum Foil Shielded PVC Jacket

Stock Colors: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded polypropylene insulation, conductors cabled, wrapped with Flexfoil® mylar supported aluminum foil shield with foil facing to outside, stranded tinned copper drain wire, PVC jacket overall.

Specifications: −20°C to +60°C.

Applications: 100% shielded cable for recording studios, broadcast and sound systems. Requires ½ to ⅔ less space than standard broadcast cables.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

CATALOG NUMBER	NO. OF COND.	COND. SIZE	COND. STRAND.	SIZE OF DRAIN WIRE	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	PERCENT SHIELD COVERAGE	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)
02515	2	22	Solid	22	.008	.018	100	200V	.125
02516	2	22	7/30	22	.008	.020	100	200V	.135
02517	3	22	7/30	22	.008	.020	100	200V	.145

COLOR CODE OF CONDUCTORS

CONDUCTOR	COLOR
1	Black
2	Red
3	White

*T.M. DuPont

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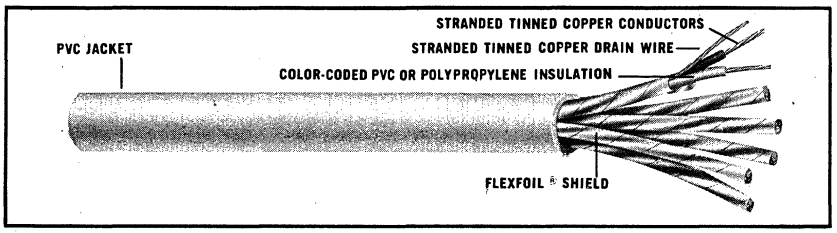
Audio/Data Individually Shielded Multiple Pair Cable PVC Jacket



Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded polypropylene insulation, cabled in pairs, each pair and its drain wire under Flexfoil® aluminum foil polyester shield, PVC jacket overall.

Specifications: +105°C. Suggested working voltage 300V. 100 Megohms/M insulation resistance between shields. 115 MMF/Ft. capacitance between adjacent shields. 1500V voltage breakdowns between adjacent shields. 50V working voltage between adjacent shields.

Applications: For audio RF and pulse applications requiring superior circuit isolation. The use of polypropylene insulation results in excellent high frequency properties and mechanical durabilty.

Put-up: 100', 500' and 1000' spools. (Other put-ups also available.)

NO. OF PAIRS	COLOR CODING
1	Black paired with Red
2	Black paired with White
3	Black paired with Green
4	Black paired with Blue
5	Black paired with Brown
6	Black paired with Yellow
7	Black paired with Orange
8	Red paired with Green
9	Red paired with White
10	Red paired with Blue
11	Red paired with Yellow
12	Red paired with Brown
13	Red paired with Orange
14	Green paired with Blue
15	Green paired with White
16	Green paired with Brown
17	Green paired with Orange
18	Green paired with Yellow
19	White paired with Blue
20	White paired with Brown
21	White paired with Orange
22	White paired with Yellow
23	Blue paired with Brown
24	Blue paired with Orange
25	Blue paired with Yellow
26	Brown paired with Orange
27	Brown paired with Yellow

CATALOG NUMBER	NO. OF PAIRS	NO. OF COND.	COND. SIZE	COND. STRAND.	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	NOM. O.D. (INCHES)	NOM. CAP.* MMF/FT.	NOM. CAP.** MMF/FT.
06040	3	6	22	7/30	.008	.030	.265	35	62
06041	6	12	22	7/30	.008	.035	.360	35	62
06042	9	18	22	7/30	.008	.040	.420	35	62
06043	11	22	22	7/30	.008	.040	.460	35	62
06044	15	30	22	7/30	.008	.045	.530	35	62
06045	19	38	22	7/30	.008	.055	.580	35	62
†06046	27	54	22	7/30	.008	.070	.720	35	62
06047	3	6	18	16/30	.016	.035	.375	30	55
06048	6	12	18	16/30	.016	.045	.555	30	55
06049	9	18	18	16/30	.016	.055	.620	30	55
06050	12	24	18	16/30	.016	.070	.765	30	55
06051	15	30	18	16/30	.016	.070	.830	30	55

Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded PVC insulation, cabled in pairs, each pair and its drain wire under Flexfoil® aluminum foil polyester shield, PVC jacket overall.

Specifications: −20°C to +60°C. Recommended operating voltage 300V. 100 Megohms 'M insulation resistance between shields. 115 MMF Ft. capacitance between adjacent shields. 1500V voltage breakdowns between adjacent shields. 50V working voltage between adjacent shields.

Applications: For audio RF and pulse applications requiring superior circuit isolation.

Put-up: 100', 500' and 1000' spools. (Other put-ups also available.)

CATALOG NUMBER	NO. OF PAIRS	NO. OF COND.	COND. SIZE	COND. STRAND.	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)
06035	3	6	22	Solid	.015	.030	300V	.280
06036	6	12	22	Solid	.015	.035	300V	.400
06037	9	18	22	Solid	.015	.040	300V	.455
06039	11	22	22	Solid	.015	.040	300V	.500
06038	15	30	22	Solid	.015	.045	300V	.555

See Color Code Above

†Cat. No. 06046 is available cut to specified length. Maximum length is 1000'.
*Capacitance between conductors.
**Capacitance between one conductor and other conductor connected to shield.

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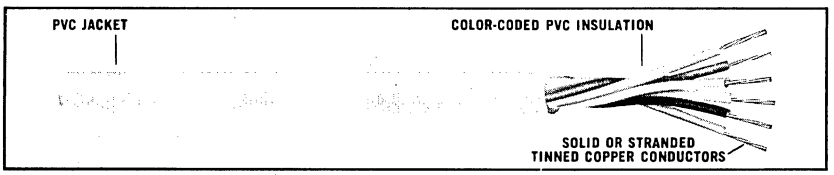

Audio Cable Unshielded Unpaired Multi-Conductor PVC Jacket

Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors (Cat. Nos. 02754 and 02755 are bare copper), color-coded PVC insulation, PVC jacket overall, conductors cabled.

Specifications: −20°C to +60°C.

Applications: PA systems, unbalanced intercom systems, interconnecting cables, remote control circuits, telephones, low-voltage relay control cables.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

COLOR CODE OF CONDUCTORS

CONDUCTOR	COLOR
1	Black
2	Red
3	White
4	Green
5	Orange
6	Blue
7	Brown
8	Yellow
9	Purple
10	Gray
11	Pink
12	Tan
13	Red/Green
14	Red/Yellow
15	Red/Black
16	White/Black
17	White/Red
18	White/Green
19	White/Yellow
20	White/Blue
21	White/Brown
22	White/Orange
23	White/Gray
24	White/Violet
25	White/Black/Red
26	White/Black/Green
27	White/Black/Yellow
28	White/Black/Blue
29	White/Black/Brown
30	White/Black/Orange
31	White/Black/Slate
32	White/Black/Purple
33	White/Black/Black
34	White/Red/Black
35	White/Red/Red
36	White/Red/Green
37	White/Red/Blue
38	White/Red/Brown
39	White/Red/Purple
40	White/Green/Black
41	White/Green/Red
42	White/Green/Yellow
43	White/Green/Blue
44	White/Green/Brown
45	White/Green/Purple
46	White/Blue/Black
47	White/Blue/Red
48	White/Blue/Green
49	White/Blue/Blue
50	White/Blue/Brown
51	White/Blue/Purple
52	White/Brown/Black
53	White/Brown/Red
54	White/Brown/Green
55	White/Brown/Blue
56	White/Brown/Brown
57	White/Brown/Purple
58	White/Purple/Red
59	White/Purple/Green
60	White/Purple/Blue

CATALOG NUMBER	NO. OF COND.	COND. SIZE	COND. STRAND.	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	SUGGESTED WORKING VOLTAGE	NOM. O.D. (INCHES)	COLOR CODE
SOLID CONDUCTORS								
04008	2	22	Solid	.010	.020	200V	.130	1, 2
04310	3	22	Solid	.010	.020	200V	.140	1, 2
04311	2	20	Solid	.015	.020	350V	.170	1, 2
02754	2	19	Solid	.015	.020	350V	.165	2, 3
02755	3	19	Solid	.015	.020	350V	.175	2-4
STRANDED CONDUCTORS								
06348	2	22	7/30	.010	.020	200V	.140	1, 2
04062	3	22	7/30	.010	.020	200V	.150	1-3
04063	4	22	7/30	.010	.020	200V	.170	1-4
04064	5	22	7/30	.010	.020	200V	.175	1-5
04066	6	22	7/30	.010	.020	200V	.185	1-6
04088	7	22	7/30	.010	.020	200V	.190	1-7
04065	8	22	7/30	.010	.020	200V	.200	1-8
04070	9	22	7/30	.010	.020	200V	.225	1-9
04071	10	22	7/30	.010	.020	200V	.235	1-10
04067	12	22	7/30	.010	.025	200V	.265	1-12
04073	15	22	7/30	.010	.025	200V	.290	1-15
04069	18	22	7/30	.010	.030	200V	.310	1-18
04075	20	22	7/30	.010	.030	200V	.340	1-20
04076	25	22	7/30	.010	.030	200V	.360	1-25
04077	30	22	7/30	.010	.030	200V	.385	1-30
04078	40	22	7/30	.010	.030	200V	.435	1-40
04079	50	22	7/30	.010	.035	200V	.500	1-50
04087	60	22	7/30	.010	.035	200V	.530	1-60
06351	2	20	10/30	.015	.020	350V	.180	1, 2
06352	3	20	10/30	.015	.020	350V	.190	1-3
06353	4	20	10/30	.015	.020	350V	.215	1-4
02830	2	18	16/30	.018	.020	350V	.200	1-2
02831	3	18	16/30	.018	.020	350V	.210	1-3
02404	4	18	16/30	.018	.030	400V	.250	1-4
02405	2	16	26/30	.020	.025	350V	.235	1-2
02406	3	16	26/30	.020	.025	350V	.255	1-3
02407	4	16	26/30	.020	.030	600V	.295	1-4
02409	2	14	41/30	.030	.035	600V	.332	1, 3
02410	2	12	65/30	.030	.040	600V	.384	1, 3

□ First color in stripe combination is body color. Second or third colors are stripes. Example: White Black Red. Other striped combinations available to order.

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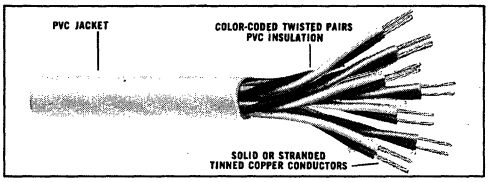
Audio Cable Unshielded Paired Multi-Conductor PVC Jacket



Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded PVC insulation, conductors paired with a short lay twist for conductor balance providing a circuit free from cross talk, pairs cabled, PVC jacket overall.

Specifications: −20°C to +60°C. Suggested working voltage: 22 gauge 200V, 18 gauge 400V.

Applications: Heavy-duty intercom and audio cable for intercom systems, signal systems, annunciators, nurse's call systems, multiple speaker systems, control circuit cables.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

CATALOG NUMBER	NUMBER OF PAIRS	NUMBER OF CONDUCTORS	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	NOM. O.D. (INCHES)
SOLID CONDUCTORS							
04008	1	2	22	Solid	.010	.020	.130
04010	2	4	22	Solid	.010	.020	.195
04014	3	6	22	Solid	.010	.020	.220
04017	6	12	22	Solid	.010	.020	.275
04018	7	14	22	Solid	.010	.020	.285
04020	9	18	22	Solid	.010	.020	.310
04022	11	22	22	Solid	.010	.020	.340
04024	13	26	22	Solid	.010	.025	.380
04026	15	30	22	Solid	.010	.025	.400
04028	16	32	22	Solid	.010	.025	.420
04030	27	54	22	Solid	.010	.035	.510
04032	41	82	22	Solid	.010	.035	.555
04038	51	102	22	Solid	.010	.045	.630
STRANDED CONDUCTORS							
06010	2	4	22	7/30	.010	.020	.210
06014	3	6	22	7/30	.010	.020	.225
06015	4	8	22	7/30	.010	.020	.240
06016	5	10	22	7/30	.010	.020	.265
06017	6	12	22	7/30	.010	.020	.290
06019	9	18	22	7/30	.010	.020	.355
06022	11	22	22	7/30	.010	.020	.365
06023	12	24	22	7/30	.010	.025	.410
06026	15	30	22	7/30	.010	.025	.450
06027	19	38	22	7/30	.010	.025	.480
06028	23	46	22	7/30	.010	.030	.530
06030	27	54	22	7/30	.010	.035	.570
06032	31	62	22	7/30	.010	.040	.635
06033	41	82	22	7/30	.010	.040	.710
06025	51	102	22	7/30	.010	.045	.800
06103	3	6	18	16/30	.018	.035	.360
06106	6	12	18	16/30	.018	.045	.555
06109	9	18	18	16/30	.018	.055	.638
06110	12	24	18	16/30	.018	.055	.690
06111	15	30	18	16/30	.018	.060	.800
06112	19	38	18	16/30	.018	.070	.880

NO. OF PAIRS	COLOR CODING□
1	Black paired with Red
2	Black paired with White
3	Black paired with Green
4	Black paired with Blue
5	Black paired with Brown
6	Black paired with Yellow
7	Black paired with Orange
8	Red paired with Green
9	Red paired with White
10	Red paired with Blue
11	Red paired with Yellow
12	Red paired with Brown
13	Red paired with Orange
14	Green paired with Blue
15	Green paired with White
16	Green paired with Brown
17	Green paired with Orange
18	Green paired with Yellow
19	White paired with Blue
20	White paired with Brown
21	White paired with Orange
22	White paired with Yellow
23	Blue paired with Brown
24	Blue paired with Orange
25	Blue paired with Yellow
26	Brown paired with Orange
27	Brown paired with Yellow
28	Purple paired with Red
29	Purple paired with White
30	Purple paired with Green
31	Purple paired with Blue
32	Purple paired with Brown
33	Purple paired with Yellow
34	Purple paired with Orange
35	Purple paired with Slate
36	Purple paired with Black
37	Slate paired with Red
38	Slate paired with White
39	Slate paired with Green
40	Slate paired with Blue
41	Slate paired with Brown
42	Slate paired with Yellow
43	Slate paired with Orange
44	Slate paired with Black
45	White Black paired w. Red
46	White Black paired w. Green
47	White Black paired w. Blue
48	White Black paired w. Brown
49	White Black paired w. Yellow
50	White Black paired w. Orange
51	White Black paired w. Purple

□First color in stripe combination is body color. Second or third colors are stripes. Example: White Black Red. Other striped combinations available to order.

CATALOG NUMBER	CORD TYPE	LENGTH	COLOR	TYPE PACKAGE	RATING
2 CONDUCTOR POWER SUPPLY CORDS					
UL listed					
20250	18/2 SV	6′	Black	Bulk	10A-125V
20252	18/2 SV	9′	Black	Bulk	10A-125V
20254	18/2 SV	12′	Black	Bulk	10A-125V
20327	18/2 SVT	6′	Black, Gray	Bulk	10A-125V
24516	18/2 SJ	6′	Black	Bulk	10A-125V
20256	18/2 SJ	8′	Black	Bulk	10A-125V
24519	18/2 SJ	9′	Black	Bulk	10A-125V
20258	18/2 SJ	10′	Black	Bulk	10A-125V
24546	18/2 SJT	6′	Gray	Bulk	10A-125V
24549	18/2 SJT	9′	Gray	Bulk	10A-125V
24526	16/2 SJ	6′	Black	Bulk	13A-125V
20260	16/2 SJ	8′	Black	Bulk	13A-125V
24529	16/2 SJ	9′	Black	Bulk	13A-125V
20262	16/2 SJ	10′	Black	Bulk	13A-125V
24532	16/2 SJ	12′	Black	Bulk	13A-125V
3 CONDUCTOR POWER SUPPLY CORDS					
UL listed					
20328	18/3 SV	6′	Black	Bulk	10A-125V
20329	18/3 SV	8′	Black	Bulk	10A-125V
20330	18/3 SVT	6′	Gray	Bulk	10A-125V
20331	18/3 SVT	8′	Gray	Bulk	10A-125V
20264	18/3 SJ	6′	Black	Bulk	10A-125V
20314	18/3 SJ	8′	Black	Bulk	10A-125V
20266	18/3 SJ	9′	Black	Bulk	10A-125V
20316	18/3 SJ	12′	Black	Bulk	10A-125V
24936	18/3 SJT	6′	Gray	Bulk	10A-125V
24939	18/3 SJT	9′	Gray	Bulk	10A-125V
24926	16/3 SJ	6′	Black	Bulk	13A-125V
20324	16/3 SJ	8′	Black	Bulk	13A-125V
24929	16/3 SJ	9′	Black	Bulk	13A-125V
24932	16/3 SJ	12′	Black	Bulk	13A-125V
24946	16/3 SJT	6′	Gray	Bulk	13A-125V
24949	16/3 SJT	9′	Gray	Bulk	13A-125V
20332	14/3 S	9′	Black	Bulk	15A-125V
20333	14/3 S	15′	Black	Bulk	15A-125V
SMALL APPLIANCE LINE CORDS					
UL listed					
24586	18/2 SPT-1	6′	Brown	Bulk	10A-125V
24596	18/2 SPT-1	6′	White	Bulk	10A-125V
24589	18/2 SPT-1	9′	Brown	Bulk	10A-125V
24599	18/2 SPT-1	9′	White	Bulk	10A-125V

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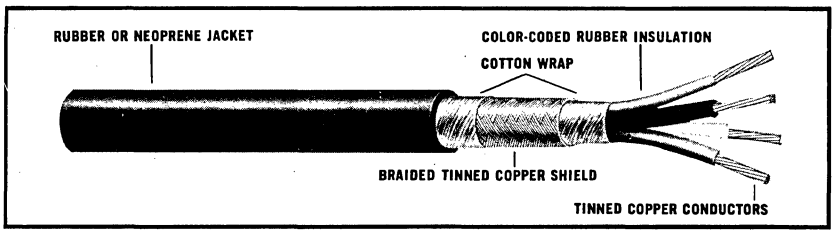

Control Cable Multi-Conductor Shielded Neoprene or Rubber Jacket

Stock Color: Black jacket.

Construction: Tinned copper conductors, color-coded rubber insulation, cabled, filled where required, cotton wrap, tinned copper braided shield, cotton wrap, neoprene jacket or rubber jacket.

Specifications: −20°C to +60°C. Suggested working voltage 350V.

Applications: Control circuits, video and audio interconnecting cables, broadcast and studio use. Precision engineered to prevent cross-talk and eliminate hum pick-up. Neoprene and rubber jackets are resistant to impact and abrasion and have extra limpness. For outside installations, neoprene is recommended being resistant to oil, ozone, moisture and sunlight.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

COLOR CODE OF CONDUCTORS□

CONDUCTOR	COLOR
1	Black
2	White
3	Red
4	Green
5	Yellow
6	Blue
7	Brown
8	Orange
9	Gray (slate)
10	Purple
11	White/Black
12	White/Red
13	White/Green
14	White/Yellow
15	White/Blue
16	White/Brown
17	White/Purple
18	White/Gray (slate)
19	Black/Red
20	Black/Yellow

NEOPRENE JACKET

CATALOG NUMBER	NUMBER OF CONDUCTORS	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	(INCHES) NOM. O.D.
01202	2	18	41/34	.020	.035	.295
01203	3	18	41/34	.020	.035	.305
01204	4	18	41/34	.020	.035	.330
01206	6	18	41/34	.020	.035	.370
01208	8	18	41/34	.020	.035	.420
01210	10	18	41/34	.020	.035	.480
01212	12	18	41/34	.020	.065	.555
01215	15	18	41/34	.020	.065	.640
01220	20	18	41/34	.020	.065	.730
01602	2	16	65/34	.025	.035	.335
01603	3	16	65/34	.025	.035	.355
01604	4	16	65/34	.025	.035	.385
01606	6	16	65/34	.025	.040	.445
01608	8	16	65/34	.025	.040	.510
01610	10	16	65/34	.025	.040	.575
01612	2	14	41/30	.030	.040	.395
01613	3	14	41/30	.030	.040	.425
01614	4	14	41/30	.030	.040	.455
01616	6	14	41/30	.030	.040	.515
01622	2	12	65/30	.030	.040	.440
01623	3	12	65/30	.030	.040	.465
01624	4	12	65/30	.030	.040	.505
01632	2	10	105/30	.030	.040	.495
01633	3	10	105/30	.030	.040	.520

□First color in stripe combination is body color. Second or third colors are stripes. Example: White/Black/Red. Other solid colors and striped combinations available to order.

COLOR CODE OF CONDUCTORS□

CONDUCTOR	COLOR
1	Black
2	White
3	Red
4	Green
5	Yellow
6	Blue
7	Brown
8	Orange
9	Gray (slate)
10	Purple
11	White/Black
12	White/Red
13	White/Green
14	White/Yellow
15	White/Blue
16	White/Brown
17	White/Purple
18	White/Gray (slate)
19	Black/Red
20	Black/Yellow

RUBBER JACKET

CATALOG NUMBER	NUMBER OF CONDUCTORS	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	NOM. O.D. (INCHES)
01303	2	18	41/34	.020	.035	.295
01302	2	20	26/34	.020	.035	.270
01304	3	20	26/34	.020	.035	.285
01305	4	20	26/34	.020	.035	.305
01308	5	20	26/34	.020	.035	.330
01310	6	20	26/34	.020	.035	.345
01312	7	20	26/34	.020	.035	.360
01313	8	20	26/34	.020	.035	.385
01315	10	20	26/34	.020	.035	.440
01316	12	20	26/34	.020	.065	.525
01317	15	20	26/34	.020	.065	.595
01325	20	20	26/34	.020	.065	.660

□First color in stripe combination is body color. Second or third colors are stripes. Example: White/Black/Red. Other solid colors and striped combinations available to order.

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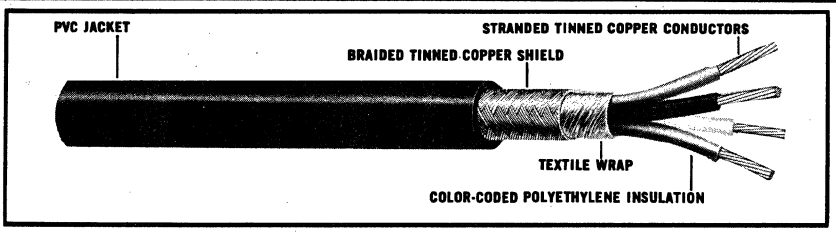
Control Cable Multi-Conductor Shielded PVC Jacket



Stock Color: Chrome gray jacket.

Construction: Tinned copper conductors, color-coded polyethylene insulation, cabled, filled where required, rayon wrap, tinned copper braid shield, PVC jacket overall.

Specifications: −20°C to +60°C. Suggested working voltage 600V.

Applications: Low capacity cable for control circuits, video and audio interconnecting cables, broadcast and studio use. Precision engineered to prevent cross-talk and eliminate hum pick-up. Low capacitance, light weight.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

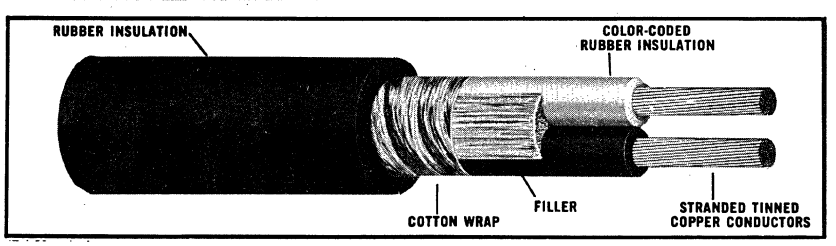
COLOR CODE OF CONDUCTORS□

CONDUCTOR	COLOR
1	Black
2	White
3	Red
4	Green
5	Yellow
6	Blue
7	Brown
8	Orange
9	Gray (slate)
10	Purple
11	White/Black
12	White/Red
13	White/Green
14	White/Yellow
15	White/Blue
16	White/Brown
17	White/Purple
18	White/Gray (slate)
19	Black/Red
20	Black/Yellow

CATALOG NUMBER	NUMBER OF CONDUCTORS	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	NOM. O.D. (INCHES)
01642	2	20	26/34	.015	.030	.245
01643	3	20	26/34	.015	.035	.250
01644	4	20	26/34	.015	.035	.260
01645	5	20	26/34	.015	.035	.275
01646	6	20	26/34	.015	.035	.300
01648	8	20	26/34	.015	.035	.330
01650	10	20	26/34	.015	.035	.375
01652	12	20	26/34	.015	.035	.380
01655	15	20	26/34	.015	.035	.410
01660	20	20	26/34	.015	.035	.455

□First color in stripe combination is body color. Second or third colors are stripes. Example: White/Black/Red. Other solid colors and striped combinations available to order.

Control Cable Multi-Conductor Unshielded Rubber Jacket



Stock Color: Black jacket.

Construction: Tinned copper conductors, color-coded rubber insulation, cabled, filled where required, cotton wrap, rubber jacket.

Specifications: −20°C to +60°C. Suggested working voltage 350V.

Applications: Control circuits, broadcast and studio use, traffic and fire alarm control, temperature control systems, other multiple control applications. Resistant to impact and abrasion. Extra limpness.

Put-up: 100′, 500′ and 1000′ spools. (Other put-ups also available.)

CATALOG NUMBER	NUMBER OF CONDUCTORS	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	NOM. JACKET THICKNESS (INCHES)	NOM. O.D. (INCHES)
03602	2	20	26/34	.020	.035	.240
03603	3	20	26/34	.020	.035	.255
03604	4	20	26/34	.020	.035	.275
03605	5	20	26/34	.020	.035	.300
03606	6	20	26/34	.020	.035	.315
03607	7	20	26/34	.020	.035	.325
03608	8	20	26/34	.020	.035	.360
03610	10	20	26/34	.020	.035	.410
03612	12	20	26/34	.020	.035	.435
03615	15	20	26/34	.020	.035	.505
03620	20	20	26/34	.020	.035	.570

□ First color in stripe combination is body color. Second or third colors are stripes. Example: White/Black/Red. Other solid colors are striped combinations available to order.

COLOR CODE OF CONDUCTORS□

COND.	COLOR	COND.	COLOR	COND.	COLOR	COND.	COLOR	COND.	COLOR
1	Black	5	Yellow	9	Gray (slate)	13	White/Green	17	White/Purple
2	White	6	Blue	10	Purple	14	White/Yellow	18	White/Gray (slate)
3	Red	7	Brown	11	White/Black	15	White/Blue	19	Black/Red
4	Green	8	Orange	12	White/Red	16	White/Brown	20	Black/Yellow

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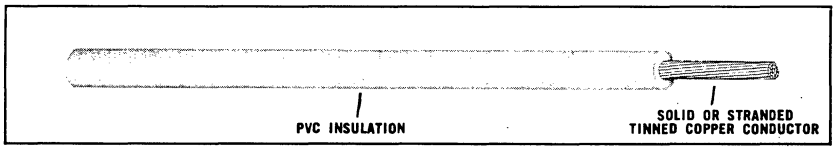


UL Listed Style No. 1007 Unshielded

Stock Colors: See table below.

Construction: Tinned copper conductor, color-coded PVC insulation.

Specifications: −40°C to +80°C, 300V. Resistant to acids, oil, alkalis, flame, moisture and fungus.

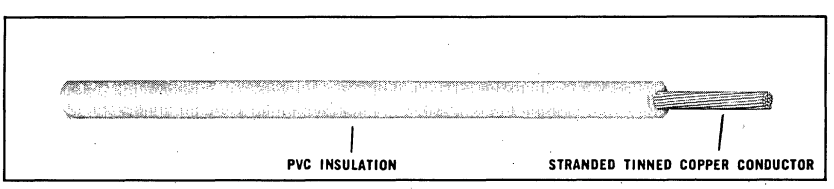
Applications: Internal wiring of electronic and electrical equipment.

Put-up: 100′ and 1000′ spools. (Other put-ups also available.)

STOCK COLORS□
1 White
2 Black
3 Red
4 Green
5 Yellow
6 Light Blue
7 Brown
8 Orange
9 Gray (slate)
10 Violet (purple)
11 White/Black
12 White/Red
13 White Green
14 White Yellow
15 White/Blue
16 White/Brown
17 White/Orange
18 White/Gray
19 White/Violet

CATALOG NUMBER	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	VOLTAGE RATING	NOM. O.D. (INCHES)	STOCK COLORS
			SOLID CONDUCTORS			
02003	24	Solid	.016	300V	.054	1-10
02004	22	Solid	.016	300V	.059	1-19
02028	20	Solid	.016	300V	.066	1-19
02052	18	Solid	.016	300V	.079	1-19
02053	16	Solid	.016	300V	.089	1-19
			STRANDED CONDUCTORS			
02015	24	7/32	.016	300V	.056	1-19
02016	22	7/30	.016	300V	.062	1-19
02040	20	10/30	.016	300V	.071	1-19
02064	18	16/30	.016	300V	.080	1-19
02065	16	26/30	.016	300V	.095	1-19

□First color in stripe combination is body color. Second or third colors are stripes. Example: White/Black/Red. Other solid colors and striped combinations available to order.



UL Listed Style No. 1015 CSA Type TEW Unshielded

Stock Colors: See table below.

Construction: Tinned copper conductor, color-coded PVC insulation.

Specifications: −40°C to +105°C, 600V. Resistant to acids, oil, alkalis, flame, moisture and fungus.

Applications: Internal wiring of electronic and electrical equipment.

Put-up: 100′ and 1000′ spools. (Other put-ups also available.)

STOCK COLORS■
1 White
2 Black
3 Red
4 Green
5 Yellow
6 Light Blue
7 Brown
8 Orange
9 Gray (slate)
10 Violet (purple)

CATALOG NUMBER	CONDUCTOR SIZE	CONDUCTOR STRANDING	NOM. INSULATION THICKNESS (INCHES)	VOLTAGE RATING	NOM. O.D. (INCHES)	STOCK COLORS
			SOLID CONDUCTORS			
02117	22	Solid	.032	600V	.090	1-10
02118	20	Solid	.032	600V	.097	1-10
02119	18	Solid	.032	600V	.105	1-10
			STRANDED CONDUCTORS			
02100	24	7/32	.032	600V	.088	1-10
02101	22	7/30	.032	600V	.095	1-10
02102	20	10/30	.032	600V	.102	1-10
02103	18	16/30	.032	600V	.112	1-10
02104	16	26/30	.032	600V	.125	1-10
02105	14	41/30	.032	600V	.142	1-10

■Other solid colors and striped combinations available to special order.

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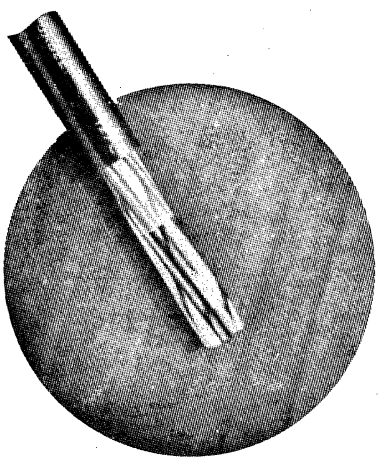
Conco-Foam
...NEW LOW LOSS FOAM POLYETHYLENE ALL CHANNEL COLOR TV CABLE.

Rome Synthinol*
...A THERMO-PLASTIC INSULATED HOOK-UP WIRE APPROVED FOR 80°, 90° & 105° C. OPERATING TEMPERATURE.

CT-B, CT-C Control Cable
...600 AND 1000 VOLT CONTROL CABLE PER IPCEA AND NEMA STANDARDS.



Consolidated Control Cables types CT-B and CT-C

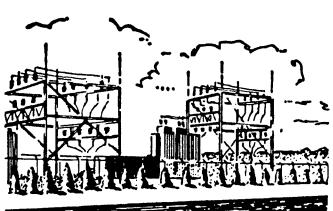
Meeting IPCEA-NEMA standards for use on both AC and DC circuits, these control cables are designed to handle a wide range of applications. Lighter in weight, smaller in diameter and more flexible than conventional rubber insulated multi-conductor cables, consolidated CT Thermoplastic insulated control cables are easy to handle, store and install.

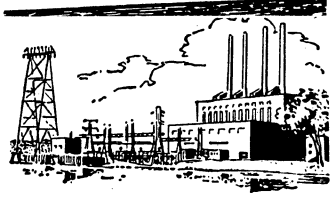
The Consolidated CT control cables are available with various types of copper, bronze or copper clad stainless shielding to provide electrostatic or electromagnetic protection. Shielding also provides added physical protection and acts as a positive deterrent against rodent or insect attack.

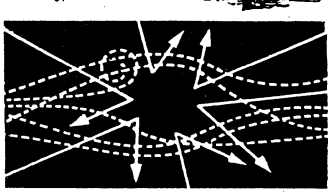
Synthinol (polyvinylchloride) is used for jacketing individual conductors as well as for an over-all jacket. Synthinol provides added resistance to heat and to chemical and corrosive attack. It also provides mechanical protection and is a flame retardant barrier for the cable insulation.

600 volt rated Type CT-B cables are primarily for use in general applications, while 1000 volt rated Type CT-C cables are more frequently used in connection with heavy magnetic trip devices, where induced over-voltages may occur.

Both CT-B and CT-C are made with bare stranded copper conductors, individually insulated and fully color-coded. These cables are suitable for all types of installations — aerial, conduit, duct, tray, direct burial — in wet or dry locations.







USES

In power generating stations and substations as well as throughout industry in both manufacturing and processing plants.

RATINGS

For AC and DC circuits. Type CT-B is rated 600 volts. Type CT-C, 1000 volts. Both are recommended for operation at 90° C. maximum continuous conductor temperature.

INSULATION

Polyethylene insulation is used on individual conductors since it has proven superior to many other dielectric materials used on solid insulated cables. This material is particularly well suited for DC circuits in moist locations where electro-osmosis maye be a problem. Along with its important outstanding electrical properties, polyethylene also resists acids, alkalies and oils. It is thus capable of standing up well under many hazardous environmental conditions.

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UNSHIELDED STATION CONTROL CABLE

HEAVY DUTY MULTI-CONDUCTOR PLASTIC JACKET — TYPE CT-B CONTROL CABLE — 600 VOLTS

DESCRIPTION: Each conductor, stranded bare copper, .020" polyethylene insulation, .010" polyvinylchloride jacket over each conductor, color coded, cabled with fillers where necessary, moisture resistant tape, black polyvinyl-chloride jacket overall. 600 volt operating voltage. Approved per IPCEA-NEMA standards.

16 GAUGE — 26/30 BARE COPPER

CAT. NO.	NO. OF COND.	NOM. JKT. THICKNESS	NOM. O.D.
7502	2	.045"	.330"
7503	3	.045"	.350"
7505	5	.045"	.410"
7506	6	.045"	.440"
7507	7	.045"	.440"
7508	8	.045"	.480"
7510	10	.045"	.580"
7512	12	.045"	.600"
7514	14	.045"	.630"
7516	16	.045"	.660"
7519	19	.060"	.690"
7521	21	.060"	.730"
7522	22	.060"	.760"
7524	24	.060"	.810"
7526	26	.060"	.820"
7530	30	.060"	.900"
7537	37	.060"	.960"
7540	40	.060"	1.00"
7550	50	.080"	1.10"
7560	60	.080"	1.19"

**Flat Dimension .252" x .404"

12 GAUGE — 7/20 BARE COPPER

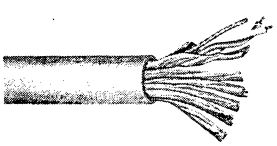
CAT. NO.	NO. OF COND.	NOM. JKT. THICKNESS	NOM. O.D.
7702	2 Twin	.045"	**
7703	3 Rd.	.045"	.460"
7704	4	.045"	.471"
7705	5	.045"	.523"
7706	6	.045"	.564"
7707	7	.060"	.599"
7708	8	.060"	.644"
7709	9	.060"	.690"
7710	10	.060"	.727"
7712	12	.060"	.775"
7714	14	.060"	.807"
7715	15	.060"	.832"
7716	16	.060"	.901"
7718	18	.080"	.928"
7719	19	.080"	.943"
7720	20	.080"	.966"
7722	22	.080"	1.01"
7725	25	.080"	1.09"
7727	27	.080"	1.129"
7730	30	.080"	1.168"
7734	34	.080"	1.201"
7737	37	.080"	1.257"

14 GAUGE — 7/22 BARE COPPER

CAT. NO.	NO. OF COND.	NOM. JKT. THICKNESS	NOM. O.D.
7602	2 Twin	.045"	*
7603	3 Rd.	.045"	.419"
7604	4	.045"	.425"
7605	5	.045"	.462"
7606	6	.045"	.481"
7607	7	.045"	.502"
7608	8	.060"	.556"
7609	9	.060"	.622"
7610	10	.060"	.657"
7612	12	.060"	.696"
7614	14	.060"	.744"
7616	16	.060"	.798"
7619	19	.060"	.808"
7624	24	.080"	.947"
7627	27	.080"	1.002"
7630	30	.080"	1.110"
7634	34	.080"	1.118"
7637	37	.080"	1.124"
7640	40	.080"	1.290"

*Flat Dimension .233" x .366"

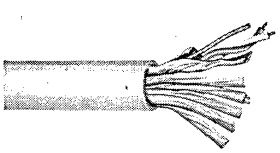
MULTIPLE PAIR INDIVIDUALLY SHIELDED AUDIO AND SOUND CABLE



SHIELDED PAIRS

NO.	TYPE	SIZE & STRANDING	SPECIFICATIONS AND GENERAL APPLICATIONS	NOMINAL JACKET THICKNESS INCHES	NOMINAL DIAMETER INCHES
5303	3 pair	22 / solid	Tinned copper conductor .010". Polypropylene insulation. Mylar aluminum shield and tinned copper drain wire, each pair. Overall Gray vinyl jacket.	.028	.250
5306	6 pair	22 / solid	Same as 5303	.037	.330
5309	9 pair	22 / solid	Same as 5303	.040	.390
5311	11 pair	22 / solid	Same as 5303	.040	.420
5315	15 pair	22 / solid	Same as 5303	.045	.485

MULTIPLE PAIR INDIVIDUALLY SHIELDED AUDIO AND DATA CABLE



NO.	TYPE	SIZE & STRANDING	SPECIFICATIONS AND GENERAL APPLICATIONS	NOMINAL JACKET THICKNESS INCHES	NOMINAL DIAMETER INCHES
5323	3 pair	22 / 7x30 overall	Tinned copper .010" polypropylene insulation. Mylar aluminum shield and tinned copper drain wire each pair. Overall gray vinyl jacket.	.030	.265
5326	6 pair	22 / 7x30	Same as 5323	.037	.355
5329	9 pair	22 / 7x30	Same as 5323	.040	.425
5331	11 pair	22 / 7x30	Same as 5323	.040	.455
5335	15 pair	22 / 7x30	Same as 5323	.045	.525
5339	19 pair	22 / 7x30	Same as 5323	.055	.575
5347	27 pair	22 / 7x30	Same as 5323	.070	.705

COLOR CODING FOR PAIRED INTERCOM CABLES

PAIRED INTERCOMMUNICATING CABLES COLOR CODING
Identification is simple with Consolidated Intercom Cables because they are all color coded. See chart below.

1 Black paired with Red
2 Black paired with White
3 Black paired with Green
4 Black paired with Blue
5 Black paired with Yellow
6 Black paired with Brown
7 Black paired with Orange
8 Red paired with White
9 Red paired with Green
10 Red paired with Blue
11 Red paired with Yellow
12 Red paired with Brown
13 Red paired with Orange
14 Green paired with White
15 Green paired with Blue
16 Green paired with Yellow
17 Green paired with Brown
18 Green paired with Orange
19 White paired with Blue
20 White paired with Yellow
21 White paired with Brown
22 White paired with Orange
23 Blue paired with Yellow
24 Blue paired with Brown
25 Blue paired with Orange
26 Brown paired with Yellow
27 Brown paired with Orange

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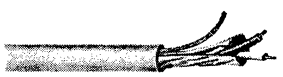
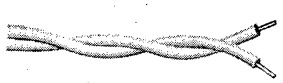
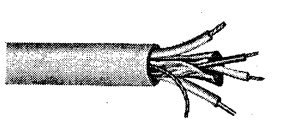
INTERCOMMUNICATION AND SOUND SYSTEM CABLES

	NO.	TYPE	SIZE & STRAND-ING	SPECIFICATIONS AND GENERAL APPLICATIONS	NOMINAL JACKET THICK-NESS INCHES	NOMINAL DIAMETER INCHES	
 **SHIELDED 2 AND 3 CONDUCTOR**	5572	2 condr.	22 / 7x30	Tinned copper conductors. .016" Polyethylene insulation color coded black and red. Mylar aluminum shield stranded tinned copper drain wire gray vinyl jacket.	.025	.170	
	5573	2 condr.	20 / 10x30	Same as 5572 color coded black and white.	.025	.200	
	5574	2 condr.	18 / 16x30	Same as 5573	.030	.225	
	5575	2 condr.	16 / 26x30	Same as 5573	.030	.250	
	5589	2 condr.	14 / 41x30	Same as 5573	.030	.320	
	5576	3 condr.	22 / 7x30	Same as 5572 color coded black, white and red.	.025	.210	
	5577	3 condr.	20 / 10x30	Same as 5576	.025	.235	
	5578	3 condr.	18 / 16x30	Same as 5576	.025	.240	
	5590	3 condr.	16 / 26x30	Same as 5576	.030	.255	
	5591	3 condr.	14 / 41x30	Same as 5576	.030	.285	
UNSHIELDED WITH JACKET	5579	2 condr.	22 / 7x30	Tinned copper conductors. 015" Vinyl insulation. Color coded black and red.	.020	.165	
	5580	2 condr.	20 / 10x30	Same as 5579 color coded black and white.	.025	.190	
	5581	2 condr.	18 / 16x30	Same as 5580	.030	.225	
	5582	2 condr.	16 / 26x30	Same as 5580	.030	.245	
	5583	2 condr.	14 / 41x30	Same as 5580	.030	.310	
 **WITHOUT JACKET**	5584	2 condr.	22 / solid	Tinned copper conductors. .015" Vinyl insulation twisted. Color coded brown and tan.		.115	
	5585	2 condr.	18 / 16x30	.018" Insulation. Same as 5584. Color coded black and white.		.175	
	5586	2 condr.	16 / 26x30	.020" Insulation. Same as 5585.		.195	
MINIATURE BROADCAST AUDIO CABLE	5570	2 condr.	22 / 7x30	Tinned copper .010" Polyethylene insulation color coded black and red. Mylar aluminum shield stranded tinned copper drain wire gray vinyl jacket.	.016	.140	
	5588	2 condr.	22 / solid	Same as 5570	.016	.120	
 **2 PAIR MINIATURE AUDIO AND SOUND CABLE**	5594	2 pair	22 / 7x30	Tinned copper polypropylene insulation. Each pair shielded. Mylar aluminum shield and drain wire. Color coded same as 5571.	.019	.165	
	5571	2 pair	22 / 7x30	Tinned copper .009" Polyethylene insulation 1 pair black and red with Mylar aluminum shield. 1 pair white and green both pairs twisted with stranded tinned copper ground wire gray vinyl jacket.	.019	.165	

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SHIELDED AND JACKETED CABLES CONTROL AND MICROPHONE TYPE MULTI-CONDUCTOR CABLES

SHIELDED: Weatherproof rubber, Neoprene and plastic jacket for all microphone Electronic Power, Control Circuits, or weatherproof extension work. (Longer continuous lengths if desired).

SHIELDED RUBBER JACKET

CONDUCTOR COLOR CHART: 1—Black; 2—White; 3—Red; 4—Green; 5—Yellow; 6—Blue; 7—Brown; 8—Orange.
Standard Spool Put-up: 9 ft., 10 ft., 25 ft., 50 ft., 100 ft., 250 ft., 500 ft., 1000 ft.

NO.	NO. OF COND.	SIZE	SPECIAL USE	SPECIFICATIONS	STRANDING	FINISHED O. D. (Inches)	NOMINAL CAPACITY per ft. (mmf)
1460	1	20	Crystal microphone	Tinned copper, yarn serve; wall of live rubber; cotton fillers and wrap; tinned copper braid shield; cotton wrap rubber jacket overall.	26x34	.240	33.
1462	2	20	Low impedance microphones	Same as 1460; color coded	26x34	.268	68.
1456	2	18	Heavy duty studio cable	Same as 1460; color coded	41x34	.295	80.
1463	3	20	Low impedance microphones	Same as 1460; color coded	26x34	.277	85.
1464	4	20	Low impedance microphones	Same as 1460; color coded	26x34	.295	95.
1465	5	20	Interconnecting power cable for all electronic uses	Same as 1460; color coded	26x34	.323	
1466	6	20	Same as 1465	Same as 1460; color coded	26x34	.349	
1467	7	20	Same as 1465	Same as 1460; color coded	26x34	.360	
1455	8	20	Same as 1465	Same as 1460; color coded	26x34	.386	

SHIELDED NEOPRENE JACKET

NO.	NO. OF COND.	SIZE	SPECIFICATIONS	STRANDING	FINISHED O. D. (Inches)
1701	1	18	Tinned copper, yarn serve; wall of live rubber; cotton fillers and wrap; tinned copper braid shield; cotton wrap neoprene jacket overall.	41x34	.235
1702	2	18	Same as 1701, color coded	41x34	.295
1703	3	18	Same as 1701, color coded	41x34	.305
1704	4	18	Same as 1701, color coded	41x34	.330
1705	2	16	Same as 1701, color coded	65x34	.320
1706	3	16	Same as 1701, color coded	65x34	.340
1707	4	16	Same as 1701, color coded	65x34	.355
1708	6	18	Same as 1701, color coded	41x34	.430
1709	8	18	Same as 1701, color coded	41x34	.465

SHIELDED PLASTIC JACKET

NO.	NO. OF COND.	SIZE	SPECIAL USE	SPECIFICATIONS	STRANDING	FINISHED O. D. (Inches)	NOMINAL CAPACITY per ft. (mmf)
1721	1	24	Low capacitance	Tinned copper polyethylene insulation with a close spiral tinned copper shield. Grey vinyl plastic jacket.	7x32	.132	29.
1461	1	22	Lapel microphone	Same as 1721	16x34	.125	36.
1457	1	22	Crystal, Ribbon and other high impedance microphones	Same as 1721 except heavier polyethylene insulation on conductor.	16x34	.200	25.
1458	2	22	Low impedance microphones	Tinned copper conductors polyethylene insulation conductors; black and clear. Cabled with fillers rayon serve spiral tinned copper shield. Gray vinyl plastic jacket.	16x34	.231	32.
1459	1	20	Lapel microphone	Tinned Copper Wire, with polyethylene to .087" O.D. with a closely tinned copper shielded braid, and a heavy black plastic jacket overall.	26x34	.175	40.
1722	2	20	Same as 1458	Same as 1458 except braided tin copper shield.	26x34	.245	32.
1723	3	20	Same as 1458	Same as 1722	26x34	.250	45.
1724	4	20	Same as 1458	Same as 1722	26x34	.255	45.
1725	5	20	Same as 1458	Same as 1722	26x34	.275	45.
1726	6	20	Same as 1458	Same as 1722	26x34	.300	
1727	7	20	Same as 1458	Same as 1722	26x34	.330	
1728	8	20	Same as 1458	Same as 1722	26x34	.375	

STANDARD SPOOL PUT-UP: 100 FT., 500 FT., 1000 FT.

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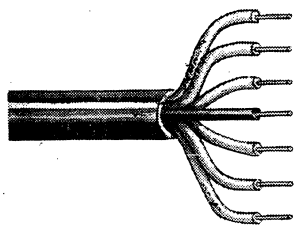
UNSHIELDED AUDIO CABLE MULTICONDUCTOR — PLASTIC JACKET



300 VOLTS STRANDED CONDUCTORS

NO.	TYPE	SIZE AND STRANDING	SPECIFICATIONS AND GENERAL APPLICATIONS	NOMINAL DIAMETER (INCHES)
5400	2 Condr.	22 / 7x30	Tinned copper conductor .010" vinyl plastic insulated cabeled .020" gray vinyl plastic jacket overall.	.130
5401	3 Condr.	22 / 7x30	Same as 5400	.145
5406	4 Condr.	22 / 7x30	Same as 5400	.175
5411	5 Condr.	22 / 7x30	Same as 5400	.180
5416	6 Condr.	22 / 7x30	Same as 5400	.205
5421	7 Condr.	22 / 7x30	Same as 5400	.215
5426	8 Condr.	22 / 7x30	Same as 5400	.225
5431	9 Condr.	22 / 7x30	Same as 5400	.245
5434	12 Condr.	22 / 7x30	Same as 5400	.275
5438	15 Condr.	22 / 7x30	Same as 5400	.268
5440	20 Condr.	22 / 7x30	Same as 5400	.300
5442	25 Condr.	22 / 7x30	Same as 5400	.330
5446	30 Condr.	22 / 7x30	Same as 5400	.375
5448	40 Condr.	22 / 7x30	Same as 5400	.425
5450	50 Condr.	22 / 7x30	Same as 5400	.500
5460	60 Condr.	22 / 7x30	Same as 5400	.530

400 VOLTS STRANDED CONDUCTORS

5470	4 Condr.	18 / 16x30	Tin copper .018" PVC cabled .030" Gray outer PVC Jacket	.250
5471	5 Condr.	18 / 16x30	Same as 5470 Except .037" Jacket	.295
5472	7 Condr.	18 / 16x30	Same as 5470 Except .037" Jacket	.324
5473	9 Condr.	18 / 16x30	Same as 5470 Except .037" Jacket	.379
5474	12 Condr.	18 / 16x30	Same as 5470 Except .040" Jacket	.412
5475	15 Condr.	18 / 16x30	Same as 5470 Except .045" Jacket	.475
5476	19 Condr.	18 / 16x30	Same as 5470 Except .045" Jacket	.505

600 VOLTS STRANDED CONDUCTORS

5480	4 Condr.	16 / 19x29	Tin copper .030" PVC cabled .045" Gray outer PVC Jacket	.375
5481	7 Condr.	16 / 19x29	Same as 5480	.455
5482	12 Condr.	16 / 19x29	Same as 5480 Except .060" Jacket	.600
5483	15 Condr.	16 / 19x29	Same as 5480 Except .060" Jacket	.650
5484	19 Condr.	16 / 19x29	Same as 5480 Except .065" Jacket	.715
5485	4 Condr.	14 / 19x27	Tin copper .045" PVC cabled .045" Gray outer PVC Jacket	.495
5486	7 Condr.	14 / 19x27	Same as 5485 Except .060" Jacket	.630
5487	12 Condr.	14 / 19x27	Same as 5485 Except .065" Jacket	.770

*Catalog No's 5400 thru 5473 Color Coding Chart 1
**Catalog No's 5474 thru 5487 Color Coding Chart 2

COLOR CODING FOR MULTIPLE INTERCOM CABLES

CHART 1*

1	Black
2	Red
3	Green
4	White
5	Brown
6	Blue
7	Orange
8	Yellow
9	Purple
10	Slate
11	Pink
12	Tan
13	Red/Green
14	Red/Yellow
15	Red/Black
16	White/Black
17	White/Red
18	White/Green
19	White/Yellow
20	White/Blue
21	White/Brown
22	White/Orange
23	White/Gray
24	White/Violet
25	White/Black/Red
26	White/Black/Green
27	White/Black/Yellow
28	White/Black/Blue
29	White/Black/Brown
30	White/Black/Orange
31	White/Black/Slate
32	White/Black/Purple
33	White/Black/Black
34	White/Red/Black
35	White/Red/Red
36	White/Red/Green
37	White/Red/Blue
38	White/Red/Brown
39	White/Red/Purple
40	White/Green/Black
41	White/Green/Red
42	White/Green/Green
43	White/Green/Blue
44	White/Green/Brown
45	White/Green/Purple
46	White/Blue/Black
47	White/Blue/Red
48	White/Blue/Green
49	White/Blue/Blue
50	White/Blue/Brown
51	White/Blue/Purple
52	White/Brown/Black
53	White/Brown/Red
54	White/Brown/Green
55	White/Brown/Blue
56	White/Brown/Brown
57	White/Brown/Purple
58	White/Purple/Red
59	White/Purple/Green
60	White/Purple/Blue

CHART 2**

1	Black
2	White
3	Red
4	Green
5	Orange
6	Blue
7	White/Black
8	Red/Black
9	Green/Black
10	Orange/Black
11	Blue/Black
12	Black/White
13	Red/White
14	Green/White
15	Blue/White
16	Black/Red
17	White/Red
18	Orange/Red
19	Blue/Red

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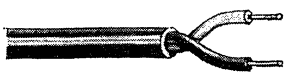
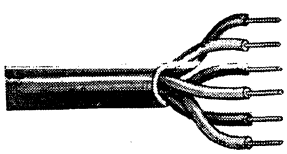
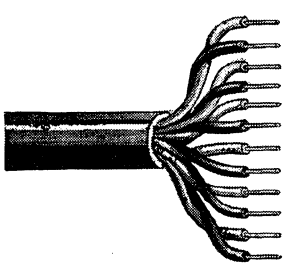
UNSHIELDED INTERCOM CABLE
PAIRED CONDUCTORS SOLID AND STRANDED PLASTIC JACKET







SOLID

NO.	TYPE	SIZE AND STRANDING	SPECIFICATIONS AND GENERAL APPLICATIONS	NOMINAL DIAMETER (Inches)
5201	1 Pr. 2 Condr.	22 Solid	Tinned copper conductor .010" vinyl plastic insulation. Cabled, .020" gray vinyl plastic Jacket overall	.130
5205	2 Pr. 4 Condr.	22 Solid	Same as 5201	.190
5211	3 Pr. 6 Condr.	22 Solid	Same as 5201	.220
5221	5 Pr. 10 Condr.	22 Solid	Same as 5201	.250
5226	6 Pr. 12 Condr.	22 Solid	Same as 5201	.275
5231	7 Pr. 14 Condr.	22 Solid	Same as 5201	.280
5236	8 Pr. 16 Condr.	22 Solid	Same as 5201	.300
5241	9 Pr. 18 Condr.	22 Solid	Same as 5201	.320
5251	11 Pr. 22 Condr.	22 Solid	Same as 5201	.340
5271	15 Pr. 30 Condr.	22 Solid	Same as 5201	.400
5286	27 Pr. 54 Condr.	22 Solid	Same as 5201	.510
5289	31 Pr. 62 Condr.	22 Solid	Same as 5201	.555
5292	41 Pr. 82 Condr.	22 Solid	Same as 5201	.630
5297	51 Pr. 102 Condr.	22 Solid	Same as 5201	.735

STRANDED

5151	1 Pr. 2 Condr.	22 (7x30)	Tinned copper conductor .010" vinyl plastic insulation. Cabled, .020" gray vinyl plastic jacket overall	.145
5152	2 Pr. 4 Condr.	22 (7x30)	Same as 5151	.210
5153	3 Pr. 6 Condr.	22 (7x30)	Same as 5151	.230
5155	5 Pr. 10 Condr.	22 (7x30)	Same as 5151	.265
5156	6 Pr. 12 Condr.	22 (7x30)	Same as 5151	.290
5157	7 Pr. 14 Condr.	22 (7x30)	Same as 5151	.300
5158	8 Pr. 16 Condr.	22 (7x30)	Same as 5151	.320
5159	9 Pr. 18 Condr.	22 (7x30)	Same as 5151	.355
5161	11 Pr. 22 Condr.	22 (7x30)	Same as 5151	.370
5165	15 Pr. 30 Condr.	22 (7x30)	Same as 5151	.450
5167	27 Pr. 54 Condr.	22 (7x30)	Same as 5151	.570
5171	31 Pr. 62 Condr.	22 (7x30)	Same as 5151	.635
5181	41 Pr. 82 Condr.	22 (7x30)	Same as 5151	.710
5191	51 Pr. 102 Condr.	22 (7x30)	Same as 5151	.800

Color Coding For Paired Intercom Cables

PAIRED INTERCOMMUNICATING CABLES COLOR CODING Identification is simple with Consolidated Intercom Cables because they are all color coded. See chart below.

1	Black paired with Red
2	Black paired with White
3	Black paired with Green
4	Black paired with Blue
5	Black paired with Brown
6	Black paired with Yellow
7	Black paired with Orange
8	Red paired with Green
9	Red paired with White
10	Red paired with Blue
11	Red paired with Yellow
12	Red paired with Brown
13	Red paired with Orange
14	Green paired with Blue
15	Green paired with White
16	Green paired with Brown
17	Green paired with Orange
18	Green paired with Yellow
19	White paired with Blue
20	White paired with Brown
21	White paired with Orange
22	White paired with Yellow
23	Blue paired with Brown
24	Blue paired with Orange
25	Blue paired with Yellow
26	Brown paired with Orange
27	Brown paired with Yellow
28	Purple paired with Red
29	Purple paired with White
30	Purple paired with Green
31	Purple paired with Blue
32	Purple paired with Brown
33	Purple paired with Yellow
34	Purple paired with Orange
35	Purple paired with Slate
36	Purple paired with Black
37	Slate paired with Red
38	Slate paired with White
39	Slate paired with Green
40	Slate paired with Blue
41	Slate paired with Brown
42	Slate paired with Yellow
43	Slate paired with Orange
44	Slate paired with Black
45	White/Black paired w. Red
46	White/Black paired w. Green
47	White/Black paired w. Blue
47	White/Black paired w. Brown
49	White/Black paired w. Yellow
50	White/Black paired w. Orange
51	White/Black paired w. Purple

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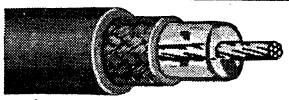
RG TYPE COAXIAL CABLES



Non-Contaminating Low Temp. Black Jacket		Vinyl & Poly. Jackets					Shields							
Number RG-/U	Cat. Number	No. RG/U	Cat. No.	Armor O.D.	Jacket O.D.	Vinyl Jacket	Outer	Inner	Dielectric O.D.	Center Conductor	V.P. %	Cap. Mmfd. /Ft.	Max. Oper. Volts Rms.	Nom. Imp. Ohms.
		5	4431		.332	Black	C	C	185	16	65.9	28.5	3000	52.5
5B	4432				.332	Black	S	S	.185	.053S	65.9	29.5	3000	50
6A	4433				.332	Black	C	C	.185	21CW	65.9	20.	2700	75
		7	4434		.370	Black	–	C	.250**	19	84	12.5	1000	97
		8	4415		.405	Black	–	C	.285	7/21	65.9	29.5	4000	52
8A	4435				.405	Black	–	C	.285	7/.0296	65.9	30.5	4000	52
		9	4436		.420	Grey	C	S	.280	7/21S	65.9	30	4000	51
9A	4437				.420	Grey	S	S	.280	7/21S	65.9	30	4000	51
9B	4438				.425	Black	S	S	.285	7/.0296S	65.9	30.5	4000	50
10A	4439			.475	.405	Black	–	C	.285	7/.0296	65.9	30.5	4000	50
		11	4419		.405	Black	–	C	.285	7/26T	65.9	20.5	4000	75
11A	4440				.405	Black	–	C	.285	7/26T	65.9	20.5	4000	75
12A	4441			.475	.405	Black	–	C	.285	7/26T	65.9	20.5	4000	75
		13	4442		.425	Black	C	C	.285	7/26T	65.9	20.5	4000	75
13A	4443				.425	Black	C	C	.285	7/26T	65.9	20.5	4000	75
14A	4468				.545	Black	C	C	.370	.106	65.9	30	5500	52
17A	4482				.870	Black	–	C	.680	.188C	65.9	29.5	11000	52
18A	4483			.945	.870	Black	–	C	.680	.188C	65.9	29.5	11000	52
		21	4444		.322	Grey	S	S	.185	16N	65.9	29	2700	53
21A	4445				.332	Black	S	S	.185	.053N	65.9	30	2700	50
		22	4471		.405	Black	–	T	.285	Two 7/.0152	65.9	16	1000	95
22B	4475				.420	Black	T	T	.285	Two 7/.0152	65.9	16	1000	95
		29	4446		.184	Poly	–	T	.116	20	65.9	28.5	1900	53.5
		54A	4469		.250	Poly	–	T	.178	7/.0152	65.9	26.5	3000	58
		55	4447		.206	Poly	T	T	.116	20	65.9	28.5	1900	53.5
55A	4448				.216	Black	S	S	.116	.035S	65.9	29.5	1900	50
55B	4484				.206	Black	T	T	.116	20S	65.9	28.5	1900	53.5
		58	4405		.195	Black	–	T	.116	20	65.9	28.5	1900	53.5
58A	4449				.195	Black	–	T	.116	19/.0071T	65.9	29.5	1900	50
58B	4474				.195	Black	–	T	.116	20	65.9	28.5	1900	53.5
58C	4450				.195	Black	–	T	.116	19/.0071T	65.9	29.5	1900	50
		59	4401		.242	Black	–	C	.146	22CW	65.9	21	2300	73
		59	4402		.242	Grey	–	C	.146	22CW	65.9	21	2300	73
59	4403				.242	White	–	C	.146	22CW	65.9	21	2300	73
59A	4451				.242	Black	–	C	.146	.023CW	65.9	20.5	2300	75
59B	4470				.242	Black	–	C	.146	.023CW	65.9	20.5	2300	75
		62	4452		.242	Black	–	C	.146**	22CW	84	13.5	750	93
62A	4453				.242	Black	–	C	.146**	22CW	84	13.5	750	93
62B	4472				.242	Black	–	C	.146	7x32CW	84	13.5	750	93
		63	4454		.405	Black	–	C	.285**	22CW	84	10	1000	125
63B	4455				.405	Black	–	C	.285**	22CW	84	10	1000	125
		71	4456		.250	Poly	T	T or C	.146**	22CW	84	13.5	750	93
71A	4466				.245	Black	T	T or C	.146**	22CW	84	13.5	750	93
71B	4485				.250	Black	T	C	.146	22CW	84	13.5	750	93
74A	4486			.615	.545	Black	C	C	.370	10C	65.9	29.5	7000	52
79B	4487			.475	.405	Black	–	C	.285	22CW	84	10	1000	125
		83	4410		.405	Black	–	C	.240	10C	65.9	44	2000	35
		100	4412		.242	Black	–	C	.146	19/.0147C	65.9	44	2000	35
		108	4464		.235	Black	–	T	.079 ea.	Two 7/28T	68	23.5	1000	78
108A	4465				.235	Black	–	T	.079 ea.	Two .7/28T	65.9	23.5	1000	78
		111	4422	.480	.420	Gray	T	T	.285	Two 7/.152T	65.9	16	1000	95
111A	4423			.490	.420	Gray	T	T	.285	Two 7/.152T	65.9	16	1000	95
		114	4426		.405	Black	–	C	.285	.007CW	–	6.8	1000	185
114A	4427				.405	Black	–	C	.285	.007CW	–	6.8	1000	185
122	4457				.160	Black	–	T	.096	27/36T	65.9	29.5	1900	50
130	4428				.625	Black	–	T	.472	Two 7/21C	65.9	17	3000	95

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

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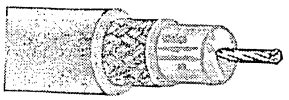
RG TYPE COAXIAL CABLES



Non-Contaminating Low Temp. Black Jacket		Vinyl & Poly. Jackets					Shields							
Number RG-/U	Cat. Number	No. RG/U	Cat. No.	Armor O.D.	Jacket O.D.	Vinyl Jacket	Outer	Inner	Dielectric O.D.	Center Conductor	V.P. %	Cap. Mmfd. /Ft.	Max. Oper. Volts Rms.	Nom. Imp. Ohms.
131	4429			.710	.625	Black	—	T	.472	Two 7/21C	65.9	17	3000	95
133	4430				.405	Black	—	C	.285	21C	65.9	16.2	1000	95
		164	4404		.870	Black	—	C	.680	.1045C	—	—	10000	75
		177	4406		.895	Black	S	S	.680	.195C	—	—	11000	50
		181	4407		.640	Black	—	C	.210	Two 7/26C	—	12	3500	125
212	4488				.332	Black	S	S	.185	.0556S	65.9	29.5	3000	50
213	4489				.405	Black	—	C	.285	7X.0296C	65.9	29.5	5000	50
214	4490				.425	Black	S	S	.285	7X.0296C	65.9	29.5	5000	50
215	4497				.475	Black	—	C	.285	7/.029C	65.9	29.5	4000	50
216	4491				.425	Black	C	C	.285	7X26TC	65.9	20.5	5000	75
217	4492				.545	Black	C	C	.370	.106C	65.9	29.5	7000	50
218	4493				.870	Black	—	C	.680	.195C	65.9	29.5	11000	50
219	4494			.945	.870	Black	—	C	.680	.195C	65.9	29.5	11000	50
		220	4408		1.120	Black	—	C	.910	.260C	65.9	29.5	14000	50
		221	4409	1.195	1.120	Black	—	C	.910	.260C	65.9	29.5	14000	50
222	4495				.332	Black	S	S	.185	.0556N	65.9	29.0	2700	50
223	4496				.216	Black	S	S	.116	.035S	65.9	29.5	1900	50
		224	4411	.615	.545	Gray	C	C	.370	.106C	65.9	29.5	5500	52

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

MINIATURE COAXIAL CABLE

Non-Contaminating Low Temp. Black Jacket		Vinyl & Poly. Jackets					Shields							
Number RG/U	Cat. Number	Cat. No.	No. RG/U	Armor O.D.	Jacket O.D.	Vinyl Jacket	Outer	Inner	Dielectric O.D.	Center Conductor	V.P. %	Cap. Mmfd. /Ft.	Max. Oper. Volts Rms.	Nom. Imp. Ohms
		4459	174		.105	Black	—		.060**	7/.0063CW		30		50

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

FOAM POLYETHYLENE COAXIAL CABLE

		8	4477		.405	Black	—	C	.285	7/19C	80	24.5	1500	50
11	4476				.405	Black	—	C	.285	14C	80	16.5	3000	75
		58	4493		.195	Black	—	T	.116	20C	80	28.5	1900	53.5
		59	4478		.242	Black	—	C	.107	22CW	80	17	500	72
62	4479				.242	Black	—	C	.146	.023CW	80	14.5	700	93

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

FOAM POLYETHYLENE TRIAXIAL CABLE DOUBLE SHIELD DOUBLE JACKET

11	4480				.460	Black	C	C	.285	14C	80	16.5	3000	75
59	4481				.242	Black	C	C	.107	.107	80	17	500	72

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

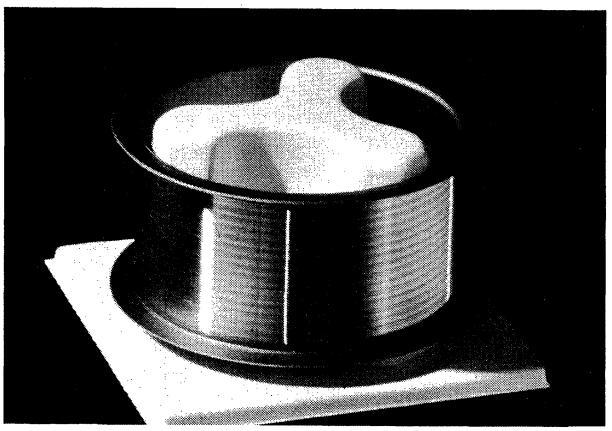
TRIAXIAL CABLE DOUBLE SHIELD DOUBLE JACKET

RG/U Type	Cat. No.	Impedance in Ohms	Jacket Diameter	Vinyl Jacket	Shields		O. D. Dielectric	Inner Conductor	V. P. %	Cap. MMFD/Ft.	Max. Oper. Volts-RMS
					1st	2nd					
Triaxial 58A	4463	50	.285	Black	T	T	.116	19 .0071T	65.9	28.5	1,900
Triaxial 59	4460	73	.242	Black	C	C	.146	22CW	65.9	21.0	2,300
Triaxial 11	4461	75	.460	Black	C	C	.285	7 26T	65.9	20.5	4,000
Triaxial 8	4462	52	.490	Black	C	C	.285	7 21C	65.9	29.5	4,000

**Semi-Solid Dielectric N—Nichrome C—Copper S—Silvered Copper CW—Copperweld T—Tinned Copper F—Formvar

CRM a single source for electronic grade preforms and fine wire of pure metals and special alloys

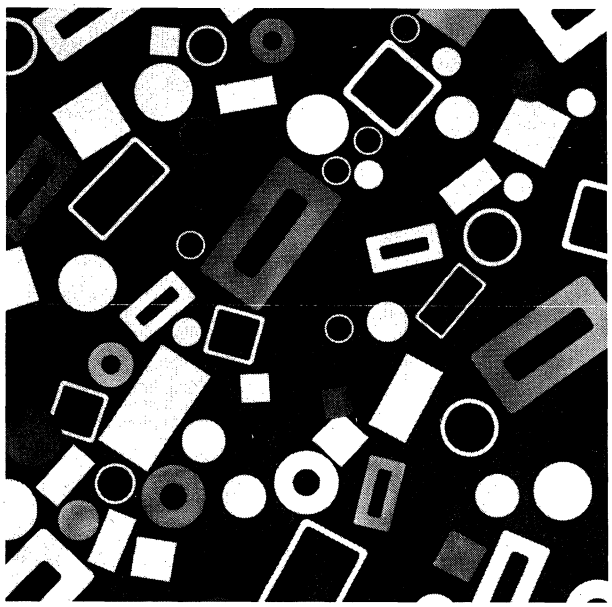
CRM specializes in the manufacture of precision wire and preforms for use in electronic components and semiconductor devices. In order to assure conformance to the most rigid specifications, even metals purification and alloying are done within CRM's own plant. Hundred of stock dies supplement extensive tool-making facilities, permitting fast and inexpensive fabrication of custom sizes and shapes. Appropriate physical, chemical, and performance tests are used at all stages of production to assess and certify both the quality and usability of CRM products. CRM preforms and wire are available from stock or are custom fabricated to meet all your specifications.



WIRE from CRM is available in all varieties required for electronics, semiconductors, and electrical instruments to any specification. Thus, pure Gold may be obtained in 5-9's purity for vapor deposition or lower purity for bonding. Tensile strength and other physical properties can also be varied, even to match particular wire bonding machines. Various doped Gold wires are also available. Similarly, standard and custom wire of pure metals and special alloys are produced by CRM for other semiconductor applications, resistance thermometers, potentiometers, strain gauges, galvanometers, thermocouples, and for experimental applications. All wire can be supplied with any type of enamel or plated, or bare.

Gold bonding wire • silicon-aluminum bonding wire • pure vapor deposition wire • potentiometer wire • platinum resistance thermometer wire • fuse wire • strain gauge wire • enameled wire • plated wire

CRM WIRE CAN HELP YOU MAKE A BETTER PRODUCT.



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Discs • rectangles • washers • frames • solder • braze • eutectic gold alloys

CRM PREFORMS CAN HELP YOU MAKE A BETTER PRODUCT.

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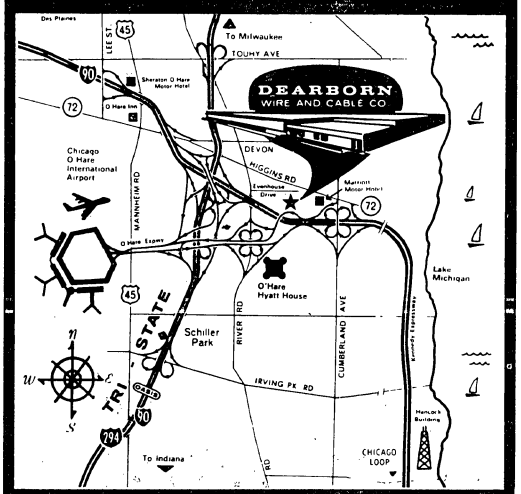
DEARBORN

AMERICA'S FULL-SERVICE SOURCE FOR WIRE, CABLE, INSULATION AND ELECTRONIC ACCESSORIES

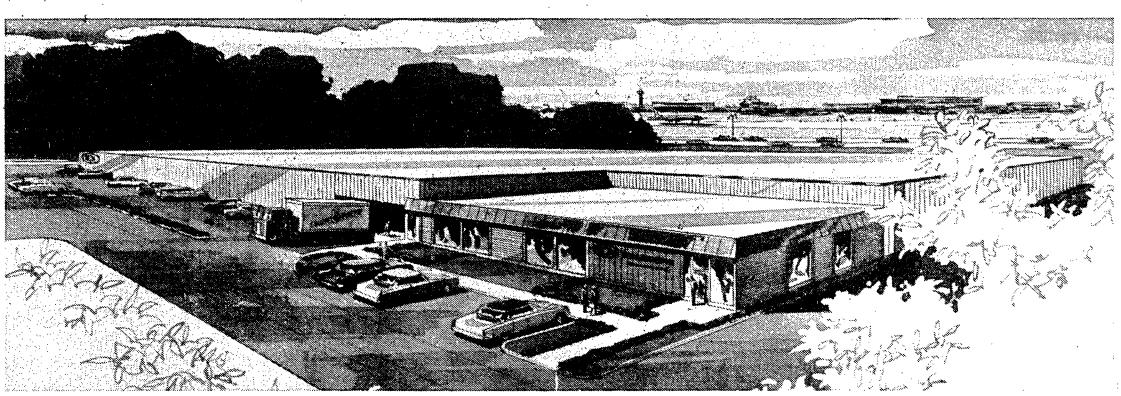
Growing to Serve You Better!

We've Built Our New Home at the Crossroads of the Nation!

AT THE GATEWAY TO CHICAGO'S O'HARE INTERNATIONAL AIRPORT



The new 50,000 square foot Dearborn service center has been designed with "space age" innovations in manufacturing, processing and warehousing equipment. Modern processing systems, together with proximity of plant to O'Hare International Airport air cargo facilities and all major expressways, means rush orders for in-stock items can be well on the way to their destinations in less than half a day.



YES, We Have It!

The vast selection of merchandise listed on the following pages represents only a partial amount of the thousands of wire, cable and insulation items stocked by Dearborn.

Our new 44 page catalog will give you full details on the complete Dearborn line. Send for it, or call us for information on stock or special constructions.

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive • Rosemont, Illinois 60018

Phone Area (312) 696-0090 • Telex Number 28-2449

DEARBORN PRODUCTS ARE CATALOGED AND STOCKED BY THESE AND MANY OTHER FINE DISTRIBUTORS IN THE U.S.A.

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Chicago, Illinois 60680
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To Order: (312) 829-9121
Customer Service: (312) 829-9100

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A Division of Avnet Incorporated
3901 Pace Court
Schiller Park, Illinois 60176
(312) 678-6310

DEARBORN

MIL SPEC MIL-W-16878D HOOKUP WIRE-TYPES B & C

Single conductor, stranded tinned copper

TYPE B

Insulation PVC .010″ wall thickness, color coded. **Temperature rating:** −55°C to +105°C. **Voltage rating:** 600 volts.

TYPE B — NYLON

Same as above but with clear nylon jacket (.003″ wall) over PVC insulation increasing temperature rating to +115°C.

TYPE B — PREBONDED

Double tinned strands are heated which fuses the individual strands together in order to prevent fraying. Allows easy stripping and insertion in holes in lugs, circuit boards, etc. Color coded .010″ PVC insulation to MIL-W-16878D. **Temperature rating:** −55°C to +105°C. **Voltage rating:** 600 volts.

TYPE C

Insulation PVC .017″ wall thickness. **Temperature rating:** −55°C to +105°C. **Voltage rating:** 1000 volts.

TYPE C — NYLON

Same as above but with clear nylon jacket which increases temperature rating to +115°C.

TYPE C — SHIELD AND NYLON JACKET

Basic type C with 90% coverage braided tinned copper shield and clear nylon .005″ jacket overall.

105°C TYPE B, 600 VOLT

DEARBORN NO.	MIL TYPE	SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
173207	B-32	32	7/40	.028	.010	0-9 & 90-98
173007	B-30	30	7/38	.032	.010	0-9 & 90-98
172807	B-28	28	7/36	.034	.010	0-9 & 90-98
172607	B-26	26	7/34	.038	.010	0-9 & 90-98
172619	B-26	26	19/38	.038	.010	0-9 & 90-98
172407	B-24	24	7/32	.044	.010	0-9 & 90-98
172419	B-24	24	19/36	.044	.010	0-9 & 90-98
172207	B-22	22	7/30	.051	.010	0-9 & 90-98
172219	B-22	22	19/34	.051	.010	0-9 & 90-98
172007	B-20	20	7/28	.058	.010	0-9 & 90-98
172019	B-20	20	19/32	.058	.010	0-9 & 90-98
171807	B-18	18	7/26	.068	.010	0-9 & 90-98
171819	B-18	18	19/30	.068	.010	0-9 & 90-98
171619	B-16	16	19/29	.077	.010	0-9 & 90-98
171419	B-14	14	19/27	.091	.010	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

105°C TYPE B, BONDED CONDUCTOR, 600 V.

DEARBORN NO.	MIL TYPE	SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
192407	B-24	24	7/32	.043	.010	0-9 & 90-98
192207	B-22	22	7/30	.050	.010	0-9 & 90-98
192007	B-20	20	7/28	.058	.010	0-9 & 90-98
191807	B-18	18	7/26	.068	.010	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

115°C TYPE B, NYLON JACKET (.003″), 600 V.

DEARBORN NO.	MIL TYPE	SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
183207	B-32	32	7/40	.035	.010	0-9 & 90-98
183007	B-30	30	7/38	.039	.010	0-9 & 90-98
182807	B-28	28	7/36	.041	.010	0-9 & 90-98
182607	B-26	26	7/34	.044	.010	0-9 & 90-98
182619	B-26	26	19/38	.044	.010	0-9 & 90-98
182407	B-24	24	7/32	.050	.010	0-9 & 90-98
182419	B-24	24	19/36	.050	.010	0-9 & 90-98
182207	B-22	22	7/30	.057	.010	0-9 & 90-98
182219	B-22	22	19/34	.057	.010	0-9 & 90-98
182007	B-20	20	7/28	.064	.010	0-9 & 90-98
182019	B-20	20	19/32	.064	.010	0-9 & 90-98
181807	B-18	18	7/26	.074	.010	0-9 & 90-98
181819	B-18	18	19/30	.074	.010	0-9 & 90-98
181619	B-16	16	19/29	.085	.010	0-9 & 90-98
181419	B-14	14	19/27	.099	.010	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

105°C TYPE C, 1000 VOLT

DEARBORN NO.	MIL TYPE	SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
202407	C-24	24	7/32	.058	.017	0-9 & 90-98
202419	C-24	24	19/36	.058	.017	0-9 & 90-98
202207	C-22	22	7/30	.065	.017	0-9 & 90-98
202219	C-22	22	19/34	.065	.017	0-9 & 90-98
202007	C-20	20	7/28	.072	.017	0-9 & 90-98
202019	C-20	20	19/32	.072	.017	0-9 & 90-98
201807	C-18	18	7/26	.082	.017	0-9 & 90-98
201819	C-18	18	19/30	.082	.017	0-9 & 90-98
201619	C-16	16	19/29	.092	.017	0-9 & 90-98
201419	C-14	14	19/27	.105	.017	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

115°C TYPE C, NYLON JACKET (.003″), 1000 V.

DEARBORN NO.	MIL TYPE	GAUGE SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
212407	C-24	24	7/32	.064	.017	0-9 & 90-98
212419	C-24	24	19/36	.064	.017	0-9 & 90-98
212207	C-22	22	7/30	.071	.017	0-9 & 90-98
212219	C-22	22	19/34	.071	.017	0-9 & 90-98
212007	C-20	20	7/28	.079	.017	0-9 & 90-98
212019	C-20	20	19/32	.079	.017	0-9 & 90-98
211807	C-18	18	7/26	.090	.017	0-9 & 90-98
211819	C-18	18	19/30	.090	.017	0-9 & 90-98
211619	C-16	16	19/29	.100	.017	0-9 & 90-98
211419	C-14	14	19/27	.113	.017	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

115°C TYPE C, SHIELDED, NYLON JACKET, 1000 V.

DEARBORN NO.	MIL TYPE	GAUGE SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
222407	C-24	24	7/32	.102	.017	9 Only
222207	C-22	22	7/30	.109	.017	9 Only
222007	C-20	20	7/28	.120	.017	9 Only
221819	C-18	18	19/30	.132	.017	9 Only
221619	C-16	16	19/29	.144	.017	9 Only
221419	C-14	14	19/27	.159	.017	9 Only

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

COLOR CODE ON HOOKUP WIRE: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White
90—White/Black • 91—White/Brown • 92—White/Red • 93—White/Orange • 94—White/Yellow • 95—White/Green • 96—White/Blue • 97—White/Violet • 98—White/Gray
OTHER COLORS AND STRIPE COMBINATIONS AVAILABLE UPON REQUEST

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

CROSS-LINKED IRRADIATED HOOKUP WIRE

XLV DUAL SERVICE HOOKUP WIRE

UL AND MIL-SPEC HOOKUP AND LEAD WIRE

CROSS-LINKED POLYVINYL CHLORIDE INSULATION

MIL-W-16878/1 — TYPE B

XLV U.L. STYLE 1429

DEARBORN NO.	MIL TYPE	U.L. STYLE	AWG SIZE STRANDING	NOM. INSUL. THICK'S	NOM. O.D.	STOCK COLORS	STOCK PUT UP (FT)
252807	B-28	1429	**28** (7/36)	.010	.035	0-9	1000
252607	B-26	1429	**26** (7/34)	.010	.039	0-9	1000
252607F	B-26	1429	**26** (7/34)	.010	.039	0-9	1000
252407	B-24	1429	**24** (7/32)	.010	.044	0-9	1000
252407F	B-24	1429	**24** (7/32)	.010	.044	0-9	1000
252419	B-24	1429	**24** (19/36)	.010	.045	0-9	1000
252207	B-22	1429	**22** (7/30)	.010	.050	0-9	1000
252207F	B-22	1429	**22** (7/30)	.010	.050	0-9	1000
252219	B-22	1429	**22** (19/34)	.010	.051	0-9	1000
252007	B-20	1429	**20** (7/28)	.010	.058	0-9	1000
252007F	B-20	1429	**20** (7/28)	.010	.058	0-9	1000
252019	B-20	1429	**20** (19/32)	.010	.059	0-9	1000
251819	B-18	1429	**18** (19/30)	.010	.068	9 only	1000
251807F	B-18	1429	**18** (7/26)	.010	.068	9 only	1000
251619	B-16	1429	**16** (19/29)	.010	.078	9 only	1000
252601	NOT MIL SPEC	1429	**26** (1)	.010	.039	0-9	1000
252401	NOT MIL SPEC	1429	**24** (1)	.010	.044	0-9	1000
252201	NOT MIL SPEC	1429	**22** (1)	.010	.050	0-9	1000

F — SUFFIX INDICATES FUSED OR PREBONDED STRANDS

MIL-W-16878/2 — TYPE C

XLV U.L. STYLE 1430

DEARBORN NO.	MIL TYPE	U.L. STYLE	AWG SIZE STRANDING	NOM. INSUL. THICK'S	NOM. O.D.	STOCK COLORS	STOCK PUT UP (FT)
272407	C-24	1430	**24** (7/32)	.016	.058	0-9	1000
272407F	C-24	1430	**24** (7/32)	.016	.058	0-9	1000
272207	C-22	1430	**22** (7/30)	.016	.064	0-9	1000
272207F	C-22	1430	**22** (7/30)	.016	.064	0-9	1000
272007	C-20	1430	**20** (7/28)	.016	.072	0-9	1000
272007F	C-20	1430	**20** (7/28)	.016	.072	9 only	1000
271819	C-18	1430	**18** (19/30)	.016	.082	9 only	1000
271807F	C-18	1430	**18** (7/26)	.016	.082	9 only	1000
271619	C-16	1430	**16** (19/29)	.016	.092	9 only	1000
271419	C-14	1430	**14** (19/27)	.016	.105	9 only	1000
271219	C-12	1430	**18** (19/25)	.016	.124	9 only	1000

F — SUFFIX INDICATES FUSED OR PREBONDED STRANDS

THE XLV IS ESPECIALLY SUITABLE FOR AEROSPACE, MILITARY AND INDUSTRIAL ELECTRONIC EQUIPMENT

Dual service hook-up wire insulated with a polyvinyl chloride which has been cross-linked by an irradiation process. This process changes the linear molecular configuration of the PVC and connects molecules through a network of chemical bonds. This specially processed insulation "XLV" becomes extremely burn-thru and heat resistant. The shrinkback or heat flow normally encountered when applying a hot soldering iron does not occur when using "XLV" hook-up wire.

This resistance to heat also prevents distortion of the insulation when the wire is subjected to temporary overloads and high temperatures.

Cross linking the PVC by irradiation also increases the abrasion resistance and makes it much superior to regular vinyl insulations.

The table below lists both the UL and military specifications to which "XLV" wire is manufactured.

Note that since the military and U.L. specifications vary, the temperature and voltage ratings assigned differ for the same wire as per the chart.

SPECIFICATIONS	MAX. OPER. TEMPS.	MAXIMUM VOLTAGE
MIL-W-16878/1 TYPE B	105°C	600 V. RMS
U.L. AWM STYLE 1429	80°C	Voltage not specified for general appliance hook-up usage. 300 volt peak for electronic use only.
MIL-W-16878/2 TYPE C	105°C	1000 V. RMS.
U.L. AWM STYLE 1430	105°C	300 VOLT RMS 600 VOLT PEAK For electronic use only.

See other U.L. & CSA products starting with page 21.

All above can be supplied in multi-conductor, with shield and XLV jacket or multi-conductor, and XLV jacket.

COLOR CODE ON HOOKUP WIRE: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White
OTHER COLORS AND STRIPE COMBINATIONS AVAILABLE UPON REQUEST

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

MIL-SPEC MIL-W-16878D HOOKUP WIRE AND CABLE

TYPE D AND D-NYLON

Stranded tinned copper with color coded PVC insulation. Temperature rating: −55°C to +105°C (+115°C with nylon type jacket). Voltage rating: 3000 volts.

105°C TYPE D, 3000 VOLT

DEARBORN NO.	MIL TYPE	GAUGE SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
232407	D-24	24	7/32	.082	.031	0, 2, 9
232419	D-24	24	19/36	.082	.031	0, 2, 9
232207	D-22	22	7/30	.089	.031	0, 2, 9
232219	D-22	22	19/34	.089	.031	0, 2, 9
232007	D-20	20	7/28	.097	.031	0, 2, 9
232019	D-20	20	19/32	.097	.031	0, 2, 9
231807	D-18	18	7/26	.107	.031	0, 2, 9
231819	D-18	18	19/30	.107	.031	0, 2, 9
231619	D-16	16	19/29	.116	.031	0, 2, 9
231419	D-14	14	19/27	.130	.031	0, 2, 9
231219	D-12	12	19/25	.162	.037	0, 2, 9
231037	D-10	10	37/26	.183	.037	9 Only
238133	D-8	8	133/29	.247	.040	9 Only
236133	D-6	6	133/27	.291	.040	9 Only
234133	D-4	4	133/25	.355	.045	9 Only
232665	D-2	2	665/30	.423	.045	9 Only
231817	D-1	1	817/30	.480	.050	9 Only
230001	D-0	0	1045/30	.530	.052	9 Only

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

115°C TYPE D, NYLON JACKET, 3000 VOLT

DEARBORN NO.	MIL TYPE	GAUGE SIZE	STRANDING	NOM. O.D.	WALL THICKNESS	STOCK COLORS
242407	D-24	24	7/32	.090	.031	0, 2, 9
242207	D-22	22	7/30	.097	.031	0, 2, 9
242007	D-20	20	7/28	.105	.031	0, 2, 9
241807	D-18	18	7/26	.115	.031	0, 2, 9
241619	D-16	16	19/29	.124	.031	0, 2, 9
241419	D-14	14	19/27	.140	.031	0, 2, 9
241219	D-12	12	19/25	.172	.037	0, 2, 9
241037	D-10	10	37/26	.195	.037	9
248133	D-8	8	133/29	.265	.040	9
246133	D-6	6	133/27	.310	.040	9

115°C TYPE D, WHITE NYLON BRAID, 3000 V.

244133	D-4	4	133/25	.375	.045	9
242665	D-2	2	665/30	.447	.045	9
241817	D-1	1	817/30	.502	.050	9
240001	D-0	0	1045/30	.552	.052	9

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

MULTI-CONDUCTOR CABLES, TYPE C, FLAT RIBBON

Each conductor to MIL-W-16878D Type C. All conductors bonded together to form ribbon type cable. All conductors color coded and easily separated for ease in terminating.

MULTI-CONDUCTOR, TYPE B, NYLON, SHIELDED AND JACKETED WITH WHITE PVC JACKET*

Stranded tinned copper conductors with .010 PVC insulation, color coded. .003" nylon jacket on each conductor, 90% coverage braided tinned copper shield and white PVC jacket overall.

* This series can be supplied with XL vinyl insulation on conductors and jacket on special order. See preceding page for description.

105°C TYPE C, FLAT MULTI-CONDUCTOR, 1000 V.

DEARBORN NO.	NO. OF COND.	GAUGE SIZE	STRANDING	NOM. WALL	NOM. THICKNESS	NOM. WIDTH
382204	4	22	7/30	.016	.065	.260
382208	8	22	7/30	.016	.065	.520
382212	12	22	7/30	.016	.065	.780
382216	16	22	7/30	.016	.065	1.040
382220	20	22	7/30	.016	.065	1.300

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

• Other sizes and numbers of conductors can be supplied on special order.

MULTI-CONDUCTOR, TYPE B, NYLON, SHIELD AND JACKET

DEARBORN NO.	NO. OF COND.	GAUGE SIZE	STRANDING	NOM. WALL	NOM. JACKET THICKNESS	NOM. O.D.
262601	1	26	7/34	.010	.010	.087
262602	2	26	7/34	.010	.014	.138
262603	3	26	7/34	.010	.014	.142
262604	4	26	7/34	.010	.016	.162
262401	1	24	19/36	.010	.010	.092
262402	2	24	19/36	.010	.016	.152
262403	3	24	19/36	.010	.016	.161
262404	4	24	19/36	.010	.017	.164
262201	1	22	19/34	.010	.010	.100
262202	2	22	19/34	.010	.016	.168
262203	3	22	19/34	.010	.017	.178
262204	4	22	19/34	.010	.019	.184
262001	1	20	19/32	.010	.010	.106
262002	2	20	19/32	.010	.019	.186
262003	3	20	19/32	.010	.019	.196
262004	4	20	19/32	.010	.021	.203
261801	1	18	19/30	.010	.012	.120
261802	2	18	19/30	.010	.021	.210
261803	3	18	19/30	.010	.022	.227
261804	4	18	19/30	.010	.023	.238
261601	1	16	19/29	.010	.016	.137
261602	2	16	19/29	.010	.023	.236
261603	3	16	19/29	.010	.023	.240
261604	4	16	19/29	.010	.025	.274

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

COLOR CODING ON HOOK-UP WIRE: 0—Black • 2—Red • 9—White

COLOR CODE ON MULTI-CONDUCTOR CABLES: 1—White • 2—Black • 3—Red • 4—Green • 5—Yellow • 6—Light Blue • 7—Brown • 8—Orange • 9—Gray (Slate) • 10—Violet (Purple) • 11—White/Black • 12—White/Red • 13—White/Green • 14—White/Yellow • 15—White/Blue • 16—White/Brown • 17—White/Orange • 18—White/Gray • 19—White/Violet • 20—White/Black/Red.

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

TEFLON* INSULATED AIRCRAFT, MISSILE AND ELECTRONIC WIRE AND CABLE

MIL-W-16878D, TYPE ET

Voltage rating: 250 volts. **Temperature rating:** −65°C to +200°C. Single conductor stranded silver plated copper, extruded TFE Teflon insulation.

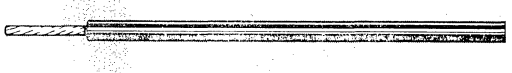
MIL-W-7139B, CLASS I WIRE

Voltage rating: 600 volts. **Temperature rating:** −65°C to +200°C. Silver plated copper, insulated with layers of TFE Teflon, interspersed with layers of Teflon impregnated fiberglass. Color is white with blue tracer. Teflon impregnated fiberglass braid overall.

MIL-W-7139B, CLASS II WIRE

Voltage rating: 600 volts. **Temperature rating:** −65°C to +260°C. Nickel coated copper, insulated with layers of TFE Teflon, interspersed with layers of Teflon impregnated fiberglass. Color is white with orange tracer. Teflon impregnated fiberglass braid overall.

- **All Teflon wire and cable listed here is resistant to acids, alkalis, oil, flame, moisture, solvents, fungus, aircraft fuels, hydraulic fluid, skydral, ethylene glycol and alcohol.**



MIL-W-16878D, TYPE ET, TEFLON

DEARBORN P/N	TYPE & CONDUCTOR AWG SIZE & STRAND.		NOM. WALL THICKNESS	NOM. O.D.	STOCK P.U. (FT.)	STOCK COLORS
33207	ET-32	7/40	.006	.021	500 & 1000	0-9
33219	ET-32	19/44	.006	.023	500 & 1000	0-9
33007	ET-30	7/38	.006	.024	500 & 1000	0-9
33019	ET-30	19/42	.006	.024	500 & 1000	0-9
32807	ET-28	7/36	.006	.027	500 & 1000	0-9
32819	ET-28	19/40	.006	.027	500 & 1000	0-9
32607	ET-26	7/34	.006	.031	500 & 1000	0-9
32619	ET-26	19/38	.006	.031	500 & 1000	0-9
32407	ET-24	7/32	.006	.036	500 & 1000	0-9
32419	ET-24	19/36	.006	.036	500 & 1000	0-9
32207	ET-22	7/30	.006	.042	500 & 1000	0-9
32219	ET-22	19/34	.006	.042	500 & 1000	0-9
32007	ET-20	7/28	.006	.050	500 & 1000	0-9
32019	ET-20	19/32	.006	.050	500 & 1000	0-9

MIL-W-7139B, CLASS I WIRE

DEARBORN P/N	CONDUCTOR AWG SIZE & STRANDING		NOMINAL O.D. FINISHED WIRE	STOCK PUT UP (FT.)
82219N	22	19/34	.087	500 & 1000
82019N	20	19/32	.097	500 & 1000
81819N	18	19/30	.112	500 & 1000
81619N	16	19/29	.132	500 & 1000
81419N	14	19/27	.147	500 & 1000
81219N	12	19/25	.167	500 & 1000
81037N	10	37/26	.197	500 & 1000
88133N	8	133/29	.250	500 & 1000
86133N	6	133/27	.293	500 & 1000
84133N	4	133/25	.350	500 & 1000
82665N	2	665/30	.435	500 & 1000
81817N	1	817/30	.480	500 & 1000
80001N	0	1045/30	.540	500 & 1000
80002N	00	1330/30	.590	500 & 1000
80003N	000	1665/30	.654	500 & 1000
80004N	0000	2109/30	.743	500 & 1000

MIL-W-7139B, CLASS II WIRE

DEARBORN P/N	CONDUCTOR AWG SIZE & STRANDING		NOMINAL O.D. FINISHED WIRE	STOCK PUT UP (FT.)
82219	22	19/34	.087	500 & 1000
82019	20	19/32	.097	500 & 1000
81819	18	19/30	.112	500 & 1000
81619	16	19/29	.132	500 & 1000
81419	14	19/27	.147	500 & 1000
81219	12	19/25	.167	500 & 1000
81037	10	37/26	.197	500 & 1000
88133	8	133/29	.250	500 & 1000
86133	6	133/27	.293	500 & 1000
84133	4	133/25	.350	500 & 1000
82665	2	665/30	.435	500 & 1000
81817	1	817/30	.480	500 & 1000
80001	0	1045/30	.540	500 & 1000
80002	00	1330/30	.590	500 & 1000
80003	000	1665/30	.654	500 & 1000
80004	0000	2109/30	.743	500 & 1000

COLOR CODE ON HOOKUP WIRE: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White
OTHER COLORS AND STRIPE COMBINATIONS AVAILABLE UPON REQUEST

*DuPont TM

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN
MIL-W-16878D TEFLON* HOOKUP WIRE

TYPE E, 600 VOLT

DEARBORN NO.	TYPE & CONDUCTOR AWG SIZE & STRAND'G		NOM. WALL THICKNESS	NOM. O.D.	STOCK COLORS 100′	STOCK COLORS 1000′
13207	E-32	7/40	.010	.029	0-9	0-9
13007	E-30	7/38	.010	.032	0-9	0-9
12807	E-28	7/36	.010	.036	0-9	0-9
12619	E-26	19/38	.010	.040	0-9	0-9 & 90-98
12607	E-26	7/34	.010	.039	0-9	0-9 & 90-98
12419	E-24	19/36	.010	.045	0-9	0-9 & 90-98
12407	E-24	7/32	.010	.044	0-9	0-9 & 90-98
12219	E-22	19/34	.010	.052	0-9	0-9 & 90-98
12207	E-22	7/30	.010	.050	0-9	0-9 & 90-98
12019	E-20	19/32	.010	.060	0-9	0-9 & 90-98
12007	E-20	7/28	.010	.058	0-9	0-9 & 90-98
11819	E-18	19/30	.010	.070	0-9	0-9 & 90-98
11807	E-18	7/26	.010	.068	0-9	0-9 & 90-98
11619	E-16	19/29	.011	.077	0-9	0-9 & 90-98
11419	E-14	19/27	.011	.094	0-9	0-9 & 90-98
11219	1-12	19/25	.012	.113	0-9	0-9 & 90-98
11037	E-10	37/26	.012	.135	0-9	0-9 & 90-98
	**SOLID CONDUCTOR					
13201	E-32	1/32	.010	.029	0-9	0-9
13001	E-30	1/30	.010	.032	0-9	0-9
12801	E-28	1/28	.010	.035	0-9	0-9
12601	E-26	1/26	.010	.039	0-9	0-9 & 90-98
12401	E-24	1/24	.010	.044	0-9	0-9 & 90-98
12201	E-22	1/22	.010	.050	0-9	0-9 & 90-98
12001	E-20	1/20	.010	.058	0-9	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

**Not MIL Spec.

TYPE E, 600 VOLT

Single conductor, stranded or solid silver plated copper, extruded TFE Teflon insulaiton. **Voltage rating:** 600 volts. **Temperature rating:** −65°C to +200°C.

TYPE EE, 1000 VOLT

Same as Type E, except for insulation thickness and voltage rating of 1000 volts.

TYPE E, SPIRAL WRAPPED FUSED TEFLON

Same as Type E—600 volt but with spiral wrapped fused Teflon insulation.

TYPE EE, SPIRAL WRAPPED FUSED TEFLON

Same as Type EE, but with spiral wrapped fused Teflon insulation.

TYPE E, SPIRAL WRAPPED FUSED TEFLON

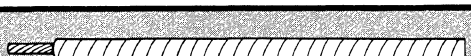
DEARBORN NO.	TYPE & CONDUCTOR AWG SIZE & STRAND'G		NOM. WALL THICKNESS	NOM. O.D.	STOCK COLORS 100′	STOCK COLORS 1000′
13207W	E-32	7/40	.010	.029	0-9	0-9
13007W	E-30	7/38	.010	.032	0-9	0-9
12807W	E-28	7/36	.010	.035	0-9	0-9
12619W	E-26	19/38	.010	.040	0-9	0-9 & 90-98
12607W	E-26	7/34	.010	.039	0-9	0-9 & 90-98
12419W	E-24	19/36	.010	.045	0-9	0-9 & 90-98
12407W	E-24	7/32	.010	.044	0-9	0-9 & 90-98
12219W	E-22	19/34	.010	.052	0-9	0-9 & 90-98
12207W	E-22	7/30	.010	.050	0-9	0-9 & 90-98
12019W	E-20	19/32	.010	.060	0-9	0-9 & 90-98
12007W	E-20	7/28	.010	.058	0-9	0-9 & 90-98
11819W	E-18	19/30	.010	.070	0-9	0-9 & 90-98
11807W	E-18	7/26	.010	.068	0-9	0-9 & 90-98
11619W	E-16	19/29	.011	.077	0-9	0-9 & 90-98
11419W	E-14	19/27	.011	.094	0-9	0-9 & 90-98
11219W	E-12	19/25	.012	.113	0-9	0-9 & 90-98
11037W	E-10	37/26	.012	.135	0-9	0-9 & 90-98

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

TYPE EE, 1000 VOLT

DEARBORN NO.	TYPE & CONDUCTOR AWG SIZE & STRAND'G		NOM. WALL THICKNESS	NOM. O.D.	STOCK COLORS 100′	STOCK COLORS 1000′
23207	EE-32	7/40	.015	.039	0-9	0-9
23007	EE-30	7/38	.015	.042	0-9	0-9
22807	EE-28	7/36	.015	.045	0-9	0-9
22607	EE-26	7/34	.015	.049	0-9	0-9 & 90-98
22619	EE-26	19/38	.015	.050	0-9	0-9 & 90-98
22407	EE-24	7/32	.015	.054	0-9	0-9 & 90-98
22419	EE-24	19/36	.015	.055	0-9	0-9 & 90-98
22207	EE-22	7/30	.015	.060	0-9	0-9 & 90-98
22219	EE-22	19/34	.015	.062	0-9	0-9 & 90-98
22007	EE-20	7/28	.015	.068	0-9	0-9 & 90-98
22019	EE-20	19/32	.015	.070	0-9	0-9 & 90-98
21819	EE-18	19/30	.015	.079	0-9	0-9 & 90-98
21619	EE-16	19/29	.016	.089	0-9	0-9 & 90-98
21419	EE-14	19/27	.017	.105	0-9	0-9 & 90-98
21219	EE-12	19/25	.017	.124	0-9	0-9 & 90-98
21037	EE-10	37/26	.017	.145	0-9	0-9 & 90-98
28133	EE-8	133/29	.020	.207	0,2,9	0,2,9

STOCK PUT UP: 100 FT., 1000 FT., AND BULK



TYPE EE, SPIRAL WRAPPED FUSED TEFLON

DEARBORN NO.	TYPE & CONDUCTOR AWG SIZE & STRAND'G		NOM. WALL THICKNESS	NOM. O.D.	STOCK COLORS 100′	STOCK COLORS 1000′
23207W	EE-32	7/40	.015	.039	0-9	0-9
23007W	EE-30	7/38	.015	.042	0-9	0-9
22807W	EE-28	7/36	.015	.045	0-9	0-9
22607W	EE-26	7/34	.015	.049	0-9	0-9 & 90-98
22619W	EE-26	19/38	.015	.050	0-9	0-9 & 90-98
22407W	EE-24	7/32	.015	.054	0-9	0-9 & 90-98
22419W	EE-24	19/36	.015	.055	0-9	0-9 & 90-98
22207W	EE-22	7/30	.015	.060	0-9	0-9 & 90-98
22219W	EE-22	19/34	.015	.062	0-9	0-9 & 90-98
22007W	EE-20	7/28	.015	.068	0-9	0-9 & 90-98
22019W	EE-20	19/32	.015	.070	0-9	0-9 & 90-98
21819W	EE-18	19/30	.015	.088	0-9	0-9 & 90-98
21619W	EE-16	19/29	.016	.089	0-9	0-9 & 90-98
21419W	EE-14	19/27	.017	.105	0-9	0-9 & 90-98
21219W	EE-12	19/25	.017	.124	0-9	0-9 & 90-98
21037W	EE-10	37/26	.017	.145	0-9	0-9 & 90-98
28133W	EE-8	133/29	.020	.207	0,2,9	0,2,9

STOCK PUT UP: 100 FT., 1000 FT., AND BULK

COLOR CODE ON HOOKUP WIRE: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White
90—White/Black • 91—White/Brown • 92—White/Red • 93—White/Orange • 94—White/Yellow • 95—White/Green • 96—White/Blue • 97—White/Violet • 98—White/Gray
OTHER COLORS AND STRIPE COMBINATIONS AVAILABLE UPON REQUEST

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

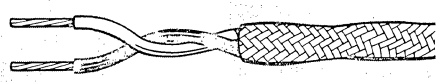
DEARBORN

MIL-W-16878D SHIELDED TEFLON* CABLES

- **NO OUTER COVERING OVER SHIELD**
- **TEFLON IMPREGNATED BRAID OVER SHIELD**
  Braided natural or white Teflon impregnated fiberglass braid overall.
- **FEP EXTRUDED JACKET OVER SHIELD**
  Tough abrasion resistant extruded white FEP Teflon jacket overall.
- **TEFLON TAPE WRAP JACKET OVER SHIELD**
  Sintered wrapped white Teflon tape jacketed overall.

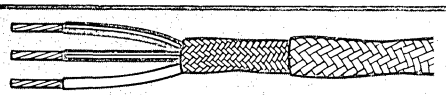
Each conductor stranded silver plated copper, Type E extruded TFE Teflon .010" color coded insulation. Braided silver plated copper shield, 90% coverage. **Voltage rating:** 600 volts. **Temperature rating:** −65°C to +200°C. Resistant to acids, alkalis, oil, flame, moisture, solvents and fungus.

*Dupont T.M.



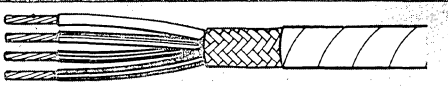
NO OUTER COVERING OVER SHIELD

DEARBORN NO.	NO. OF COND.	CONDUCTOR AWG SIZE	CONDUCTOR STRANDING	NOM O.D. AT MAX. WIDTH HIGH POINT	PUT UP (FT.)
42401	1	24	19/36	.069	100 & 1000
42402	2	24	19/36	.112	100 & 1000
42403	3	24	19/36	.120	100 & 1000
42404	4	24	19/36	.132	100 & 1000
42201	1	22	19/34	.075	100 & 1000
42202	2	22	19/34	.124	100 & 1000
42203	3	22	19/34	.132	100 & 1000
42204	4	22	19/34	.146	100 & 1000
42001	1	20	19/32	.083	100 & 1000
42002	2	20	19/32	.142	100 & 1000
42003	3	20	19/32	.153	100 & 1000
42004	4	20	19/32	.168	100 & 1000
41801	1	18	19/30	.093	100 & 1000
41802	2	18	19/30	.162	100 & 1000
41803	3	18	19/30	.172	100 & 1000
41804	4	18	19/30	.192	100 & 1000
41601	1	16	19/29	.103	100 & 1000
41602	2	16	19/29	.184	100 & 1000
41603	3	16	19/29	.200	100 & 1000
41604	4	16	19/29	.230	100 & 1000



TEFLON IMPREGNATED BRAID OVERALL

DEARBORN NO.	NO. OF COND.	CONDUCTOR AWG SIZE	CONDUCTOR STRANDING	NOM O.D. AT MAX. WIDTH HIGH POINT	PUT UP (FT.)
52401	1	24	19/36	.081	100 & 1000
52402	2	24	19/36	.126	100 & 1000
52403	3	24	19/36	.133	100 & 1000
52404	4	24	19/36	.144	100 & 1000
52201	1	22	19/34	.088	100 & 1000
52202	2	22	19/34	.137	100 & 1000
52203	3	22	19/34	.144	100 & 1000
52204	4	22	19/34	.158	100 & 1000
52001	1	20	19/32	.097	100 & 1000
52002	2	20	19/32	.154	100 & 1000
52003	3	20	19/32	.163	100 & 1000
52004	4	20	19/32	.180	100 & 1000
51801	1	18	19/30	.106	100 & 1000
51802	2	18	19/30	.174	100 & 1000
51803	3	18	19/30	.185	100 & 1000
51804	4	18	19/30	.205	100 & 1000
51601	1	16	19/29	.117	100 & 1000
51602	2	16	19/29	.196	100 & 1000
51603	3	16	19/29	.225	100 & 1000
51604	4	16	19/29	.255	100 & 1000



TEFLON TAPE WRAP OVERALL

DEARBORN NO.	NO. OF COND.	CONDUCTOR AWG SIZE	CONDUCTOR STRANDING	NOM O.D. AT MAX. WIDTH HIGH POINT	PUT UP (FT.)
62401	1	24	19/36	.095	100 & 1000
62402	2	24	19/36	.140	100 & 1000
62403	3	24	19/36	.147	100 & 1000
62404	4	24	19/36	.159	100 & 1000
62201	1	22	19/34	.102	100 & 1000
62202	2	22	19/34	.154	100 & 1000
62203	3	22	19/34	.162	100 & 1000
62204	4	22	19/34	.176	100 & 1000
62001	1	20	19/32	.110	100 & 1000
62002	2	20	19/32	.170	100 & 1000
62003	3	20	19/32	.175	100 & 1000
62004	4	20	19/32	.213	100 & 1000
61801	1	18	19/30	.120	100 & 1000
61802	2	18	19/30	.190	100 & 1000
61803	3	18	19/30	.219	100 & 1000
61804	4	18	19/30	.237	100 & 1000
61601	1	16	19/29	.130	100 & 1000
61602	2	16	19/29	.230	100 & 1000
61603	3	16	19/29	.240	100 & 1000
61604	4	16	19/29	.270	100 & 1000

EXTRUDED JACKET OVER SHIELD

DEARBORN NO.	NO. OF COND.	CONDUCTOR AWG SIZE	CONDUCTOR STRANDING	NOM O.D. AT MAX. WIDTH HIGH POINT	PUT UP (FT.)
72401	1	24	19/36	.085	100 & 1000
72402	2	24	19/36	.130	100 & 1000
72403	3	24	19/36	.135	100 & 1000
72201	1	22	19/34	.091	100 & 1000
72202	2	22	19/34	.150	100 & 1000
72203	3	22	19/34	.158	100 & 1000
72001	1	20	19/32	.100	100 & 1000
72002	2	20	19/32	.168	100 & 1000
72003	3	20	19/32	.178	100 & 1000
71801	1	18	19/30	.110	100 & 1000
71802	1	18	19/30	.188	100 & 1000
71803	3	18	19/30	.207	100 & 1000
71601	1	16	19/29	.123	100 & 1000
71602	2	16	19/29	.220	100 & 1000
71603	3	16	19/29	.235	100 & 1000

COLOR CODE OF CONDUCTORS: 1st Conductor—White • 2nd Conductor—Black • 3rd Conductor—Red • 4th Conductor—Green

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN
SPECIAL PURPOSE MILITARY CABLES

HEAVY DUTY VEHICLE CABLE MIL-C-13486B, TYPE 1, CLASS A SINGLE CONDUCTOR, SPECIAL PURPOSE

CONSTRUCTION

Stranded tinned copper conductor, rubber insulating core, inner glass braid, black neoprene jacket.

Ordnance part number, gauge and manufacturer's name stamped on outer jacket.

USAGE

For use on all types of military ground vehicles, such as tanks, trailers, trucks and jeeps.

CHARACTERISTICS

Excellent flexibility, even at low temperatures; resistance to abrasion, fluids and weather allows use in exposed situations. Fungus resistant.

MIL-C-13486B

TYPE 1, CLASS A

DEARBORN P/N	MILITARY P/N	FORMER ORDNANCE NO.	WIRE SIZE	STRAND-ING-	NOM. O.D.	STOCK PUT UPS (FT.)
551619	M-13486/1-3	7722204	16	19/29	.140″	100, 500, 1000
551419	M-13486/1-5	7720853	14	19/27	.160″	100, 500, 1000
551219	M-13486/1-7	7056678	12	19/25	.235″	100, 500, 1000
558133	M-13486/1-9	7056677	8	133/29	.360″	100, 500, 1000
556133	M-13486/1-10	7056676	6	133/27	.422″	100, 500, 1000
554133	M-13486/1-11	8690175	4	133/25	.490″	100, 500, 1000
552670	M-13486/1-12	7056675	2	670/30	.610″	100, 500, 1000
550001	M-13486/1-14	7056674	0	1045/30	.670″	100, 500, 1000

MIL-C-3432C CABLE AND WIRE ELECTRICAL, POWER AND CONTROL, FLEXIBLE 600 VOLTS

CONSTRUCTION

T.C. stranded conductors, rubber insulated, cabled with filler, cotton served, black rubber jacket.

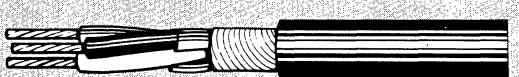
USAGE

The cables covered by this specification are intended for use by the armed services in extensive electrical and electronic applications. These cables can be used to transmit power, sync pulses, data transmission voltages, video, audio or control.

CHARACTERISTICS

The MGF series is intended for medium duty per specification and the tough flexible jacket amply serves the intended usage under these specifications.

MIL-C-3432C



TYPE MGF. 600 VOLTS

DEARBORN NO.	MILITARY DESIGNATION	NO. OF COND.	AWG SIZE & STRANDING	NOM. O.D.	STOCK PUT UPS (FT.)
5142	CO-02 MGF (2/14) 0400	2	**14** (41)	.400	500, 1000
5162	CO-02 MGF (2/16) 0335	2	**16** (65)	.335	500, 1000
5163	CO-03 MGF (3/16) 0365	3	**16** (65)	.365	500, 1000
5182	CO-02 MGF (2/18) 0310	2	**18** (41)	.310	500, 1000
5183	CO-03 MGF (3/18) 0340	3	**18** (41)	.340	500, 1000
5205	CO-05 MGF (5/20) 0480	5	**20** (26)	.480	500, 1000

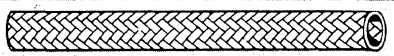
COLOR CODING: 1—White • 2—Black • 3—Red • 4—Green • 5—Orange

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

TUBULAR BRAID Tinned copper braid woven in completely round configuration as outlined in MIL-SPEC QQ-B-575. All strands soft drawn tinned copper. Shielding is 95% or more when placed over equivalent diameter mandrel to the inside diameter of the tubular braid.

Used as both shielding and protective covering. While the larger sizes shown in second table below are not listed in the spec, they are manufactured to the same standards.

FLAT BRAID Tinned copper strands, woven and rolled flat to specific width depending on construction, number of strands, etc.
Used for bonding, straps, grounding, or connecting moving parts. Recommended for high current usage.



TINNED COPPER TUBULAR BRAID

DEARBORN P/N	SIZE I.D. INCHES	TOTAL NO. INDIVIDUAL STRANDS	SIZE EACH STRAND AWG	NOM. CIRCULAR MIL AREA	STOCK PUT UPS (FT.)
92160	1/32	24	36	600	100
92162	1/16	48	36	1200	100
92164	7/64	96	36	2400	100
92166	1/8	120	36	3000	100
92168	11/64	168	36	4200	100
92170	13/64	192	34	7630	100
92171	1/4	384	36	9600	100
92172	3/8	384	36	9600	100
92174	1/2	528	36	13,200	100
92175	9/16	480	30	48,240	100
92176	25/32	864	36	21,600	100
92177	7/8	336	30	33,700	50 & 100
92178	1	384	30	38,600	50 & 100
92179	1-1/8	432	30	43,330	50 & 100
92180	1-1/4	480	30	48,150	50 & 100
92181	1-3/8	528	30	53,000	50 & 100
92182	1-1/2	576	30	57,775	50 & 100

TUBULAR SILVER OR GOLD WIRE BRAID

This tubular braid is supplied with either silver or gold wire. The wire is braided over a mandrel of monofilament and is .0030" ±.0005" diameter. The braid I.D. is .060" when supplied on the mandrel.

MATERIAL: Silver wire strands are 95% minimum purity. Gold is of extreme high quality and purity.

CONSTRUCTION: Number of carriers: 16. Number of ends/carrier: 2. Number of picks/inch: 42 ±2.

DEARBORN NO.	MATERIAL	PUT UP SOLD PER FT.
92000-S	Silver	25' Min.
92000-G	Gold	25' Min.

PRICES ON APPLICATION

*FLAT TINNED COPPER BRAID

DEARBORN NO.	NOM. FLAT WIDTH (INCHES)	TOT. NO. INDIV. STRANDS	SIZE EACH STRAND AWG	NOM. CIRCULAR MIL AREA	STOCK (PUT UPS (FT.)
91221	.025	8	36	200	100, 500 & 1000
91222	1/32	16	36	400	100, 500 & 1000
91223	3/64	24	36	600	100, 500 & 1000
91224	3/32	48	36	1200	100, 500 & 1000
91229	1/8	72	36	1800	100, 500 & 1000
91230	3/16	120	36	3000	100, 500 & 1000
91231	1/4	168	36	4200	100, 500 & 1000
91232	3/8	288	36	7200	100, 500 & 1000
91233	1/2	384	36	9600	100, 500 & 1000
91234	3/4	832	36	20,800	100, 500 & 1000
91235	1	832	36	20,800	100, 500 & 1000
91239	1-3/8	336	30	33,700	100, 500 & 1000
91240	1-1/2	528	30	53,064	100, 500 & 1000
91241	1-3/4	1248	30	125,424	100, 500 & 1000
91242	2	1536	30	154,368	100, 500 & 1000

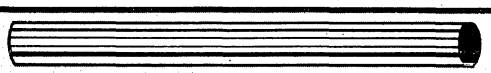
*Commercial Type.

DEARBORN

MIL-W-3861 TYPE S, QQ-W-343 TYPE S, ASTM B-33 UNINSULATED TINNED OR SILVER PLATED COPPER WIRE

SOFT DRAWN SOLID WIRE

Properly annealed, pure electrolytic soft, drawn, solid; tinned or silver plated copper wire used for applications such as point to point wiring, component leads, and ground wire.



UNINSULATED TINNED COPPER WIRE

DEARBORN NO.	CONDUCTOR SIZS	NOM. CIRCULAR MIL AREA	NOM. O.D.	STOCK PUT UPS (FT.)
938	38	16.0	.004	100 & 1000
936	36	25.0	.005	100 & 1000
934	34	39.7	.006	100 & 1000
932	32	64.0	.008	100 & 1000
930	30	100.5	.010	100 & 1000
928	28	159.8	.013	100 & 1000
926	26	254.1	.016	100 & 1000
924	24	404.0	.020	100 & 1000
922	22	642.4	.025	100 & 1000
920	20	1,022.0	.033	100 & 1000
918	18	1,642.0	.040	100 & 1000
916	16	2,583.0	.051	100 & 1000
914	14	4,107.0	.065	100 & 1000
912	12	6,530.0	.082	100 & 1000
910	10	10,380.0	.103	100 & 1000
908	8	16,510.0	.129	100 & 1000
906	6	26,250.0	.162	100 & 1000
UNINSULATED SILVER PLATED WIRE				
922SPC	22	642.4	.025	100 & 1000
920SPC	20	1,022.0	.033	100 & 1000
918SPC	18	1,642.0	.040	100 & 1000
916SPC	16	2,583.0	.051	100 & 1000
914SPC	14	4,107.0	.065	100 & 1000

Suffix SPC denotes Silver Plated Copper

SOFT DRAWN STRANDED WIRE

Properly annealed; pure electrolytic soft, drawn, concentric lay; stranded, tinned copper wire for many applications such as point to point wiring, flexible leads for components, and ground wire.

UNINSULATED STRANDED TINNED COPPER WIRE

DEARBORN NO.	SIZE STRANDING	NOM. CIRCULAR MIL AREA	NOM. O.D.	STOCK PUT UPS (FT.)
830	30 (7/38)	112.0	.012	1000
828	28 (7/36)	141.75	.016	1000
827	27 (7/35)	219.52	.018	1000
826	26 (7/34)	277.83	.019	1000
824	24 (7/32)	448.00	.024	1000
822	22 (7/30)	700.00	.030	1000
820	20 (10/30)	1000.00	.035	1000
818	18 (16/30)	1600.00	.047	1000
816	16 (26/30)	2600.00	.059	1000

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

MULTI-CONDUCTOR CONTROL CABLE-UNSHIELDED NEOPRENE OR PLASTIC

PLASTIC JACKETED 15/5 CONTROL CABLES, 600 VOLT, VN20, 90°C

Stranded bare copper conductors, insulated with .015 PVC color coded insulation and .005 Nylon jacket over each conductor; cabled with fillers. Moisture resistant tape, and a black Polyvinylchloride jacket overall. Used for controlling temperature, voltage, pressure and relay circuits and many other electronic and electrical circuits. **All conductors color coded to IPECA Standards (see bottom, this page).**

* .020″ on sizes 4 and 12; .015″ on size 16.

UNSHIELDED CONTROL CABLE (PLASTIC)

DEARBORN NO.	NO. CONDUCTOR	AWG SIZE	JKT. THICKNESS	NOM. O.D.
701602	2	16	.045	.295
701603	3	16	.045	.310
701604	4	16	.045	.335
701605	5	16	.045	.360
701606	6	16	.045	.395
701607	7	16	.045	.395
701608	8	16	.045	.420
701609	9	16	.045	.455
701610	10	16	.045	.490
701611	11	16	.045	.505
701612	12	16	.045	.505
701614	14	16	.060	.560
701616	16	16	.060	.595
701620	20	16	.060	.650
701402	2	14	.045	.325
701403	3	14	.045	.345
701404	4	14	.045	.375
701405	5	14	.045	.405
701406	6	14	.045	.440
701407	7	14	.045	.440
701408	8	14	.045	.475
701409	9	14	.045	.510
701410	10	14	.060	.585
701411	11	14	.060	.605
701412	12	14	.060	.605
701414	14	14	.060	.630
701416	16	14	.060	.665
701420	20	14	.060	.735
701202	2	12	.045	.365
701203	3	12	.045	.385
701204	4	12	.045	.420
701205	5	12	.045	.460
701206	6	12	.060	.500
701207	7	12	.060	.500
701208	8	12	.060	.570
701209	9	12	.060	.615
701210	10	12	.060	.665
701211	11	12	.060	.685
701212	12	12	.060	.685
701214	14	12	.060	.720
701216	16	12	.080	.760
701220	20	12	.080	.880

25 Ft. MINIMUM ORDER — CUT TO LENGTH — NO RETURNS

RUBBER INSULATED CONDUCTORS, NEOPRENE JACKETED

Stranded bare copper conductors, with color coded rubber insulation; cabled with fillers; cotton wrapped; tough Neoprene jacket overall. Used for remote control circuits. Flexible stranding and heavy duty Neoprene jacket combined, make this cable suitable for outdoor usage under extreme conditions. Neoprene jacket resists sunlight, oil, moisture, ozone, abrasion and impact.

UNSHIELDED CONTROL CABLES (NEOPRENE)

DEARBORN NO.	NO. COND.	SIZE AWG	INSULATION THICKNESS	JACKET THICKNESS	NOMINAL O.D.
711805	5	18	1/32	5/64	.490
711806	6	18	1/32	5/64	.525
711808	8	18	1/32	5/64	.570
711809	9	18	1/32	5/64	.620
711810	10	18	1/32	5/64	.630
711814	14	18	1/32	6/64	.710
711605	5	16	1/32	5/64	.530
711606	6	16	1/32	5/64	.570
711607	7	16	1/32	5/64	.570
711608	8	16	1/32	5/64	.605
711610	10	16	1/32	6/64	.740
711612	12	16	1/32	6/64	.760
711614	14	16	1/32	6/64	.785
711616	16	16	1/32	6/64	.820
711620	20	16	1/32	6/64	.920
711622	22	16	1/32	6/64	.930
711624	24	16	1/32	7/64	1.010
711626	26	16	1/32	7/64	1.030
711630	30	16	1/32	7/64	1.050
711637	37	16	1/32	7/64	1.140
711640	40	16	1/32	7/64	1.175
711650	50	16	1/32	7/64	1.520
711660	60	16	1/32	7/64	1.610
711405	5	14	3/64	6/64	.695
711406	6	14	3/64	6/64	.750
711407	7	14	3/64	6/64	.760
711408	8	14	3/64	6/64	.820
711409	9	14	3/64	6/64	.925
711410	10	14	3/64	6/64	.930
711412	12	14	3/64	6/64	.935
711205	5	12	3/64	6/64	.750
711206	6	12	3/64	6/64	.810
711207	7	12	3/64	6/64	.870
711208	8	12	3/64	6/64	.920
711209	9	12	3/64	7/64	1.000
711210	10	12	3/64	7/64	1.000
711212	12	12	3/64	7/64	1.050
711216	16	12	3/64	7/64	1.160
711005	5	10	3/64	6/64	.830
711006	6	10	3/64	6/64	.890
711008	8	10	3/64	7/64	1.060
711010	10	10	3/64	7/64	1.160

25 FT. MINIMUM ORDER — CUT TO LENGTH — NO RETURNS

NEC COLOR CODE FOR CONTROL CABLES: 1—Black • 2—White • 3—Red • 4—Green • 5—Orange • 6—Blue • 7—Yellow • 8—Brown • 9—Slate • 10—Purple • 11—Black/White • 12—Red/White • 13—Orange/White • 14—Blue/White • 15—Yellow/White • 16—Brown/White • 17—Slate/White • 18—Purple/White • 19—Red/Black • 20—Orange/Black • 21—Blue/Black • 22—Yellow/Black • 23—Brown/Black • 24—Slate/Black • 25—Purple/Black • 26—Black/Red • 27—Blue/Red • 28—Yellow/Red • 29—Brown/Red • 30—Slate/Red • 31—Purple/Red • 32—Black/Orange • 33—Blue/Orange • 34—Yellow/Orange • 35—Brown/Orange • 36—Slate/Orange • 37—Purple/Orange • 38—Black/Blue • 39—Red/Blue • 40—Orange/Blue

IPECA COLOR CODING: 1—Black • 2—White • 3—Red • 4—Green • 5—Orange • 6—Blue • 7—White/Black • 8—Red/Black • 9—Green/Black • 10—Orange/Black • 11—Blue/Black • 12—Black/White • 13—Red/White • 14—Green/White • 15—Blue/White • 16—Black/Red • 17—White/Red • 18—Orange/Red • 19—Blue/Red • 20—Red/Green

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN
THERMOPLASTIC INSULATED HOOKUP WIRE

U.L. AND C.S.A. APPROVED

STYLE 1007, U.L. HOOK-UP WIRE

Voltage rating: 300 Volts. **Temperature rating:** −10°C to +80°C. 1/64" Polyvinylchloride insulation over stranded tinned copper.

STYLES 1015, 1028 U.L. HOOK-UP WIRE

Voltage rating: 600 Volts. **Temperature rating:** −10°C to +105°C. 1/32" Polyvinylchloride insulation over stranded tinned copper on Style 1015; 3/64" on Style 1028.

STYLE 1061, U.L. SEMI-RIGID BUSINESS MACHINE WIRE

Voltage rating: 300 Volts. **Temperature rating:** −10°C to +80°C. .009" Polyvinylchloride insulation over solid or stranded tinned copper.

300 VOLT, 80°C, STYLE 1007

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
402407	24	7/32	1/64	.057	1000 & 5000	0-9
402207	22	7/30	1/64	.065	1000 & 5000	0-9
402010	20	10/30	1/64	.071	1000 & 5000	0-9
401816	18	16/30	1/64	.080	1000 & 5000	0-9
401626	16	26/30	1/64	.095	1000 & 5000	0-9

600 VOLT, 105°C, STYLES 1015, 1028

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
412207	22	7/30	1/32	.095	500, 1000 & 5000	0-9
412207F	22	7/30	1/32	.095	500, 1000 & 5000	0-9
412010	20	10/30	1/32	.100	500, 1000 & 5000	0-9
412010F	20	10/30	1/32	.100	500, 1000 & 5000	0-9
411816	18	16/30	1/32	.110	500, 1000 & 5000	0-9
411816F	18	16/30	1/32	.110	500, 1000 & 5000	0-9
411626	16	26/30	1/32	.124	500, 1000 & 5000	0-9
411441	14	41/30	1/32	.141	500, 1000 & 5000	0-9
411265	12	65/30	1/32	.160	500, 1000 & 5000	0-9
411000	10	105/30	1/32	.194	500, 1000 & 5000	0-9
418133	8	133/29	3/64	.255	500, 1000 & 5000	0-9

(F) After part number indicates fused or prebonded T.C.

U.L. SEMIRIGID, STYLE 1061

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
422601	26	1/26	.009	.036	500, 1000 & 5000	0-9
422401	24	1/24	.009	.041	500, 1000 & 5000	0-9
422201	22	1/22	.009	.046	500, 1000 & 5000	0-9
422001	20	1/20	.009	.052	500, 1000 & 5000	0-9
421801	18	1/18	.009	.060	500, 1000 & 5000	0-9
422607	26	7/34	.009	.037	500, 1000 & 5000	0-9
422407	24	7/32	.009	.042	500, 1000 & 5000	0-9
422207	22	7/30	.009	.049	500, 1000 & 5000	0-9
422007	20	7/28	.009	.057	500, 1000 & 5000	0-9
422010	20	10/30	.009	.057	500, 1000 & 5000	0-9
421807	18	7/26	.009	.067	500, 1000 & 5000	0-9
421816	18	16/30	.009	.067	500, 1000 & 5000	0-9
421626	16	26/30	.009	.076	500, 1000 & 5000	0-9

FLAME RETARDANT, FR-1 STYLE 1015, 600 V., 105°C AND FR-1 STYLE 1007, 300 V., 80°C

The polyvinyl chloride insulation used on this series of hook-up wire listed below, has incorporated in it the necessary additives that enable the wire to pass the Vertical Flame Test as prescribed by the Underwriters' Laboratories for this U.L. style.

All this wire is imprinted with the symbol FR-1 to indicate that it is covered by the above specifications.

See eem page 3027 for high voltage Flame Retardant wire.

X-L POLYETHYLENE, U.L. STYLES 3173, 3199, 125°C — 600 VOLT, 105°C — 300 VOLT

The Polyethylene insulation used on this series of lead wire is chemically cross-linked, which increases the moisture resistance, solvent resistance and aging characteristics.

When momentary high temperatures caused by overloads or shorts occur, the insulation does not deform as quickly as if not cross-linked.

Typical applications include small motors, control panels, dry transformers, etc.

Recommended maximum baking cycles: 300°F for 24 hrs. — 325°F for 12 hrs. — 350° F for 8 hrs.

FR-1 105°C — 600 VOLT, 1/32", STYLE 1015

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
782207	22	7/30	1/32	.095	500 & 1000	0-9
782207F	22	7/30	1/32	.095	500 & 1000	0-9
782010	20	10/30	1/32	.100	500 & 1000	0-9
782010F	20	10/30	1/32	.100	500 & 1000	0-9
781816	18	16/30	1/32	.110	500 & 1000	0-9
781816F	18	16/30	1/32	.110	500 & 1000	0-9
781626	16	26/30	1/32	.124	500 & 1000	0-9
781441	14	41/30	1/32	.141	500 & 1000	0-9

(F) After part number indicates fused or prebonded T.C.

FR-1 80°C — 300 VOLT, 1/64", STYLE 1007

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
792407	24	7/32	1/64	.057	1000 & 5000	0-9
792207	22	7/30	1/64	.065	1000 & 5000	0-9
792010	20	10/30	1/64	.071	1000 & 5000	0-9
791816	18	16/30	1/64	.080	1000 & 5000	0-9
791626	16	26/30	1/64	.095	1000 & 5000	0-9

XL — POLYETHYLENE INSULATED, 1/32", 125°C — 600 VOLT, HOOK-UP WIRE

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
752207	22	7/30	1/32	.094	1000 & 5000	0 only
752010	20	10/30	1/32	.102	1000 & 5000	0 only
751816	18	16/30	1/32	.112	1000 & 5000	0 only
751626	16	26/30	1/32	.125	1000 & 5000	0 only
751441	14	41/30	1/32	.143	1000 & 5000	0 only
751265	12	65/30	1/32	.164	1000 & 3000	0 only
751065	10	65/28	1/32	.187	1000 & 2000	0 only

XL — POLYETHYLENE INSULATED, 1/64", 105°C — 300 VOLT, HOOK-UP WIRE

DEARBORN NO.	SIZE AWG	STRAND-ING	NOM. WALL	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
762207	22	7/30	1/64	.066	1000 & 5000	0, 2, 4, 5, 9
762010	20	10/30	1/64	.072	1000 & 5000	0, 2, 4, 5, 9
761816	18	16/30	1/64	.082	1000 & 5000	0, 2, 4, 5, 9
761626	16	26/30	1/64	.109	1000 & 5000	0, 2, 4, 5, 9

COLOR CODE ON HOOKUP WIRE: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

MACHINE TOOL WIRE MTW-THWN-THHN

U.L. APPROVED

THWN — THHN

Gas and oil resistant 75°C MTW — 105°C AWM

CONSTRUCTION

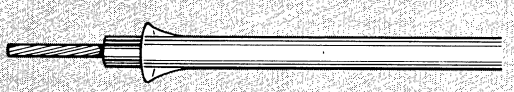
Bare soft copper, stranded or solid.
Insulated with polyvinylchloride compounds U.L. listed for temperatures not exceeding 105°C.
Jacketed with nylon armor as follows:
.004″ Thick Sizes 18-10
.005″ Thick Sizes 8-6 .007″ Thick Sizes 1-0000
.006″ Thick Sizes 4-2 .008″ Thick Sizes 250-500 MCM
The clear nylon is applied over all surface printing. Specifically designed for use in wet locations and is resistant to oils, gasoline, water, acids, alkalies, ozone, sunlight and abrasion.

USE

An all around general purpose building wire, for fixture raceways, conduit and tubing raceways, internal wiring of fixtures, and applications requiring building wire, machine tool wire or appliance wiring.

U.L. LISTING COVERS

1. 90°C THHN Dry
2. 90°C MTW (Machine Tool)
3. AWM 105°C Dry — 80°C in Oil (Appliance Wire)
4. 75°C THWN
5. Gasoline and oil resistant to 75°C.



THWN-THHN — NYLON ARMORED

DEARBORN NO.	SIZE AWG	STRANDING	PVC INSUL. THICK.	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
541401	14	(1)	.015″	.110″	500	0-6, 9
541201	12	(1)	.015″	.127″	500	0-6, 9
541001	10	(1)	.015″	.158″	500	0-6, 9
541816	18	16/30	.015″	.094″	500	0-6, 9
541626	16	26/30	.015″	.107″	500	0-6, 9
541419	14	19/27	.015″	.120″	500	0-6, 9
541219	12	19/25	.015″	.139″	500	0-6, 9
541019	10	19/.0234	.020″	.173″	500	0-6, 9
540807	8	7/.0486	.030″	.210″	500	0, 9
540607	6	7/.0612	.030″	.250″	500	0 only
540407	4	7/.0772	.040″	.320″	500	0 only
540207	2	7/.0974	.040″	.380″	500	0 only
540119	1	19/.0664	.050″	.440″	500	0 only
540001	0	19/.0745	.050″	.480″	500 & 1000	0 only
540002	00	19/.0837	.050″	.527″	500 & 1000	0 only
540003	000	19/.0940	.050″	.578″	500 & 1000	0 only
540004	0000	19/.1055	.050″	.636″	500 & 1000	0 only
540250	250 mcm	37/.0822	.060″	.705″	500 & 1000	0 only
540300	300 mcm	37/.0900	.060″	.760″	500 & 1000	0 only
540350	350 mcm	37/.0973	.060″	.810″	500 & 1000	0 only
540400	400 mcm	37/.1040	.060″	.860″	500 & 1000	0 only
540500	500 mcm	37/.1162	.060″	.945″	500 & 1000	0 only

MACHINE TOOL WIRE / MTW TYPE

U.L. approved for use in industrial machine tools where wiring is exposed to oil, coolants, or other liquids. Meets MTW type, NEC and NPFA (79) for metal working machine tool use.

VOLTAGE RATING: 600 V. RMS.
INSULATION: PVC OVER BARE STRANDED COPPER

UL STYLE	THICKNESS	TEMPERATURE RATING	
		DRY	OIL
1335	2/64″	90°C	60°C
1336	3/64″	90°C	60°C
1337	4/64″	90°C	60°C
1338	5/65″	90°C	60°C
1400	3/64″	90°C	75°C
1401	4/64″	90°C	75°C

MTW-MACHINE TOOL WIRE—2/64″ INSULATION

DEARBORN NO.	SIZE AWG	STRANDING	U.L. STYLE	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
461816	18	16/30	1335	.110	500 & 1000	0-9
461626	16	26/30	1335	.125	500 & 1000	0-9
461419	14	19/27	1335	.138	500	0-9
461219	12	19/25	1335	.157	500	0-9
461019	10	19/.0234	1335	.182	500	0-9

MTW-MACHINE TOOL WIRE—3/64″ INSULATION

DEARBORN NO.	SIZE AWG	STRANDING	U.L. STYLE	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
521419	14	19/27	1400	.170	500	0-9
521219	12	19/25	1400	.189	500	0-9
521019	10	19/.0234	1400	.214	500	0-6, 9
520819	8	19/.0295	1336	.245	500	0, 2, 9

MTW-MACHINE TOOL WIRE—4/64″ INSULATION

DEARBORN NO.	SIZE AWG	STRANDING	U.L. STYLE	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
530819	8	19/.0295	1401	.277	500	0, 2, 9
530619	6	19/.0372	1337	.315	500	0 only
530419	4	19/.0469	1337	.364	500	0 only
530219	2	19/.0591	1337	.425	500	0 only

MTW-MACHINE TOOL WIRE—5/64″ INSULATION

DEARBORN NO.	SIZE AWG	STRANDING	U.L. STYLE	NOM. O.D.	STANDARD PUT UP (FT.)	STOCK COLORS
530119	1	19/.0664	1338	.492	500	0 only
530001	1/0	19/.0745	1338	.532	500	0 only
530002	2/0	19/.0837	1338	.579	500	0 only
530003	3/0	19/.0940	1338	.632	500	0 only
530004	4/0	19/.1055	1338	.688	500	0 only

COLOR CODE: 0—Black • 2—Brown • 3—Orange • 4—Yellow • 5—Green • 6—Blue • 7—Violet • 8—Grey • 9—White

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

TYPE TGS-250°C.-600 VOLT HIGH TEMPERATURE APPLIANCE WIRE- U.L.

CONSTRUCTION

Nickel conductor, stranded or solid, Teflon tape wrap, Silicone impregnated glass braid. Natural color only.

TYPE TGS — 250°C — 600 VOLT

DEARBORN NO.	SIZE AND STRANDING	TAPE THICK.	BRAID THICK.	NOM. O.D.	STANDARD PUT UP (FT.)
911801	18(1)	.018	.005	.086	500 & 1000
911816	18(16)	.018	.005	.094	500 & 1000
911601	16(1)	.018	.005	.097	500 & 1000
911626	16(26)	.018	.005	.104	500 & 1000
911401	14(1)	.021	.005	.116	500 & 1000
911441	14(41)	.021	.005	.127	500 & 1000
911201	12(1)	.021	.005	.133	500 & 1000
911265	12(65)	.021	.005	.147	500 & 1000
911001	10(1)	.021	.0075	.159	500 & 1000
911000	10(105)	.021	.0075	.177	500 & 1000
910801	8(1)	.021	.0075	.185	500 & 1000
910800	8(133)	.021	.0075	.215	500 & 1000

600 Volt maximum operating potential, when supplied with the nickel conductor as shown; the maximum operating temperature is 250°C. Especially recommended for use in the wiring of ovens and other high temperature appliances.

U.L. STYLE 3239 FLAME RETARDANT HIGH VOLTAGE LEAD WIRE FOR ANODE CONNECTIONS, HIGH VOLTAGE CIRCUITS, FLY-BACK TRANSFORMERS ETC.

CONSTRUCTION

Tinned copper or pre-bonded fused tinned copper conductor all No. 22 (7/30) stranding. Insulation is Rulan and 105°C. PVC jacket. All insulation material meets U.L. vertical flame test. U.L. file numbers upon request.

FLAME RETARDANT HIGH VOLTAGE LEAD WIRE

DEARBORN NO.	D.C. VOLTAGE	RULAN INSUL. THICK.	PVC INSUL. THICK.	NOM. O.D.	PUT UP (FT.)	STOCK COLORS
980025	25KV	.025	.020	.120	1000 & 5000	Black & Red
980025F	25KV	.025	.020	.120	1000 & 5000	Black & Red
980030	30KV	.030	.020	.130	1000 & 5000	Black & Red
980030F	30KV	.030	.020	.130	1000 & 5000	Black & Red
980045F	40KV	.045	.020	.160	1000 & 5000	Black & Red
980045	40KV	.045	.020	.160	1000 & 5000	Black & Red

Suffix "F" Indicates Pre-Bonded or Fused Strands.

KYNAR INSULATED HOOKUP WIRE FOR WIRE WRAP APPLICATIONS

Especially suited for computer, business machine usage and other areas where space is limited. (For automatic point to point application)

U.L. Approved

The miniaturization of computers and business machines has created special porblems in the wiring of components and associated programming equipment. Essentially there is a need for wire with a tough insulation that is resistant to abrasion and cold flow. It should function at operating temperatures up to 125°C. The wire wrap type of termination requires a high conductivity low corrosive surface on the conductor. Dearborn Kynar insulated wire fulfills these needs.

SPECIFICATIONS

The conductor is OFHC (Oxygen Free High Conductivity) Annealed Copper, Silver Plated.

The insulation is Kynar*, a Vinylidene Fluoride Plastic with unique characteristics.

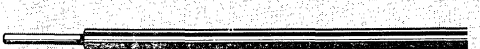
- All Kynar wire listed is supplied on 1000 ft. putups on LARGE Hub Diameter reels 8½" O.D. and 10⅝" Flange to eliminate curvature set in wire and to function properly in the automatic equipment used for application.

- Larger putups on the same reel can be supplied from Factory stock and **additional colors are available** from Factory on special order.

* Pennwalt Chemicals Corp. Trademark

KYNAR CHARACTERISTICS

- **Mechanically Tough**
- **Flame Retardant, Self Extinguishing**
- **Excellent Resistance to Ultraviolet Light and Weathering**
- **Operating Temperature Up to 125°C Continuous, Assigned U.L. Rating 105°C**
- **Exposure to 300 Million Roentgens Does Not Change Insulation Characteristics**
- **Vivid Colors for Easy Identification**



KYNAR HOOK-UP WIRE

DEARBORN NO.	AWG SIZE	INSUL. THICK.	NOM. O.D.	U.L. STYLE	STOCK COLORS AVAILABLE
773001	30(1)	.005"	.0195"	1422	0, 1, 2, 3, 4, 5, 6, 8, 9
772801	28(1)	.0035"	.020"	1423	0, 1, 2, 5, 6, 9
772601	26(1)	.005"	.027"	1422	2, 4, 5, 6, 8, 9
772401	24(1)	.010"	.042"	1327	2, 4, 5, 6, 9

ALL SUPPLIED ON SPECIALLY DESIGNED LARGE HUB REELS, 1,000' MINIMUM

CODE COLORING: 0—Black • 1—Brown • 2—Red • 3—Orange • 4—Yellow 5—Green • 6—Blue • 7—Violet • 8—Gray • 9—White

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

DATA AND AUDIO CABLE

INDIVIDUALLY SHIELDED MULTIPLE PAIRS

Tinned copper conductors, either stranded or solid (see tables), insulated with high density color coded *.010" Polyethylene, conductors twisted into pairs. Along with a †22 gauge stranded tinned copper drain wire, each pair is shielded with a Mylar supported aluminum foil shield. Covered with a Grey PVC jacket overall. Used for all circuits requiring isolation between pairs. Especially suitable for multiple audio and data control circuits. Mylar Wrap between shields and jacket.

* .016 on #18 gauge † #20 on #18 guage

INDIVIDUALLY SHIELDED PAIRS

SOLID CONDUCTORS

DEARBORN NO.	NO. OF PAIRS	NO. COND.	SIZE & STRANDING	NOM. JKT. THICK.	NOM. O.D.	STOCK PUT UP (FT.)
952203	3	6	22-Solid	.025	.235	100, 500 & 1000
952206	6	12	22-Solid	.030	.318	100, 500 & 1000
952209	9	18	22-Solid	.030	.371	100, 500 & 1000
952211	11	22	22-Solid	.035	.414	100, 500 & 1000
952215	15	30	22-Solid	.040	.485	100, 500 & 1000

STRANDED CONDUCTORS

DEARBORN NO.	NO. OF PAIRS	NO. COND.	SIZE & STRANDING	NOM. JKT. THICK.	NOM. O.D.	STOCK PUT UP (FT.)
962203	3	6	22-7/30	.025	.252	100, 500 & 1000
962206	6	12	22-7/30	.030	.342	100, 500 & 1000
962209	9	18	22-7/30	.035	.410	100, 500 & 1000
962211	11	22	22-7/30	.040	.457	100, 500 & 1000
962215	15	30	22-7/30	.040	.523	100, 500 & 1000
962219	19	38	22-7/30	.050	.570	100, 500 & 1000
962227	27	54	22-7/30	.055	.687	100, 500 & 1000
961803	3	6	18-16/30	.035	.372	1000
961806	6	12	18-16/30	.045	.555	1000
961809	9	18	18-16/30	.055	.620	1000
961812	12	24	18-16/30	.070	.765	1000
961815	15	30	18-16/30	.070	.830	1000

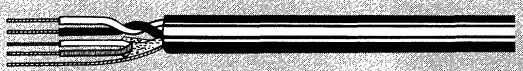
COLOR COMBINATION OF PAIRS

Pair No.	Pair No.	Pair No.
1—Black and Red	10—Red and Blue	19—White and Blue
2—Black and White	11—Red and Yellow	20—White and Yellow
3—Black and Green	12—Red and Brown	21—White and Brown
4—Black and Blue	13—Red and Orange	22—White and Orange
5—Black and Yellow	14—Green and White	23—Blue and Yellow
6—Black and Brown	15—Green and Blue	24—Blue and Brown
7—Black and Orange	16—Green and Yellow	25—Blue and Orange
8—Red and White	17—Green and Brown	26—Brown and Yellow
9—Red and Green	18—Green and Orange	27—Brown and Orange

2 PAIR MINIATURE AUDIO AND SOUND CABLE

Tinned copper .009"* Polyethylene insulation. 1 pair of black and red shielded with Mylar aluminum shield. Other pair of white and green twisted, not shielded. Both pairs twisted with #22 stranded T.C. drain wire and chrome vinyl jacket overall.

* .015 on #20

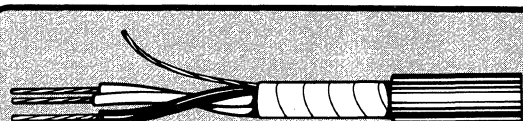


2 PAIR MINIATURE AUDIO AND SOUND CABLE
1 - Shielded — 1 - Unshielded

DEARBORN NO.	NO. OF PAIRS	NO. COND.	SIZE & STRANDING	NOM. JKT. O.D.	PUT UP (FT.)
970001	2	4	22-7/30	.165	100, 500 & 1000
970002	2	4	20-10/30	.230	100, 500 & 1000

FOIL SHIELDED, PLASTIC JACKETED, MULTI-CONDUCTOR CABLE

Stranded tinned copper conductors, insulated with .016" thick color coded Polyethylene insulation. Conductors are cabled and, along a No. 22 tinned copper stranded drain wire laid parallel, are shielded with aluminum foil Mylar backed shield. Gray PVC jacket overall. This type of shielding provides 100% effective shielding and is suitable for audio and data work where cross talk must be reduced to a minimum. **Temperature rating:** −20°C +60°C. **Operating voltage rating:** 400 V.



FOIL SHIELDED, MULTI-CONDUCTOR CABLE

DEARBORN NO.	NO. COND.	AWG SIZE	STRAND-ING	NOM. JKT. THICK.	NOM. O.D.	STOCK PUT UP (FT.)
972202	2	22	7/30	.020	.195	100, 500 & 1000
972203	3	22	7/30	.020	.210	100, 500 & 1000
972204	4	22	7/30	.020	.225	100, 500 & 1000
972002	2	20	10/30	.020	.210	100, 500 & 1000
972003	3	20	10/30	.020	.225	100, 500 & 1000
972004	4	20	10/30	.020	.240	100, 500 & 1000
971802	2	18	16/30	.020	.230	100, 500 & 1000
971803	3	18	16/30	.020	.245	100, 500 & 1000
971804	4	18	16/30	.020	.265	100, 500 & 1000
971602	2	16	26/30	.020	.255	100, 500 & 1000
971603	3	16	26/30	.020	.275	100, 500 & 1000
971402	2	14	41/30	.020	.290	100, 500 & 1000
971403	3	14	41/30	.020	.310	100, 500 & 1000

Color Code: 1—Black • 2—Red • 3—Clear • 4—Green

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

HEAT SHRINKABLE TUBING STYLE ST-150 AND ST-301

STYLE ST-301 POLYOLEFIN HEAT SHRINKABLE TUBING TO MIL-I-23053B/5, U.L. APPROVED

Dearborn Style ST-301 Heat Shrinkable Tubing is an irradiated, thermally stabilized, polyolefin product which meets or exceeds MIL-I-23053B/5, AMS 3636B and AMS 3637B. ST-301 shrinks to 50% of diameter at 121°C (250°F) in 7 seconds, and has an operating temperature range of −55°C (−67°F) to +135°C (+275°F).

MIL-I-23053/5 — CLASS I (COLORED INSULATION)

MIL-I-23053/5 — CLASS II (CLEAR INSULATION)

All sizes are shown and supplied in expanded inside diameters. Stock Colors: Black, Red, White and Clear. Clear is Non-Flame Retardant. All other colors are Flame Retardant under MIL-I-23053B/5. Additional colors available on special order. Supplied in either 4 Ft. or 6 Inch lengths, and 6 Inch Assortments. Suitable for all military applications as well as industrial and commercial uses.

STYLE ST-301

100′ — 25 x 4′ LENGTHS PER BOX					6″ LENGTHS
DEARBORN NO.	EXP. SIZE	MIN. I.D.	REC. I.D.	WALL THICK.	NO. OFL ENGTHS PER BOX
ST-301-3/64	3/64″	.046″	.023″	.016″	40
ST-301-1/16	1/16″	.063″	.031″	.017″	36
ST-301-3/32	3/32″	.093″	.046″	.020″	32
ST-301-1/8	1/8″	.125″	.062″	.020″	28
ST-301-3/16	3/16″	.187″	.093″	.020″	24
ST-301-1/4	1/4″	.250″	.125″	.025″	20
ST-301-3/8	3/8″	.375″	.187″	.025″	16
20′ — 5 x 4′ LENGTHS PER BOX					6″ LENGTHS
ST-301-1/2	1/2″	.500″	.250″	.025″	14
ST-301-3/4	3/4″	.750″	.375″	.030″	12
ST-301-1	1″	1.00″	.500″	.035″	8
ST-301-1½	1½″	1.50″	.750″	.040″	5
ST-301-2	2″	2.00″	1.00″	.045″	3
8′ — 2 x 4′ LENGTHS PER BOX					6″ LENGTHS
ST-301-3	3″	3.00″	1.50″	.050″	2
ST-301-4	4″	4.00″	2.00″	.055″	1

Specify 4′ or 6″ Box When Ordering.
Stock Colors: Clear, Black, Red and White — Specify Color.

STYLE ST-150 HEAT SHRINKABLE TUBING

Dearborn ST-150 is an irradiated polyolefin heat shrinkable tubing which provides heat and environmental characteristics superior to that of vinyl. Suitable for industrial, electronic, electromechanical and electrical uses and applications. Operating Temperature Range: −35°C to +135°C. Flame retardant; flexible. Supplied in coils. Put-ups available vary with size, so check the table. Stock color: Black Only. Also available from stock in 6 Inch assortments.

HEAT SHRINK INDUSTRIAL AND COMMERCIAL TUBING

STYLE ST-150

DEARBORN NO.	SIZE	PUT UP (FT.)	EXD. I.D.	RECOV. I.D.	WALL THICK.
ST-150	3/64″	25, 100 & 500	.046″	.023″	.020″
ST-150	1/16″	25, 100 & 500	.063″	.031″	.020″
ST-150	3/32″	25, 100 & 200	.093″	.046″	.020″
ST-150	1/8″	25, 100 & 200	.125″	.062″	.025″
ST-150	3/16″	25, 100 & 200	.187″	.093″	.025″
ST-150	1/4″	25, 100 & 200	.250″	.125″	.025″
ST-150	3/8″	25, 100 & 200	.375″	.187″	.030″
ST-150	1/2″	25 & 100	.500″	.250″	.030″
ST-150	3/4″	25 & 100	.750″	.375″	.035″
ST-150	1″	25 & 100	1.00″	.500″	.040″

ST-150 ASSORTMENTS/BOX OF 6″ LENGTHS

AST-150-1-6 — Consists of 10-6″ Lengths, each of six sizes varying from 3/64″ thru 1/4″ — (60 pieces)
AST-150-2-6 — Consists of 10-6″ Lengths, each of four sizes from 3/8″ thru 1″ (40 pieces)

ST-301 Kit Assortments Available in 6″ lengths, Assorted Colors AST-301-1-6 — 3/64″ thru 3/16″ (30) Lengths AST-301-2-6 — 1/4″ thru 3/4″ (16) Lengths

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

RETRACTILE COIL CORDS POWER-COMMUNICATION-TEST LEAD

U.L. & CSA LISTED POWER COIL CORDS NEOPRENE JACKETED SVO, SJO & SO

CONSTRUCTION

Stranded bare copper conductors, extra flexible stranding, color coded rubber insulation, cabled with fillers, separator over core, and neoprene jacket overall. Surface printed for identification. Resists abrasion, oil, sunlight, acids, alkalis and water.

APPLICATIONS

Power tools, machine tools, portable electrical equipment and appliances, etc.

TEMPERATURE RANGE: −20°C to +60°C (140°F)

2 Ft. Retracted expands to 12 Ft.

4 Ft. Retracted expands to 25 Ft.

ALL CORDS HAVE 6″ STRAIGHT PIECE ON EACH END.

POWER COIL CORDS

DEARBORN NUMBER 2 FOOT	4 FOOT	NO. COND.	AWG SIZE & STRANDING	UL TYPE	AMP RAT'G	VOLT RAT'G	COIL O.D.	CORD O.D.
936602	936604	2	18-41/34	SVO	7	300	7/8″	.260″
937602	937604	3	18-41/34	SVO	7	300	1″	.275″
936612	936614	2	18-41/34	SJO	7	300	1 3/16″	.320″
936622	936624	3	18-41/34	SJO	7	300	1 3/8″	.350″
936632	936634	4	18-41/34	SJO	5.6	300	1 7/16″	.385″
936642	936644	2	16-65/34	SJO	10	300	1 3/8″	.360″
936652	936654	3	16-65/34	SJO	10	300	1 7/16″	.390″
936662	936664	4	16-65/34	SJO	8	300	1 1/2″	.425″
936702	936704	3	16-65/34	SO	10	600	1 13/16″	.470″
936712	936714	4	16-65/34	SO	8	600	1 7/8″	.500″
936732	936734	3	14-41/30	SO	15	600	2 1/8″	.560″
936742	934744	4	14-41/30	SO	12	600	2 1/4″	.605″

Other sizes and constructions available on request.

Color Code: 1—Black • 2—White • 3—Green • 4—Red

RETRACTILE TEST LEADS

1 Conductor, No. 20 41/36 stranding T.C., Neoprene insulation. 5000 volts maximum working voltage. Used for production testing, service stations, portable test equipment, etc.

24″ Retracted, extends to 12 feet.—6″ Straight Lengths on each end. Specify Color.

RETRACTILE TEST LEADS

PART NO. BLACK	PART NO. RED	CORDAGE O.D.	COIL O.D.	AMP RATING	COND. AWG
932001B	932001R	.165″	.750″	4 Amps	20/1

UNSHIELDED MULTICONDUCTOR COMMUNICATION COIL CORDS

All Conductors No. 23 21/36 T.C.

Special long life plastic jacket, very flexible. Maximum working voltage: 120 volts. Current carrying capacity: 1 ampere. Nominal conductor resistance: .022 OHMS per linear ft., .185 OHMS per retracted ft.

2 ft. retracted cord extends to 12 ft. 4 ft. retracted cord extends to 25 ft.

For use in communications equipment, mobile units, head sets, CB units, microphones, musical instruments, etc.

UNSHIELDED COMMUNICATION COIL CORDS

DEARBORN NUMBER 2 FOOT	4 FOOT	NO. COND.	AWG SIZE & STRANDING	VOLT RATING	AMP RATING	COIL O.D.	CORD O.D.
932322	932324	2	23-21/36	120	1	3/4″	.200″
932332	932334	3	23-21/36	120	1	3/4″	.210″
932342	932344	4	23-21/36	120	1	13/16″	.240″
932352	932354	5	23-21/36	120	1	1″	.285″
932362	932364	6	23-21/36	120	1	1 1/8″	.305″
932372	932374	7	23-21/36	120	1	1 1/4″	.320″

Color Code: 1—Black • 2—White • 3—Red • 4—Green 5—Blue • 6—Yellow • 7—Brown

SHIELDED SINGLE AND MULTI-CONDUCTOR COMMUNICATION COIL CORDS

Construction same as above with exception of shielding as specified and single conductor is No. 24 41/40 Stranding.

SHIELDED COMMUNICATIONS COIL CORDS

DEARBORN NUMBER 2 FOOT	4 FOOT	NO. COND.	COND. SIZE & STRANDING	SHIELDING	COIL O.D.	CORD O.D.
931242	931244	1	24-41/40	1 cond.	5/8″	.160″
932232	932234	2	23-21/36	2 cond.	7/8″	.225″
933232	933234	3	23-21/36	1 cond.	7/8″	.240″
934232	934234	4	23-21/36	1 pair	1″	.270″

Color code same as above.

MINIATURE COIL CORDS

Used for low voltage applications where miniaturization is required. Long life plastic jacket. 100 Volt Maximum working voltage. ½ AMP allowable current carrying capacity.

2 Ft. retracted extends to 10 Ft.

6″ Straight ends.

MINIATURE COIL CORDS

DEARBORN NO.	NO. OF CONDUCTORS	COND. SIZE & STRANDING	COIL O.D.	CORD O.D.
932802	2	28-19/40	1/2″	.135″
932804	4	28-19/40	1/2″	.150″

Color Code: 1—Black • 2—White • 3—Green • 4—Red

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DEARBORN

COMPUTER TYPE CONTROL CABLES MINIATURE/STYLES 2343 AND 2344

The cables listed below, either cabled pairs or multiconductor (not paired), with or without shield are suited for computer use.

The individual conductors are stranded tinned copper Numbers 22, 24 are 7 strand, No. 20 is 19 strand. Insulated with .010" wall of PVC to MIL-W-16878D Type B. On this usage, conductors are rated 105°C and 600 V. working voltage. The conductors also meet UL Style 1061, rated 80°C, 300 V. working voltage.

Conductors are cabled by the planetary method and laid contra-helically for best flexibility, with a Mylar tape barrier placed under shields. All shielded cables are of tinned copper braid overall of 85% - 90% coverage per MIL-C-7078.

The jacket over the shield is black 105°C Vinyl per MIL-I-631 Type F. All materials are fungus resistant and self extinguishing.

All items approved under UL STYLE 2343 or 2344* for computer usage: +80°C, 300 Volts. On non-UL service can be used at 40°C to +105°C, 600 Volts.

MULTI-CONDUCTOR UNSHIELDED CABLES

DEARBORN NO.	NO. OF PAIRS	COND. SIZE	COND. O.D.	JACKET WALL	NOM. O.D.	PUT UP (FT.)
562405	5	24	.044	.062	.220	500, 1000
562407	7	24	.044	.062	.250	500, 1000
562412	12	24	.044	.062	.300	500, 1000
262415	15	24	.044	.062	.330	500, 1000
562419	19	24	.044	.062	.340	500, 1000
562427	27	24	.044	.062	.390	500, 1000
562437	37	24	.044	.062	.420	500, 1000
562448	48	24	.044	.062	.470	500, 1000
562460	60	24	.044	.062	.510	500, 1000
562205	5	22	.050	.062	.200	500, 1000
562207	7	22	.050	.062	.270	500, 1000
562212	12	22	.050	.062	.330	500, 1000
562215	15	22	.050	.062	.350	500, 1000
562219	19	22	.050	.062	.370	500, 1000
562227	27	22	.050	.062	.430	500, 1000
562237	37	22	.050	.062	.480	500, 1000
562248	48	22	.050	.062	.530	500, 1000
562260	60	22	.050	.062	.570	500, 1000
562005	5	20	.058	.062	.275	500, 1000
562007	7	20	.058	.062	.290	500, 1000
562012	12	20	.058	.062	.360	500, 1000
562015	15	20	.058	.062	.390	500, 1000
562019	19	20	.058	.062	.410	500, 1000
• 562027	27	20	.058	.062	.490	500, 1000
562037	37	20	.058	.062	.520	500, 1000
562048	48	20	.058	.062	.580	500, 1000
562060	60	20	.058	.062	.640	500, 1000

PAIRED CABLES, UNSHIELDED

DEARBORN NO.	NO. OF PAIRS	COND. SIZE	COND. O.D.	JACKET WALL	NOM. O.D.	PUT UP (FT.)
582405	5	24	.044	.062	.330	500, 1000
582407	7	24	.044	.062	.350	500, 1000
582412	12	24	.044	.062	.435	500, 1000
582415	15	24	.044	.062	.485	500, 1000
582419	19	24	.044	.062	.505	500, 1000
582427	27	24	.044	.062	.590	500, 1000
582437	37	24	.044	.062	.660	500, 1000
582448	48	24	.044	.062	.745	500, 1000
582460	60	24	.044	.062	.815	500, 1000
582205	5	22	.050	.062	.365	500, 1000
582207	7	22	.050	.062	.390	500, 1000
582212	12	22	.050	.062	.470	500, 1000
582215	15	22	.050	.062	.545	500, 1000
582219	19	22	.050	.062	.560	500, 1000
582227	27	22	.050	.062	.670	500, 1000
582237	37	22	.050	.062	.750	500, 1000
*582248	48	22	.050	.062	.850	500, 1000
*582260	60	22	.050	.062	.980	500, 1000
582005	5	20	.058	.062	.395	500, 1000
582007	7	20	.058	.062	.440	500, 1000
582012	12	20	.058	.062	.540	500, 1000
582015	15	20	.058	.062	.600	500, 1000
582019	19	20	.058	.062	.630	500, 1000
582027	27	20	.058	.062	.745	500, 1000
582037	37	20	.058	.062	.820	500, 1000
*582048	48	20	.058	.080	.950	500, 1000
*582060	60	20	.058	.080	1.040	500, 1000

MULTI-CONDUCTOR, OVERALL SHIELDED CABLES

DEARBORN NO.	NO. OF PAIRS	COND. SIZE	COND. O.D.	JACKET WALL	NOM. O.D.	PUT UP (FT.)
572405	5	24	.044	.062	.245	500, 1000
572407	7	24	.044	.062	.275	500, 1000
572412	12	24	.044	.062	.325	500, 1000
572415	15	24	.044	.062	.350	500, 1000
572419	19	24	.044	.062	.365	500, 1000
572427	27	24	.044	.062	.415	500, 1000
572437	37	24	.044	.062	.445	500, 1000
572448	48	24	.044	.062	.495	500, 1000
572460	60	24	.044	.062	.535	500, 1000
572205	5	22	.050	.062	.285	500, 1000
572207	7	22	.050	.062	.295	500, 1000
572212	12	22	.050	.062	.355	500, 1000
572215	15	22	.050	.062	.380	500, 1000
572219	19	22	.050	.062	.395	500, 1000
572227	27	22	.050	.062	.455	500, 1000
572237	37	22	.050	.062	.510	500, 1000
572248	48	22	.050	.062	.560	500, 1000
572260	60	22	.050	.062	.600	500, 1000
572005	5	20	.058	.062	.300	500, 1000
572007	7	20	.058	.062	.315	500, 1000
572012	12	20	.058	.062	.385	500, 1000
572015	15	20	.058	.062	.415	500, 1000
572019	19	20	.058	.062	.435	500, 1000
572027	27	20	.058	.062	.515	500, 1000
572037	37	20	.058	.062	.550	500, 1000
572048	48	20	.058	.062	.610	500, 1000
572060	60	20	.058	.062	.670	500, 1000

PAIRED CABLES WITH OVERALL SHIELD

DEARBORN NO.	NO. OF PAIRS	COND. SIZE	COND. O.D.	JACKET WALL	NOM. O.D.	PUT UP (FT.)
592405	5	24	.044	.062	.355	500, 1000
582407	7	24	.044	.062	.375	500, 1000
592412	12	24	.044	.062	.460	500, 1000
592415	15	24	.044	.062	.510	500, 1000
592419	19	24	.044	.062	.530	500, 1000
592427	27	24	.044	.062	.620	500, 1000
592437	37	24	.044	.062	.690	500, 1000
592448	48	24	.044	.062	.775	500, 1000
*592460	60	24	.044	.062	.845	500, 1000
592205	5	22	.050	.062	.390	500, 1000
592207	7	22	.050	.062	.415	500, 1000
592212	12	22	.050	.062	.495	500, 1000
592215	15	22	.050	.062	.575	500, 1000
592219	19	22	.050	.062	.580	500, 1000
592227	27	22	.050	.062	.600	500, 1000
592237	37	22	.050	.062	.780	500, 1000
*592248	48	22	.050	.062	.880	500, 1000
*592260	60	22	.050	.062	.960	500, 1000
592005	5	20	.058	.062	.420	500, 1000
592007	7	20	.058	.062	.465	500, 1000
592012	12	20	.058	.062	.570	500, 1000
592015	15	20	.058	.062	.630	500, 1000
592019	19	20	.058	.062	.660	500, 1000
592027	27	20	.058	.062	.775	500, 1000
*592037	37	20	.058	.080	.850	500, 1000
*592048	48	20	.058	.080	.980	500, 1000
*592060	60	20	.058	.080	1.070	500, 1000

Color Code: Ten solid colors and white with stripes per MIL-STD-681

DEARBORN WIRE AND CABLE CO. 9299 Evenhouse Drive, Rosemont, Illinois 60018 • Phone (312) 696-0090 • Telex Number 28-2449

DABURN

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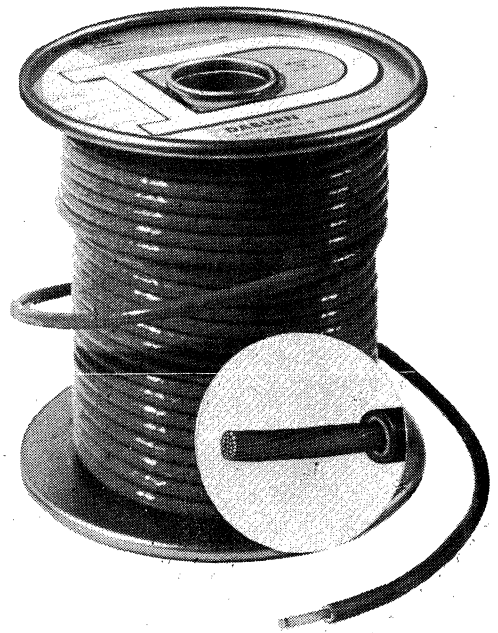
2360A HOFFMAN STREET, BRONX, N. Y. 10458, TEL. 212-295-0050

NEW

HI-VOLT CORONA RESISTANT TEFLON* CABLE

Voltage Rating at Sea Level • Voltage Rating at 80,000 feet, approximately 1/3 lower • Minimum life expectancy: 10,000 hours.

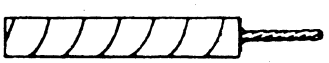


SMALL SIZE:
You do not need bulky, thick insulation jacketing as used with silicone rubber and polyethylene insulations to get your hi-voltage requirements. Wire used is MIL-SPEC QQ-W-343 and MIL-W-16878D. Insulation used conforms and surpasses MIL-SPEC-W-16878D.

AVOID CORONA PROBLEMS:
Corona resistant Teflon construction is specifically designed to retard and prevent corona penetration.
Temperature variations from −60°C to +300°C have no life effect on the corona resistant Teflon. In addition, there is no stress or crack failure under severe, adverse conditions including mechanical strain, moisture, corona or chemical conditions.

DESCRIPTION:
Single Conductor, Stranded Silver Plated Copper, Corona Resistant Teflon* Insulation.

TEMPERATURE RATING:
−90°C to +250°C.



VOLTAGE RATING:
Based on insulation thickness.

AVAILABLE COLORS:
White, Black, Red, Green, Yellow, Lt. Blue, Brown, Orange, Gray, Violet. (Also available in tracer colors)

PUT-UP: 250′, 500′, 1000′

*DUPONT

DABURN No.	AWG Size	Strand	Voltage Rating AC	Voltage Rating DC	Nom. O.D.
CRT-12-2	12	19/25	2500	10,000	.142″
CRT-12-2.5	12	19/25	3750	12,500	.152″
CRT-12-3	12	19/25	4500	15,000	.162″
CRT-12-3.5	12	19/25	5300	17,500	.172″
CRT-12-4	12	19/25	6000	20,000	.182″
CRT-12-5	12	19/25	7500	25,000	.202″
CRT-12-6.5	12	19/25	10,000	32,500	.232″
CRT-12-8	12	19/25	12,000	40,000	.262″
CRT-12-10	12	19/25	15,000	50,000	.302″
CRT-14-2	14	19/27	2500	10,000	.124″
CRT-14-2.5	14	19/27	3750	12,500	.134″
CRT-14-3	14	19/27	4500	15,000	.144″
CRT-14-3.5	14	19/27	5300	17,500	.154″
CRT-14-4	14	19/27	6000	20,000	.164″
CRT-14-5	14	19/27	7500	25,000	.184″
CRT-14-6.5	14	19/27	10,000	32,500	.214″
CRT-14-8	14	19/27	12,000	40,000	.244″
CRT-14-10	14	19/27	15,000	50,000	.284″
CRT-16-2	16	19/29	2500	10,000	.109″
CRT-16-2.5	16	19/29	3750	12,500	.119″
CRT-16-3	16	19/29	4500	15,000	.129″
CRT-16-3.5	16	19/29	5300	17,500	.139″
CRT-16-4	16	19/29	6000	20,000	.149″
CRT-16-5	16	19/29	7500	25,000	.169″
CRT-16-6.5	16	19/29	10,000	32,500	.199″
CRT-16-8	16	19/29	12,000	40,000	.229″
CRT-16-10	16	19/29	15,000	50,000	.269″
CRT-18-2	18	19/30	2500	10,000	.102″
CRT-18-2.5	18	19/30	3750	12,500	.112″
CRT-18-3	18	19/30	4500	15,000	.122″
CRT-18-3.5	18	19/30	5300	17,500	.132″
CRT-18-4	18	19/30	6000	20,000	.142″
CRT-18-5	18	19/30	7500	25,000	.162″
CRT-18-6.5	18	19/30	10,000	32,500	.192″
CRT-18-8	18	19/30	12,000	40,000	.222″
CRT-18-10	18	19/30	15,000	50,000	.272″
CRT-20-2	20	19/32	2500	10,000	.092″
CRT-20-2.5	20	19/32	3750	12,500	.102″
CRT-20-3	20	19/32	4500	15,000	.112″
CRT-20-3.5	20	19/32	5300	17,500	.122″
CRT-20-4	20	19/32	6000	20,000	.132″
CRT-20-5	20	19/32	7500	25,000	.152″
CRT-20-6.5	20	19/32	10,000	32,500	.192″
CRT-20-8	20	19/32	12,000	40,000	.212″
CRT-20-10	20	19/32	15,000	50,000	.252″
CRT-22-2	22	19/34	2500	10,000	.084″
CRT-22-2.5	22	19/34	3750	12,500	.094″
CRT-22-3	22	19/34	4500	15,000	.104″
CRT-22-3.5	22	19/34	5300	17,500	.114″
CRT-22-4	22	19/34	6000	20,000	.124″
CRT-22-5	22	19/34	7500	25,000	.144″
CRT-22-6.5	22	19/34	10,000	32,500	.174″
CRT-22-8	22	19/34	12,000	40,000	.204″
CRT-22-10	22	19/34	15,000	50,000	.244″
CRT-24-2	24	19/36	2500	10,000	.077″
CRT-24-2.5	24	19/36	2750	12,500	.087″
CRT-24-3	24	19/36	4500	15,000	.097″
CRT-24-3.5	24	19/36	5300	17,500	.107″
CRT-24-4	24	19/36	6000	20,000	.117″
CRT-24-5	24	19/36	7500	25,000	.137″
CRT-24-6.5	24	19/36	10,000	32,500	.167″
CRT-24-8	24	19/36	12,000	40,000	.197″
CRT-24-10	24	19/36	15,000	50,000	.237″
CRT-26-2	26	7/34	2500	10,000	.071″
CRT-26-2.5	26	7/34	3750	12,500	.081″
CRT-26-3	26	7/34	4500	15,000	.091″
CRT-26-3.5	26	7/34	5300	17,500	.101″
CRT-26-4	26	7/34	6000	20,000	.111″
CRT-26-5	26	7/34	7500	25,000	.131″
CRT-26-6.5	26	7/34	10,000	32,500	.161″
CRT-26-8	26	7/34	12,000	40,000	.191″
CRT-26-10	26	7/34	15,000	50,000	.231″
CRT-28-2	28	7/36	2500	10,000	.067″
CRT-28-2.5	28	7/36	3750	12,500	.077″
CRT-28-3	28	7/36	4500	15,000	.087″
CRT-28-3.5	28	7/36	5300	17,500	.097″
CRT-28-4	28	7/36	6000	20,000	.117″
CRT-28-5	28	7/36	7500	25,000	.127″
CRT-28-6.5	28	7/36	10,000	32,500	.157″
CRT-28-8	28	7/36	12,000	40,000	.187″
CRT-28-10	28	7/36	15,000	50,000	.227″

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Types B, C, D, E, EE, ET, F, FF, HF, HHF, K, KK, LW, MW, HW
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Teflon* Hook-Up Wire to MIL-16878D
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Plastic Tubing to MIL-I-7444B, MIL-I-22076B
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Audio-Intercom	Hi-Fi & Stereo	MIL-C-3432C
Automation	Language Lab	MIL-W-16878D
Broadcast-Studio Cables	Miniaturization	MIL-W-76B
Coaxial	Power-UL	MIL-W-5086A
Cord Sets	Ribbon — Flat	MIL-W-3861
Data-Digital	Shielded	MIL-C-7078A
Intercom	Strain Gauge	MIL-W-7139
Microphone	Subminiature	MIL-C-17D
Low Capacity	Telephone	MIL-W-8777B
Multi-Conductors	Teflon* Cables	MIL-W-13169B
Phono	Thermocouple	MIL-W-81381
Retractile	Speaker Extension shielded-unshielded	MIL-C-13777
Control Cables		

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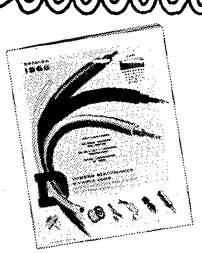

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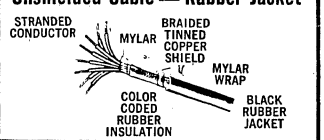
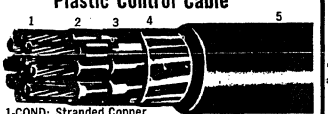
- MULTI-CONDUCTOR CABLES CUT TO YOUR EXACT REQUIREMENTS MINIMIZING WASTE AND UNNECESSARY HANDLING. THESE CABLES ARE ALSO AVAILABLE FROM STOCK IN LONG CONTINUOUS LENGTHS.

CIC-R
Shielded Cable — Rubber Jacket
Unshielded Cable — Rubber Jacket

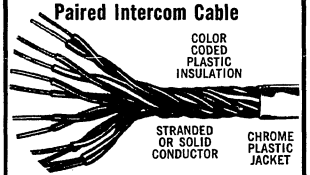


CIC-PT
Plastic Control Cable

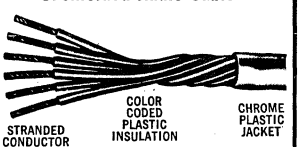


1-COND: Stranded Copper
2-COND: INSUL: 20 Mils PE
3-COND: SHEATH: 10 Mils PVC
4-CABLED: Tape
5-SHEATH: PVC

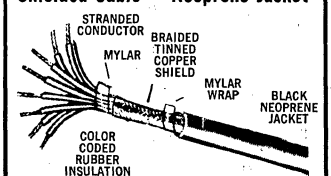
CIC-PIC
Paired Intercom Cable



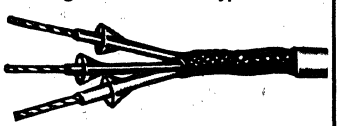
CIC-UAC
Unshielded Audio Cable



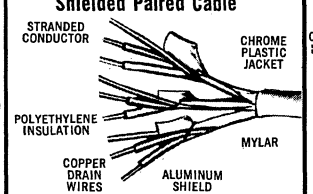
CIC-N
Shielded Cable — Neoprene Jacket



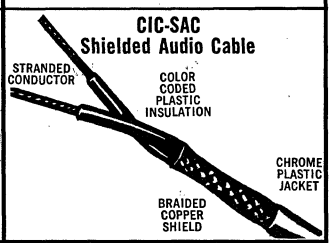
CIC-M
Multi-Conductor Shielded Cable
Type B/N-600V — MIL-W-16878D
Single Conductor — Type C



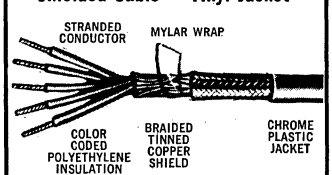
CIC-SPC
Shielded Paired Cable



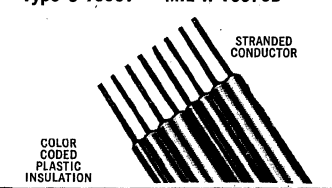
CIC-SAC
Shielded Audio Cable



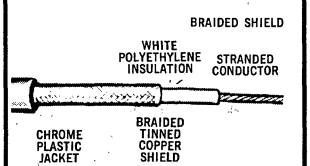
CIC-V
Shielded Cable — Vinyl Jacket



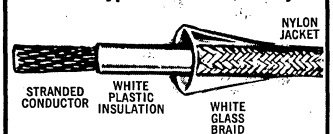
CIC-RIB — Flat Ribbon Cable
Type C-1000V — MIL-W-16878D



CIC-MIC — Microphone Cable
Shielded 1 and 2 Conductor



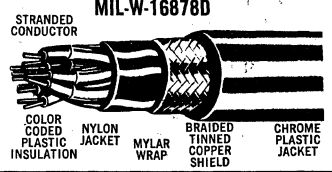
CIC-AN
Aircraft Wire — MIL-W-5086A
Jacket — Type I — Clear Nylon
Type II — Glass Braid Nylon



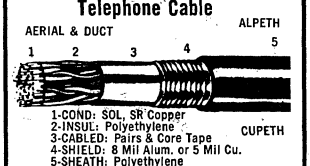
CIC-MSO
Neoprene Control Cable

1-COND: Flexible Copper
2-COND. INSUL: RHW
3-CABLED: Jute Fillers & Separator
4-SHEATH: Neoprene

CIC-MCC — Shielded Control Cable — MIL-W-16878D

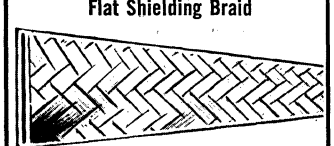


CIC-REA
Telephone Cable

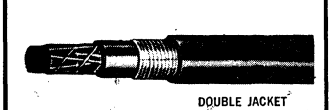


1-COND: SOL, SR Copper
2-INSUL: Polyethylene
3-CABLED: Pairs & Core Tape
4-SHIELD: 8 Mil Alum. or 5 Mil Cu.
5-SHEATH: Polyethylene

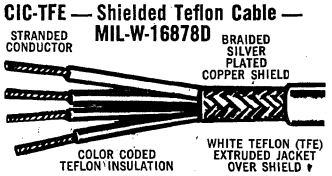
CIC-FB
Flat Shielding Braid



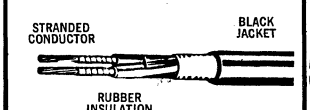
CIC-TLM
Telemetering Control Cable



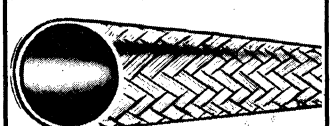
CIC-TFE — Shielded Teflon Cable — MIL-W-16878D



CIC-PC — Portable Cords — UL Listed & Labeled



CIC-TB
Tubular Braid — QQ-B-575A



FOR COMPLETE PRODUCT SPECIFICATION WRITE FOR OUR CATALOG.

MANHATTAN ELECTRIC CABLE CORPORATION

170 IMLAY STREET, BROOKLYN, N.Y. 11231 • (212) 855-0500

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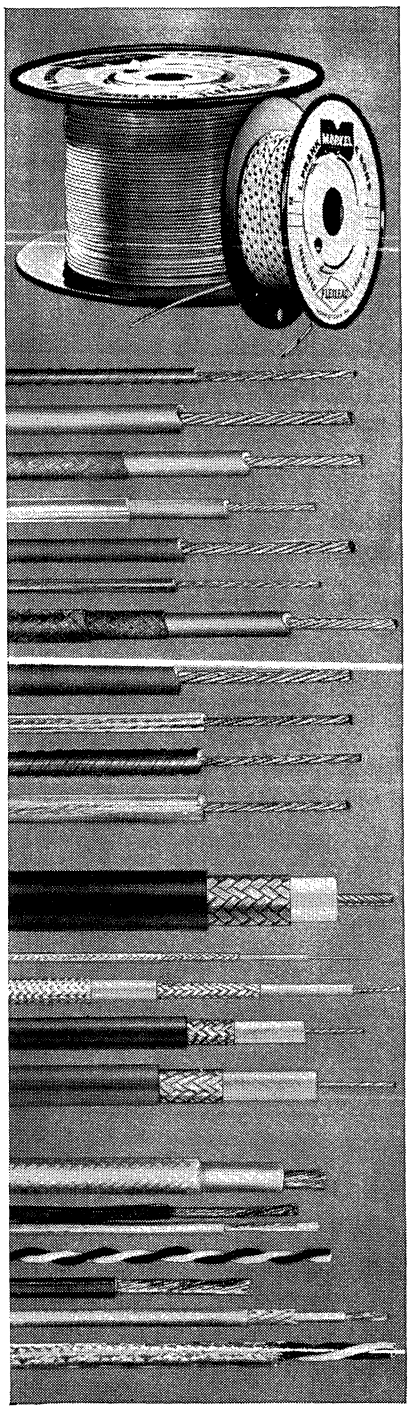
MARKEL
SINCE 1922

Insulating Tubings and Sleevings- High Temperature Wire and Cable



FLEXLEAD®

High temperature Wire and Cable insulated with Teflon (TFE or FEP) or silicone rubber. You can select a numbered FLEXLEAD type listed below, or let Markel quote, to your specifications, on a custom FLEXLEAD construction.

MIL-W-16878D

Type E—600 v. Stranded silver-plated copper insulated with extruded DuPont Teflon TFE
Type E—600 v. Stranded silver-plated copper insulated with wrapped and sintered Teflon TFE tape
Type EE—1000 v. Stranded silver-plated copper conductor insulated with extruded Teflon TFE
Type EE—1000 v. Stranded silver-plated copper insulated with wrapped and sintered TFE tape
Type ET—300 v. Stranded silver-plated copper conductor insulated with extruded Teflon TFE
Type ET—300 v. Stranded silver-plated copper insulated with wrapped and sintered TFE tape
Type K—600 v. Stranded silver-plated copper conductor insulated with extruded Teflon FEP
Type KK—1000 v. Stranded silver-plated copper conductor insulated with extruded Teflon FEP
Type KT—300 v. Stranded silver-plated copper conductor insulated with extruded Teflon FEP
Type F—600 v. Stranded tin-coated copper conductor insulated with extruded silicone rubber
Type F—600 v. Same as Type F above, jacketed with silicone resin-impregnated fiberglass braid
Type FF—1000 v. Stranded tin-coated copper conductor insulated with extruded silicone rubber
Type FF—1000 v. Same as Type FF above, jacketed with silicone resin-impregnated fiberglass braid

U/L APPROVED

Extruded Teflon Wires, sizes 10-28 AWG; 80°C to 200°C ratings; 300 and 600 volt ratings: U/L Style Nos. **1164, 1180, 1198, 1199, 1212, 1213, 1226, 1227, 1292, 1371.**

Extruded Silicone Rubber Wires, various constructions, with and without fiberglass jackets; sizes 10-32 AWG; 150°C and 200°C ratings; 300 and 600 volt ratings: U/L Style Nos. **3066, 3067, 3068, 3069, 3070, 3071, 3074, 3075, 3101, 3113, 3122, 3123, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3180, SF-1, SF-2, SFF-1, SFF-2. 3211, 3212, 3213, 3214, 3215, 3216, 3239(HVS), 5031, 5032.**

Ask for data sheets, prices, and samples of these FLEXLEAD wire constructions

FLEXLEAD Coaxial Cables. Markel manufactures a complete line of both standard and special RG/U coaxial cables. In accordance with specifications, types are available with silver-plated copper, plated or unplated copper-covered steel, or bare copper center conductor; one or two braided shields; tape-wrapped Teflon shield guards; and outer jacketing of impregnated fiberglass braid or Teflon (extruded or tape-wrapped). For complete data, ask for a FLEXLEAD Coaxial Cable Specifications folder.

FLEXLEAD Special Constructions. Because wiring problems cannot always be solved with standard materials, Markel's capacity for engineering high temperature wire and cable constructions to meet particular needs has grown steadily with the demand. We can combine insulations—Teflon, silicone rubber, fiberglass, nylon-shielding, fillers, liners, and jacket materials—with single, twisted pair or multiple conductors—to provide a special cable construction for any temperature range from —90° to 260°C. For more data, ask for a FLEXLEAD Wire and Cable Selector.

FLEXLEAD Fused Twisted Pair. This unique Teflon-insulated twisted pair construction finds wide application in computers and similar circuitry. The fusing, which will withstand predetermined pulls to separate the individual wires, keeps the wires evenly twisted for easier assembly and uniform capacitance and inductance. Ask for a test sample and prices.

FLEXLEAD MB Bondable Teflon. The Markel MB process can be factory-applied to any of the FLEXLEAD Teflon wires, extruded or tape-wrapped, and renders the surface bondable with commonly used elastomeric and epoxy-base potting and encapsulating compounds. Without affecting the color or electrical properties of the insulation, the MB treatment provides a bond with up to 150 psi pull-out strength, and a surface that is receptive to marking and printing.

1 SOURCE *for* EXCELLENCE *in Insulating Tubings and Sleevings • High Temperature Wire and Cable*

L. FRANK MARKEL & SONS, INC.
NORRISTOWN, PENNSYLVANIA 19404
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U/L APPROVED WIRE

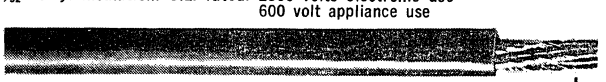
Wires approved by the Underwriters' Laboratories, Inc. for operation in an air or an oil environment. U.L. File #E35793. See Section 4 for U.L. Control Cable.

SEE PAGE 3037 FOR CSA APPROVED WIRE

U.L. TYPE 1015 105°C SERVICE**

U/L APPROVED APPLIANCE WIRING MATERIAL

1/32" vinyl insulation. U.L. rated: 2500 volts electronic use
600 volt appliance use



Vinyl Primary Insulation

Stranded Tinned Copper Conductor

COLORS: 10 standard colors plus tracers on solid colors.

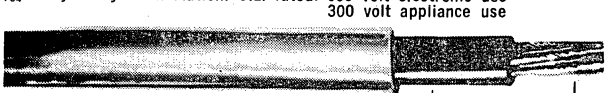
Gauge (AWG)	National Catalog Number	No. of Strands	Ga. of Strands (AWG)	Nom. Diam. of Stranded Conductor (Inches)	Nom. Fin. Wire Diam. (Inches)	Max. Resistance (dc) at 25°C Ohms/1000 Ft.	Nom. Wt. Per 1000 Ft. (Lbs.)
24†	N600-1936U	*19	36	.024	.078	26.8	4.0
22†	N600-1934U	*19	34	.030	.084	16.7	5.2
20†	N600-1932U	*19	32	.038	.092	10.5	7.3
18	N600-1930U	*19	30	.048	.102	6.57	10.0
16	N600-1929U	19	29	.057	.111	4.85	12:0
14	N600-1927U	19	27	.071	.125	3.05	17.1
12	N600-1925U	19	25	.090	.159	1.92	27.4
10	N600-4927U	49	27	.111	.178	1.24	38.6

Also approved by the Canadian Standards Assn. for use as type TR-32 radio wiring.
** Suitable for operation at +105°C in air, or up to 80°C in oil.

U.L. STYLE 1010 105°C SERVICE**

U/L APPROVED APPLIANCE WIRING MATERIAL

1/64" vinyl & nylon insulation. U.L. rated: 600 volt electronic use
300 volt appliance use



Nylon

Vinyl Primary Insulation

Stranded Tinned Copper Conductor

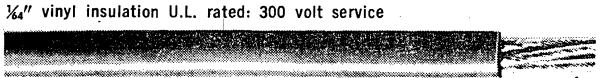
24	N300-1936N	*19	36	.024	.062	26.8	3.25
22	N300-1934N	*19	34	.030	.068	16.7	4.0
20	N300-1932N	19	32	.038	.077	10.5	6.0
18	N300-1930N	19	30	.048	.087	6.57	8.50
16	N300-1929N	19	29	.057	.097	4.85	10.75
14	N300-1927N	19	27	.071	.112	3.05	15.50

* Also available in 7 strand. † Available as Nabond 7 strand.
** Suitable for operation at +105°C in air, or up to 80°C in oil.

U.L. STYLE 1007 80°C SERVICE

U/L APPROVED APPLIANCE WIRING MATERIAL

1/64" vinyl insulation U.L. rated: 300 volt service



Vinyl Primary Insulation

Stranded Tinned Copper Conductor

COLORS: 10 standard colors plus tracer on solid colors.

Gauge (AWG)	National Catalog Number	No. of Strands	Ga. of Strands (AWG)	Nom. Diam. of Stranded Conductor (Inches)	Nom. Fin. Wire Diam. (Inches)	Max. Resistance (dc) at 25°C Ohms/1000 Ft.	Nom. Wt. Per 1000 Ft. (Lbs.)
24†	N303-1936U	*19	36	.024	.057	26.8	2.75
22†	N303-1934U	*19	34	.030	.063	16.7	3.75
20	N303-1932U	*19	32	.038	.071	10.5	5.50
18	N303-1930U	*19	30	.048	.081	6.57	8.0
16	N303-1929U	19	29	.057	.091	4.85	10.0

Also approved by the Canadian Standards Assn. (CSA) as type TR-64 radio wiring for 90°C service.

U.L. STYLE 1061 80°C SERVICE

U/L APPROVED APPLIANCE WIRING MATERIAL

.009" semi-rigid vinyl insulation U.L. rated: 300 volt service

Vinyl Primary Insulation

Stranded Tinned Copper Conductor

28	N304-736U	7	36	.015	.039	69.0	1.0
26	N304-734U	7	34	.019	.043	42.9	1.5
24	N304-1936U	*19	36	.024	.048	26.8	2.0
22	N304-1934U	*19	34	.030	.054	16.7	3.0
20	N304-1932U	*19	32	.038	.062	10.5	4.75
18	N304-1930U	*19	30	.048	.073	6.57	6.5
16	N304-1929	19	29	.057	.082	4.85	9.0

U.L. STYLE 1006 105°C SERVICE

U/L APPROVED APPLIANCE WIRING MATERIAL

.008 P.V.C. plus nylon. Voltage not specified

Nylon

Vinyl Primary Insulation

Stranded Tinned Copper Conductor

24	N305-1936N	19	36	.024	.048	26.8	2.25
22	N305-1934N	19	34	.030	.054	16.7	3.25
20	N305-1932N	19	32	.040	.062	10.5	4.75
18	N305-1930N	19	30	.050	.073	6.57	7.0
16	N305-1929N	19	29	.057	.082	4.85	9.0

* Also available in 7 strand. † Available as Nabond 7 strand.

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NAFOAM & NAFOIL

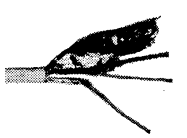
SPECIAL SHIELDED DATA & INSTRUMENTATION CABLES

Designed for Low Level or Low Capacitance Needs
All feature extremely low dielectric leakage both in insulation and outer sheath.
Suitable for very long runs in tray or conduit (1000 ft. and up).

SINGLE CONDUCTOR SHIELDED

Part Number	AWG & Stranding	Drain AWG & Stranding	Insulation & Thickness	Jacket Thickness	Nom. O.D.	Shield % Coverage	Capacitance mmfd/ft	Working Voltage	Surge Impedance Ohms	Temp. °F
S10-516	28(7x38)	—	.086″ NAFOAM	.015″ pvc	.242″	TC Braid 90%*	12	3000	120	+180
S10-328-1	22(19x34)	—	.042″ NAFOAM	.020″ pvc	.182″	90% Braid	20.7	1000	60	+180
S10-328-2						100% NAFOIL & Braid	20.7	1000		
S10-680	22(19x34)	22(7x30)	.032″ poly	.016″ pvc	.135″	NAFOIL & Drain	30	3000	—	+180
S10-679	22(19x34)	24(7x32)	.010″ pvc .002″ nylon	.015″ pvc	.091″	100% NAFOIL & Drain	100	600	25	+221

TWO CONDUCTOR SHIELDED

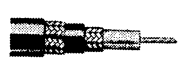


Part Number	AWG & Stranding	Drain AWG & Stranding	Insulation & Thickness	Jacket Thickness	Nom. O.D.	Shield % Coverage	Capacitance mmfd/ft	Working Voltage	Surge Impedance Ohms	Temp. °F
S10-010-1	22(19x34)	—	.042″ NAFOAM	.020″ pvc	.295″	90% Braid	10.6 W-W	1000	120	+180
S10-010-2						100% NAFOIL + Braid				
S10-010-3						NAFOIL only				
S10-681	22(19x34)	22(7x30)	.025″ NAFOAM	.020″ poly	.210″	100% NAFOIL & Drain	15 W-W	600	84	+180
S10-686	22(19x34)	22 (7x30)	.018″ NAFOAM	.020″ poly	.178″	100% NAFOIL & Drain	20	600	63	+180
S10-362	22(19x34)	22(7x30)	.010″ pvc .002″ nylon	.020″ poly	.166″	100% NAFOIL & Drain	40 W-W	600	52	+221

THREE CONDUCTOR SHIELDED

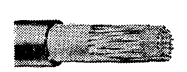
Part Number	AWG & Stranding	Drain AWG & Stranding	Insulation & Thickness	Jacket Thickness	Nom. O.D.	Shield % Coverage	Capacitance mmfd/ft	Working Voltage	Surge Impedance Ohms	Temp. °F
S10-683	22(19x34)	18(19x30)	.042″ NAFOAM	.020″ pvc	.297″	100% NAFOIL & Drain	10	1000	—	+180
S10-684	22(19x34)	20(19x32)	.018″ NAFOAM	.020″ pvc	.185″	100% NAFOIL & Drain	20	600	—	+180
S10-920	22(19x34)	22(7x30)	.010″ pvc .002″ nylon	.020″ poly	.170″	100% NAFOIL & Drain	40 W-W	600	50	+221

TRIAXIAL CABLES (Low Noise)



Part Number	AWG & Stranding	Drain AWG & Stranding	Insulation & Thickness	Jacket Thickness	Nom. O.D.	Shield % Coverage	Capacitance mmfd/ft	Working Voltage	Surge Impedance Ohms	Temp. °F
S10-685	22(19x34)	—	.042″ NAFOAM	Inner: .020″ poly Outer: .020″ pvc	.253″	NAFOIL 100% + Braid Inner & Outer (Suitable for Microvolt Signals)	20 130	600	60	+180

MULTI-CONDUCTOR DATA CABLES (Specify Polyethylene sheath if used for direct burial.)



All Shielded Pr.	Part Number	No. of Subcables	Subcable Type	Sheath Thickness	Nom. O.D.	Wt./M Ft.
Low-Cost	NW-12-362	12	S10-362	.060″ pvc	.800″	320
	NW-19-362	19	S10-362	.065″ pvc	.960″	480
Low Capacity Data Cable	NW-12-010	12	S10-010-2	.125″ Neoprene	1.50″	390
Low Capacity Data Cables	NW-12-328	12	S10-328-2	.060″ pvc	.870″	270
	NW-19-328	19	S10-328-2	.070″ pvc	1.05″	420

CODE: poly (polyethylene), PVC (polyvinyl chloride). * Not preferred for microvolt signals.

ULTRA-FLEXIBLE WIRES

National manufactures a series of extremely limp insulated lead wires for applications requiring very long life in flexing service, minimum kinking and ultra-low bending torque. Temp. range: −40°C to +90°C.

Part No.	AWG	Stranding	Insulation	Diameter	Voltage	Breaking Pull LB.	Resistance, ohms/M′
NF-2801	28	19 x 40	.010″ vinyl	.036″	600.	4.3	69.
NF-2601	26	66 x 44	.010″ vinyl	.042″	600.	7.0	42.9
NF-2401	24	41 x 40	.010″ vinyl	.047″	600.	11.	26.8
NF-2201	22	40 x 38	.015″ vinyl	.062″	600.	20.	16.7
NF-2001	20	103 x 40	.010″ vinyl	.062″	600.	27.	10.5
NF-1801	18	65 x 36	.045″ rubber	.145″	5000.	44.	6.57

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IN STOCK
EXTRA FLEXIBLE

MICRO-MINIATURE CABLES

National Wire & Cable Corp. manufactures a complete line of MICRO-MINIATURE low-voltage instrument control cable. Available as cabled pairs or singles, with optional overall shield.

Conductors are stranded tinned copper with .010″ wall of vinyl primary insulation for use up to 105°C. per MIL-W-16878 Type B, 600 volt working voltage. All are color coded using ten standard colors plus stripes on white per MIL-STD-681.*

Conductors are planetary cabled and helically laid for optimum flexibility, with a barrier under shields. Shielded cables have a tinned copper braid of 85-90% coverage per MIL-C-7078, with braid angles below 40° for easy pushback.

Outer jacket is flexible grey 105°C. vinyl meeting MIL-I-631 Class F. All materials are self-extinguishing and fungus resistant.

STANDARD PUTUPS: 500 and 1000 ft. No-deposit reels.

* Conductors are also UL Listed Style 1061.

TECHNICAL DATA (all cables)

Insulation Breakdown Voltage: Greater than 3000 volts AC RMS, 60 cps.

Capacitance: Nominal capacitance from a wire to all else in a cable ranges from 25. to 45 pf/ft at 1. kc. depending on gauge and position.

Insulation Leakage: 200. megohms/1000 ft. min. @ 500. VDC from any conductor to all else in cable.

Sheath Leakage: 10. megohms/1000 ft. min. @ 500 VDC from shield or conductor group through sheath to ground.

Temperature Range: Suitable for continuous use from −40°C. to +105°C.

Bending Characteristics: All cables are suitable for flexing to a circle diameter of 6. cable diameter from +105°C. to −20°C. Recommended flex diameter should be greater than 20 cable diameters for flexing at −40°C.

MULTI-CONDUCTOR STOCK CABLED SINGLES

UNSHIELDED CABLES							OVERALL SHIELDED CABLES						
PART NO.	NO. COND.	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M′	PART NO.	NO. COND.	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M′
NQ-428 J	4	28	.035	.025	.135	10 Lbs.	NQ-428 SJ	4	28	.035	.025	.160	17 Lbs.
NQ-728 J	7	28	.035	.025	.160	13 Lbs.	NQ-728 SJ	7	28	.035	.025	.185	21 Lbs.
NQ-1228J	12	28	.035	.025	.200	20 Lbs.	NQ-1228SJ	12	28	.035	.025	.220	30 Lbs.
NQ-1928J	19	28	.035	.025	.230	29 Lbs.	NQ-1928SJ	19	28	.035	.025	.250	40 Lbs.
NQ-2728J	27	28	.035	.025	.265	34 Lbs.	NQ-2728SJ	27	28	.035	.025	.290	53 Lbs.

MULTI-CONDUCTOR STOCK CABLED PAIRS †

UNSHIELDED CABLES							OVERALL SHIELDED CABLES						
PART NO.	NO. PAIRS	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M′	PART NO.	NO. PAIRS	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M′
NQP-728 J	7	28	.035	.025	.230	22 Lbs.	NQP-728 SJ	7	28	.035	.025	.255	35 Lbs.
NQP-1228J	12	28	.035	.030	.275	40 Lbs.	NQP-1228SJ	12	28	.035	.030	.300	57 Lbs.
NQP-1928J	19	28	.035	.035	.365	62 Lbs.	NQP-1928SJ	19	28	.035	.035	.390	82 Lbs.

† Pair Color Code is the same as National NWP-Series Cable Color Code.

UNDER-WATER CABLES

IN STOCK
DEEP-WATER
MARINE CABLE

National Wire & Cable Corp. manufactures a standard series of multi-conductor marine cables for under-water signal, control and power use. Cables are suitable for depths to 2500. ft.

Stranded conductors have nylon-over-vinyl insulation for 600. volt service; color-coded per MIL-STD-681.

Conductors are planetary cabled and helically laid with water-blocking compound filling interstices between conductors.

Jacket is tough black poly-ether-urethane compound. Highly abrasion resistant. Readily bonds to polyurethane molding compounds.

PUTUPS: 500 and 1000 ft. No-deposit reels. Special lengths to order.

TECHNICAL DATA (all cables)

Insulation Breakdown Voltage: Greater than 3000. volts AC, RMS, 60 cps.

Insulation Leakage: 200. megohms/1000 ft min. @ 500. volts DC, from any wire to all else in cable.

Sheath Leakage: 10. megohms/1000. ft min. from conductor group through sheath to seawater.

Temperature Range: From −55°C. to +90°C. use or storage.

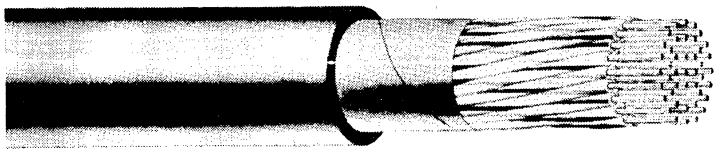
Bend Radius: Suitable for bending to a circle diameter of 8 times cable diameter.

PART NO.	NO. COND.	COND. AWG	JACKET THICK	CABLE O.D.	DRY WT./M′	WET WT./M′	BREAK STRENGTH
NY-716J	7	16	.065	.395	103 Lbs.	43 Lbs.	450 Lbs.
NY-1216J	12	16	.070	.495	164 Lbs.	74 Lbs.	750 Lbs.
NY-1916J	19	16	.075	.585	238 Lbs.	108 Lbs.	1200 Lbs.
NY-2716J	27	16	.075	.680	329 Lbs.	169 Lbs.	1700 Lbs.
NY-712J	7	12	.070	.510	235 Lbs.	145 Lbs.	1100 Lbs.
NY-1212J	12	12	.075	.640	376 Lbs.	226 Lbs.	1900 Lbs.

ALL CABLES AVAILABLE WITH BRONZE MARINE ARMOR BRAID ON REQUEST.

NATIONAL WIRE & CABLE CORPORATION

136 SAN FERNANDO RD., LOS ANGELES, CALIF. 90031 • PHONE (213) 225-5611 • TWX: 910-321-4155 • FED. STOCK CODE H4-04569



IN STOCK
MIL-SPEC
U.L. LISTED

MULTIPLE CONDUCTOR CONTROL CABLES

National Wire & Cable Corporation manufactures a complete line of multiple conductor control cable. Conductors are stranded tinned copper with 1/64" wall of vinyl primary insulation for use up to 105°C per MIL-W-16878 Type C.* Insulated for 1000 volts working voltage. Color coded using 10 standard colors plus stripes on white per MIL-STD-681.

All conductors are planetary cabled and contra-helically laid for optimum flexibility, with a Mylar tape serve over cable bundle. Shielded cables have a tinned copper braid overall, of 85-90% coverage per MIL-C-7078, and braid angles below 40 for easy pushback.

The outer jacket is black abrasion-resistant 105°C vinyl meeting MIL-I-631 Class F. All materials are self-extinguishing and fungus resistant. All cables are U. L. LISTED STYLE 2343; rated 80°C. (Higher temp. ratings apply to any non-U.L. service.) Specify polyurethane sheath for extreme rough usage or low-temp. service.

STANDARD PUTUPS: 100 ft, 500 ft or 1000 ft. No-deposit reels.

* Insulated wires also meet U.L. style 1007 and CSA type TR-64.
† Denotes U.L. Style 2344.

TECHNICAL DATA (all cables)

Insulation Breakdown Voltage: Greater than 8000 volts AC RMS, 60 cps.

Capacitance: Nominal capacitance from a wire to all else in the cable ranges from 40 to 65 mmfd per ft., @ 1000 cps; dependent on gauge and position.

Insulation Leakage Res.: 200. megohms/1000 ft. min. at 500 VDC from any conductor to all else in cable.

Sheath Leakage Res.: 10. megohms/1000 ft. min. at 500 VDC from overall shield through sheath to outside world.

Usable Temp. Range: Suitable for continuous use from +105°C to −55°C.

Cold Bending Capability: All cables are suitable for flexing to a circle diam. of approx. 6 cable diameters from +105°C to −20°C; Recommended flex diameter should be greater than 20 cable diam. for flexing at −40°C., or for continuous flexing service to −55°C, specify polyurethane sheath, in lieu of vinyl sheath.

MULTI-CONDUCTOR STOCK CABLES

Conductor sizes 22, 20, 18, 16, 14 & 12 gauge. 22 AWG is 7 strand. All others 19 strand.

UNSHIELDED

PART NO.	NO. COND.	COND. AWG	JKT. THICK	CABLE O.D.	WEIGHT PER M'
NW-722 J	7	22	.060	.315	40 Lbs.
NW-1222J	12	22	.060	.385	70 Lbs.
NW-1922J	19	22	.060	.440	110 Lbs.
NW-2722J	27	22	.060	.510	160 Lbs.
NW-3722J	37	22	.060	.565	200 Lbs.
NW-4822J	48	22	.060	.635	245 Lbs.
NW-6022J	60	22	.060	.695	300 Lbs.
NW-7222J	72	22	.060	.755	360 Lbs.
NW-8822J	88	22	.060	.820	425 Lbs.
NW-10222J	102	22	.080	.920†	485 Lbs.
NW-720 J	7	20	.060	.340	50 Lbs.
NW-1220J	12	20	.060	.420	105 Lbs.
NW-1920J	19	20	.060	.485	160 Lbs.
NW-2720J	27	20	.060	.565	210 Lbs.
NW-3720J	37	20	.060	.630	280 Lbs.
NW-4820J	48	20	.060	.710	360 Lbs.
NW-6020J	60	20	.060	.775	435 Lbs.
NW-7220J	72	20	.080	.885†	485 Lbs.
NW-8820J	88	20	.080	.960†	580 Lbs.
NW-10220J	102	20	.080	1.030†	670 Lbs.
NW-718 J	7	18	.060	.370	75 Lbs.
NW-1218J	12	18	.060	.460	135 Lbs.
NW-1918J	19	18	.060	.535	225 Lbs.
NW-2718J	27	18	.060	.625	300 Lbs.
NW-3718J	37	18	.060	.700	390 Lbs.
NW-4818J	48	18	.060	.790	510 Lbs.
NW-6018J	60	18	.080	.905†	600 Lbs.
NW-7218J	72	18	.080	.985†	720 Lbs.
NW-716 J	7	16	.060	.395	95 Lbs.
NW-1216J	12	16	.060	.495	155 Lbs.
NW-1916J	19	16	.060	.575	230 Lbs.
NW-2716J	27	16	.060	.615	320 Lbs.
NW-3716J	37	16	.060	.755	430 Lbs.
NW-4816J	48	16	.080	.895†	625 Lbs.
NW-6016J	60	16	.080	.975†	750 Lbs.
NW-714 J	7	14	.060	.435	150 Lbs.
NW-1214J	12	14	.060	.555	240 Lbs.
NW-1914J	19	14	.060	.645	370 Lbs.
NW-2714J	27	14	.060	.760	515 Lbs.
NW-512 J	5	12	.060	.460	175 Lbs.
NW-712 J	7	12	.060	.500	225 Lbs.
NW-1212J	12	12	.060	.680	375 Lbs.
NW-1912J	19	12	.060	.745	560 Lbs.

OVERALL SHIELDED

PART NO.	NO. COND	COND AWG	T.C. SHIELD	JKT. THICK	CABLE O.D.	WEIGHT PER M'
NW-722 SJ	7	22	No. 36	.060	.340	55 Lbs.
NW-1222SJ	12	22	No. 34	.060	.410	90 Lbs.
NW-1922SJ	19	22	No. 34	.060	.465	145 Lbs.
NW-2722SJ	27	22	No. 34	.060	.535	200 Lbs.
NW-3722SJ	37	22	No. 34	.060	.590	245 Lbs.
NW-4822SJ	48	22	No. 34	.060	.660	300 Lbs.
NW-6022SJ	60	22	No. 34	.060	.720	355 Lbs.
NW-7222SJ	72	22	No. 34	.060	.780	425 Lbs.
NW-8822SJ	88	22	No. 34	.080	.895†	500 Lbs.
NW-10222SJ	102	22	No. 34	.080	.945†	560 Lbs.
NW-720 SJ	7	20	No. 34	.060	.365	68 Lbs.
NW-1220SJ	12	20	No. 34	.060	.445	125 Lbs.
NW-1920SJ	19	20	No. 34	.060	.510	195 Lbs.
NW-2720SJ	27	20	No. 34	.060	.590	250 Lbs.
NW-3720SJ	37	20	No. 34	.060	.655	325 Lbs.
NW-4820SJ	48	20	No. 34	.060	.735	415 Lbs.
NW-6020SJ	60	20	No. 34	.060	.800	500 Lbs.
NW-7220SJ	72	20	No. 34	.080	.910†	555 Lbs.
NW-8820SJ	88	20	No. 34	.080	1.035†	660 Lbs.
NW-10220SJ	102	20	No. 34	.080	1.055†	750 Lbs.
NW-718 SJ	7	18	No. 34	.060	.395	95 Lbs.
NW-1218SJ	12	18	No. 34	.060	.485	170 Lbs.
NW-1918SJ	19	18	No. 34	.060	.560	265 Lbs.
NW-2718SJ	27	18	No. 34	.060	.650	350 Lbs.
NW-3718SJ	37	18	No. 34	.060	.725	445 Lbs.
NW-4818SJ	48	18	No. 34	.060	.815	575 Lbs.
NW-6018SJ	60	18	No. 34	.080	.930†	680 Lbs.
NW-7218SJ	72	18	No. 34	.080	1.010†	820 Lbs.
NW-716 SJ	7	16	No. 34	.060	.420	125 Lbs.
NW-1216SJ	12	16	No. 34	.060	.520	195 Lbs.
NW-1916SJ	19	16	No. 34	.060	.600	275 Lbs.
NW-2716SJ	27	16	No. 34	.060	.640	375 Lbs.
NW-3716SJ	37	16	No. 34	.060	.780	500 Lbs.
NW-4816SJ	48	16	No. 34	.080	.920†	700 Lbs.
NW-6016SJ	60	16	No. 34	.080	1.000†	830 Lbs.
NW-714 SJ	7	14	No. 34	.060	.465	180 Lbs.
NW-1214SJ	12	14	No. 34	.060	.580	280 Lbs.
NW-1914SJ	19	14	No. 34	.060	.670	420 Lbs.
NW-2714SJ	27	14	No. 34	.060	.785	575 Lbs.
NW-512 SJ	5	12	No. 34	.060	.485	210 Lbs.
NW-712 SJ	7	12	No. 34	.060	.525	265 Lbs.
NW-1212SJ	12	12	No. 34	.060	.705	430 Lbs.
NW-1912SJ	19	12	No. 34	.060	.770	625 Lbs.

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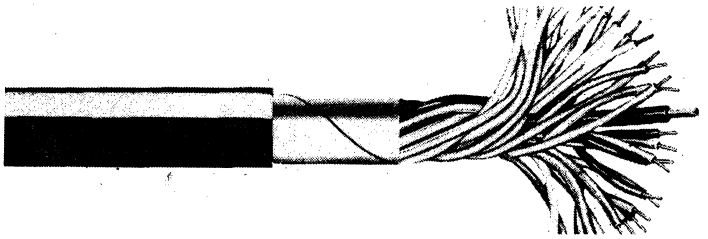


IN STOCK
MIL-SPEC

U.L. LISTED

MULTIPLE PAIR SIGNAL & CONTROL CABLES

IN STOCK
MIL-SPEC

Identical to National's NW-Series Cables except offered as twisted pairs.

National Wire & Cable Corporation manufactures a complete line of multiple pair control cables. Conductors are of tinned copper strand with 1/44" vinyl primary insulation for use up to 105° C per MIL-W-16878D Type C. Insulated for **1000** volts working voltage. Conductors are color coded using 10 standard basic colors, plus spiral tracers on white per table below.

All pairs are planetary cabled and contra-helically laid with a Mylar tape serve over the cable bundle. The overall jacket is a 105°C black vinyl plastic per MIL-I-631; or may be Neoprene to MIL-R-6855 Class 2 Grade 60 specification. (Neoprene at added cost).

SHIELDED CABLES

National Multiple Conductor SHIELDED CABLES are to the same specifications as above with addition of tinned copper braided shield over cable complex with 85-90% coverage to MIL-C-7078A. STANDARD PUT-UPS: 500 ft. and 1000 ft. No-deposit reels.

TECHNICAL DATA (all cables)

Insulation Breakdown Voltage:	Greater than 8,000 volts AC RMS, 60 cps.
Capacitance:	Nominal capacitance wire to wire for a pair ranges from 27. to 40. mmfd/ft. Capacitance from both wires tied together measured to all else in common ranges from 35. to 60. mmfd/ft. dependent on gauge and position. Overall shield has negligible effect on W-W capacitance.
Insulation Leakage Res.:	200. megohms / 1000 ft. min. at 500 VDC from any conductor to all else in cable.
Sheath Leakage Res.:	10. megohms / 1000 ft. min. at 500 VDC from overall shield through sheath to outside world.
Usable Temp. Range:	Suitable for continuous use from +105°C to −55°C.
Cold Bending Capability:	All cables are suitable for flexing to a circle diam. of approx. 6 cable diameters from +105°C to −20°C; Recommended flex diameter should be greater than 20 cable diam. for flexing at −40°C., or for continuous flexing service to −55°C, specify our neoprene sheath, in lieu of plastic sheath.

MULTIPLE PAIR STOCK CABLES

UNSHIELDED OVERALL

PART NO.	NO. OF PAIRS	COND. GA.	JKT. THICK	O.D.	WEIGHT
NWP-722 J	7	22	.045	.470	90 Lbs.
NWP-1222J	12	22	.050	.600	150 Lbs.
NWP-1922J	19	22	.050	.700	200 Lbs.
NWP-2722J	27	22	.055	.830	280 Lbs.
NWP-3722J	37	22	.060	.960	370 Lbs.
NWP-4822J	48	22	.060	1.080	470 Lbs.
NWP-6022J	60	22	.060	1.200	560 Lbs.
NWP-720 J	7	20	.050	.520	120 Lbs.
NWP-1220J	12	20	.050	.660	200 Lbs.
NWP-1920J	19	20	.050	.800	290 Lbs.
NWP-2720J	27	20	.060	.960	420 Lbs.
NWP-3720J	37	20	.060	1.100	500 Lbs.
NWP-4820J	48	20	.060	1.240	620 Lbs.
NWP-6020J	60	20	.060	1.380	750 Lbs.
NWP-718 J	7	18	.050	.580	150 Lbs.
NWP-1218J	12	18	.050	.740	290 Lbs.
NWP-1918J	19	18	.060	.920	400 Lbs.
NWP-2718J	27	18	.060	1.080	560 Lbs.
NWP-3718J	37	18	.060	1.240	750 Lbs.
NWP-4818J	48	18	.060	1.400	900 Lbs.
NWP-716 J	7	16	.050	.640	180 Lbs.
NWP-1216J	12	16	.060	.840	300 Lbs.
NWP-1916J	19	16	.060	1.020	430 Lbs.
NWP-2716J	27	16	.060	1.200	720 Lbs.
NWP-3716J	37	16	.060	1.380	1000 Lbs.

MULTIPLE PAIR STOCK CABLES

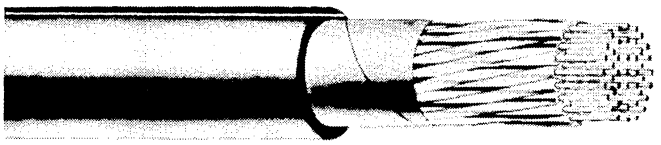
OVERALL SHIELDED

PART NO.	NO. OF PAIRS	COND. GA.	JKT. THICK	O.D.	WEIGHT
NWP-722 SJ	7	22	.045	.495	135 Lbs.
NWP-1222SJ	12	22	.050	.630	206 Lbs.
NWP-1922SJ	19	22	.050	.730	260 Lbs
NWP-2722SJ	27	22	.055	.860	358 Lbs
NWP-3722SJ	37	22	.060	.990	460 Lbs
NWP-4822SJ	48	22	.060	1.110	570 Lbs.
NWP-6022SJ	60	22	.060	1.230	675 Lbs.
NWP-720 SJ	7	20	.050	.550	170 Lbs.
NWP-1220SJ	12	20	.050	.690	260 Lbs.
NWP-1920SJ	19	20	.050	.830	355 Lbs.
NWP-2720SJ	27	20	.060	.990	510 Lbs
NWP-3720SJ	37	20	.060	1.130	603 Lbs.
NWP-4820SJ	48	20	.060	1.270	735 Lbs.
NWP-6020SJ	60	20	.060	1.410	880 Lbs.
NWP-718 SJ	7	18	.050	.610	205 Lbs.
NWP-1218SJ	12	18	.050	.770	360 Lbs.
NWP-1918SJ	19	18	.060	.950	487 Lbs.
NWP-2718SJ	27	18	.060	1.110	660 Lbs.
NWP-3718SJ	37	18	.060	1.270	865 Lbs
NWP-4818SJ	48	18	.060	1.430	1030 Lbs.
NWP-716 SJ	7	16	.050	.670	240 Lbs.
NWP-1216SJ	12	16	.060	.870	377 Lbs.
NWP-1916SJ	19	16	.060	1.050	520 Lbs.
NWP-2716SJ	27	16	.060	1.230	830 Lbs.
NWP-3716SJ	37	16	.060	1.410	1330 Lbs.

COLOR CODING USED ON TWISTED PAIRS

PR #	PAIR COLORS	PR #	PAIR COLORS	PR #	PAIR COLORS	PR #	PAIR COLORS	PR #	PAIR COLORS	PR #	PAIR COLORS
1.	WHITE WITH BLACK	11.	BLACK WITH RED	21.	BROWN WITH GREEN	31.	ORANGE WITH YELLOW	41.	GREEN WITH VIOLET	51	WHT/BLK WITH GREEN
2.	WHITE WITH BROWN	12.	BLACK WITH ORANGE	22.	BROWN WITH BLUE	32.	ORANGE WITH GREEN	42.	GREEN WITH GRAY	52.	WHT/BLK WITH BLUE
3.	WHITE WITH RED	13.	BLACK WITH YELLOW	23.	BROWN WITH VIOLET	33.	ORANGE WITH BLUE	43.	BLUE WITH VIOLET	53.	WHT/BLK WITH VIOLET
4.	WHITE WITH ORANGE	14.	BLACK WITH GREEN	24.	BROWN WITH GRAY	34.	ORANGE WITH VIOLET	44.	BLUE WITH GREY	54.	WHT/BLK WITH GRAY
5.	WHITE WITH YELLOW	15.	BLACK WITH BLUE	25.	RED WITH ORANGE	35.	ORANGE WITH GRAY	45.	VIOLET WITH GRAY	55.	WHT/BRN WITH BLACK
6.	WHITE WITH GREEN	16.	BLACK WITH VIOLET	26	RED WITH YELLOW	36	YELLOW WITH GREEN	46.	WHT/BLK WITH BLACK	56.	WHT/BRN WITH BROWN
7.	WHITE WITH BLUE	17.	BLACK WITH GRAY	27.	RED WITH GREEN	37.	YELLOW WITH BLUE	47.	WHT/BLK WITH BROWN	57.	WHT/BRN WITH RED
8.	WHITE WITH VIOLET	18.	BROWN WITH RED	28.	RED WITH BLUE	38.	YELLOW WITH VIOLET	48.	WHT/BLK WITH RED	58.	WHT/BRN WITH ORANGE
9.	WHITE WITH GRAY	19.	BROWN WITH ORANGE	29.	RED WITH VIOLET	39.	YELLOW WITH GRAY	49.	WHT/BLK WITH ORANGE	59.	WHT/BRN WITH YELLOW
10.	BLACK WITH BROWN	20.	BROWN WITH YELLOW	30.	RED WITH GRAY	40.	GREEN WITH BLUE	50.	WHT/BLK WITH YELLOW	60.	WHT/BRN WITH GREEN

NATIONAL WIRE & CABLE CORPORATION



IN STOCK
U.L. APPROVED COMPUTER GRADE

MINIATURE SIGNAL & CONTROL CABLES

National Wire & Cable Corp. manufactures a complete line of MINIATURE low voltage signal and control cable. Available as cabled pairs or cabled singles, with optional overall shield. Conductors are stranded tinned copper with .010" wall of vinyl primary insulation for use up to 105°C. per MIL-W-16878 Type B. Insulated for **600 volts** working voltage. (Also meets U.L. AWM Type 1061; 300 volt, 80°C.) All are coded using 10 standard colors plus stripes on white per MIL-STD-681.

All conductors are planetary cabled and contra-helically laid for optimum flexibility, with a Mylar tape barrier under shields. Shielded cables have a tinned copper braid overall, of 85–90% coverage per MIL-C-7078; and braid angles below 40° for easy pushback.

The outer jacket is black abrasion-resistant 105°C. vinyl meeting MIL-I-631 Type F. All materials are self-extinguishing and fungus resistant. All items are U.L. APPROVED STYLE 2343 COMPUTER CABLE; rated 80°C. (Higher temp. ratings apply for any non-U.L. service.)

Standard Putups: 500 & 1000 ft. No-deposit reels.

† Denotes U.L. Style 2344.

TECHNICAL DATA (all cables)

Insulation Breakdown Voltage:	Greater than 5000 volts AC RMS, 60 cps.
Capacitance:	Nominal capacitance from a wire to all else in a cable ranges from 45. to 70. pf/ft at 1. kc, depending on gauge and position.
Insulation Leakage:	200. megohms/1000 ft. min. @ 500. VDC from any conductor to all else in cable.
Sheath Leakage:	10. megohms/1000 ft. min. @ 500 VDC from shield or conductor group through sheath to ground.
Temperature Range:	Suitable for continuous use from −40°C. to +105°C. (U.L. Service limited to +80°C.)
Bending Characteristics:	All cables are suitable for flexing to a circle diameter of 6. cable diameters from +105°C. to −20°C. Recommended flex diameter should be greater than 20 cable diameters for flexing at −40°C.
Impedance: (24. AWG pairs)	Balanced: 87. ohms ±5% Unbalanced: 52. ohms ±5%

MULTI-CONDUCTOR STOCK CABLED SINGLES

Cond: 22, 24 are 7 strand; 20 AWG is 19 strand

UNSHIELDED CABLES

PART NO.	NO. COND.	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M'
NX-524 J	5	24	.045	.062	.220	32 Lbs.
NX-724 J	7	24	.045	.062	.250	40 Lbs.
NX-1224J	12	24	.045	.062	.300	53 Lbs.
NX-1524J	15	24	.045	.062	.330	65 Lbs.
NX-1924J	19	24	.045	.062	.340	73 Lbs.
NX-2724J	27	24	.045	.062	.390	85 Lbs.
NX-3724J	37	24	.045	.062	.420	120 Lbs.
NX-4824J	48	24	.045	.062	.470	142 Lbs.
NX-6024J	60	24	.045	.062	.510	170 Lbs.
NX-522 J	5	22	.050	.062	.200	40 Lbs.
NX-722 J	7	22	.050	.062	.270	48 Lbs.
NX-1222J	12	22	.050	.062	.330	72 Lbs.
NX-1522J	15	22	.050	.062	.350	85 Lbs.
NX-1922J	19	22	.050	.062	.370	96 Lbs.
NX-2722J	27	22	.050	.062	.430	130 Lbs.
NX-3722J	37	22	.050	.062	.480	163 Lbs.
NX-4822J	48	22	.050	.062	.530	210 Lbs.
NX-6022J	60	22	.050	.062	.570	255 Lbs.
NX-520 J	5	20	.057	.062	.275	49 Lbs.
NX-720 J	7	20	.057	.062	.290	59 Lbs.
NX-1220J	12	20	.057	.062	.360	90 Lbs.
NX-1520J	15	20	.057	.062	.390	110 Lbs.
NX-1920J	19	20	.057	.062	.410	128 Lbs.
NX-2720J	27	20	.057	.062	.490	166 Lbs.
NX-3720J	37	20	.057	.062	.520	220 Lbs.
NX-4820J	48	20	.057	.062	.580	275 Lbs.
NX-6020J	60	20	.057	.062	.640	335 Lbs.

OVERALL SHIELDED CABLES

PART NO.	NO. COND.	COND. AWG	COND. O.D.	JKT. WALL	SHLD. AWG	CABLE O.D.	WEIGHT LB/M'
NX-524 SJ	5	24	.045	.062	36	.245	44 Lbs.
NX-724 SJ	7	24	.045	.062	36	.275	55 Lbs.
NX-1224SJ	12	24	.045	.062	36	.325	68 Lbs.
NX-1524SJ	15	24	.045	.062	36	.350	80 Lbs.
NX-1924SJ	19	24	.045	.062	36	.365	88 Lbs.
NX-2724SJ	27	24	.045	.062	36	.415	102 Lbs.
NX-3724SJ	37	24	.045	.062	36	.445	140 Lbs.
NX-4824SJ	48	24	.045	.062	36	.495	172 Lbs.
NX-6024SJ	60	24	.045	.062	36	.535	205 Lbs.
NX-522 SJ	5	22	.050	.062	36	.285	50 Lbs.
NX-722 SJ	7	22	.050	.062	36	.295	58 Lbs.
NX-1222SJ	12	22	.050	.062	36	.355	87 Lbs.
NX-1522SJ	15	22	.050	.062	36	.380	101 Lbs.
NX-1922SJ	19	22	.050	.062	36	.395	111 Lbs.
NX-2722SJ	27	22	.050	.062	36	.455	150 Lbs.
NX-3722SJ	37	22	.050	.062	34	.510	193 Lbs.
NX-4822SJ	48	22	.050	.062	34	.560	245 Lbs.
NX-6022SJ	60	22	.050	.062	34	.600	295 Lbs.
NX-520 SJ	5	20	.057	.062	36	.300	59 Lbs.
NX-720 SJ	7	20	.057	.062	36	.315	69 Lbs.
NX-1220SJ	12	20	.057	.062	36	.385	105 Lbs.
NX-1520SJ	15	20	.057	.062	36	.415	137 Lbs.
NX-1920SJ	19	20	.057	.062	36	.435	158 Lbs.
NX-2720SJ	27	20	.057	.062	36	.515	196 Lbs.
NX-3720SJ	37	20	.057	.062	34	.550	255 Lbs.
NX-4820SJ	48	20	.057	.062	34	.610	320 Lbs.
NX-6020SJ	60	20	.057	.062	34	.670	385 Lbs.

MULTI-CONDUCTOR STOCK CABLED PAIRS*

UNSHIELDED CABLES

PART NO.	NO. PAIRS	COND. AWG	COND. O.D.	JKT. WALL	CABLE O.D.	WEIGHT LB/M'
NXP-524 J	5	24	.045	.062	.330	52 Lbs.
NXP-724 J	7	24	.045	.062	.350	60 Lbs.
NXP-1224J	12	24	.045	.062	.435	90 Lbs.
NXP-1524J	15	24	.045	.062	.485	110 Lbs.
NXP-1924J	19	24	.045	.062	.505	126 Lbs.
NXP-2724J	27	24	.045	.062	.590	167 Lbs.
NXP-3724J	37	24	.045	.062	.660	216 Lbs.
NXP-4824J	48	24	.045	.062	.745	270 Lbs.
NXP-6024J	60	24	.045	.062	.815	325 Lbs.
NXP-522 J	5	22	.050	.062	.365	56 Lbs.
NXP-722 J	7	22	.050	.062	.390	82 Lbs.
NXP-1222J	12	22	.050	.062	.470	120 Lbs.
NXP-1522J	15	22	.050	.062	.545	145 Lbs.
NXP-1922J	19	22	.050	.062	.550	170 Lbs.
NXP-2722J	27	22	.050	.062	.670	230 Lbs.
NXP-3722J	37	22	.050	.062	.750	300 Lbs.
NXP-4822J	48	22	.050	.080	.850	375 Lbs.
NXP-6022J*	60	22	.050	.080	.930	460 Lbs.
NXP-520 J	5	20	.057	.062	.395	82 Lbs.
NXP-720 J	7	20	.057	.062	.440	108 Lbs.
NXP-1220J	12	20	.057	.062	.540	163 Lbs.
NXP-1520J	15	20	.057	.062	.600	196 Lbs.
NXP-1920J	19	20	.057	.062	.630	235 Lbs.
NXP-2720J	27	20	.057	.062	.745	320 Lbs.
NXP-3720J	37	20	.057	.062	.820	420 Lbs.
NXP-4820J	48	20	.057	.080	† .950	530 Lbs.
NXP-6020J	60	20	.057	.080	†1.040	650 Lbs.

OVERALL SHIELDED CABLES

PART NO.	NO. PAIRS	COND. AWG	COND. O.D.	JKT. WALL	T.C. SHIELD	CABLE O.D.	WEIGHT LB/M'
NXP-524 SJ	5	24	.045	.062	No. 36	.355	67 Lbs.
NXP-724 SJ	7	24	.045	.062	No. 36	.375	75 Lbs.
NXP-1224SJ	12	24	.045	.062	No. 36	.460	115 Lbs.
NXP-1524SJ	15	24	.045	.062	No. 36	.510	140 Lbs.
NXP-1924SJ	19	24	.045	.062	No. 36	.530	161 Lbs.
NXP-2724SJ	27	24	.045	.062	No. 34	.620	211 Lbs.
NXP-3724SJ	37	24	.045	.062	No. 34	.690	266 Lbs.
NXP-4824SJ	48	24	.045	.062	No. 34	.775	330 Lbs.
NXP-6024SJ*	60	24	.045	.062	No. 34	.845	390 Lbs.
NXP-522 SJ	5	22	.050	.062	No. 36	.390	77 Lbs.
NXP-722 SJ	7	22	.050	.062	No. 36	.415	100 Lbs.
NXP-1222SJ	12	22	.050	.062	No. 36	.495	150 Lbs.
NXP-1522SJ	15	22	.050	.062	No. 34	.575	185 Lbs.
NXP-1922SJ	19	22	.050	.062	No. 34	.580	210 Lbs.
NXP-2722SJ	27	22	.050	.062	No. 34	.600	280 Lbs.
NXP-3722SJ	37	22	.050	.062	No. 34	.780	357 Lbs.
NXP-4822SJ*	48	22	.050	.080	No. 34	†.880	445 Lbs.
NXP-6022SJ*	60	22	.050	.080	No. 34	†.960	535 Lbs.
NXP-520 SJ	5	20	.057	.062	No. 36	.420	102 Lbs.
NXP-720 SJ	7	20	.057	.062	No. 36	.465	123 Lbs.
NXP-1220SJ	12	20	.057	.062	No. 34	.570	203 Lbs.
NXP-1520SJ	15	20	.057	.062	No. 34	.630	241 Lbs.
NXP-1920SJ	19	20	.057	.062	No. 34	.660	280 Lbs.
NXP-2720SJ	27	20	.057	.062	No. 34	.775	380 Lbs.
NXP-3720SJ*	37	20	.057	.080	No. 34	† .850	490 Lbs.
NXP-4820SJ*	48	20	.057	.080	No. 34	† .980	605 Lbs.
NXP-6020SJ*	60	20	.057	.080	No. 34	†1.070	735 Lbs.

*Pair Color Code is the same as National NWP-Series Cable Coding.

NATIONAL WIRE & CABLE CORPORATION

MILITARY & U.L. GRADE RFI SHIELDED PAIR CABLES

MEETS U.L. STYLE 2343 OR 2344 FOR COMPUTER USE.

SHIELDED PAIR CABLES

SIGNAL & CONTROL CABLES

National Wire & Cable Corp., manufactures a complete line of flexible multi-pair cables in which each pair is individually twisted, shielded and plastic-jacketed.

Provides a minimum of crosstalk between signal channels, plus complete isolation between shields. Excellent for analog signals. All jackets moisture-proof. Suitable for use in duct, conduit, aerial or burial installations.

Conductors are stranded tinned copper with .010″ vinyl primary insulation, plus .004″ nylon insulation over the vinyl per MIL-W-16878 Type B. Insulation for 600 volts working rating at 105°C. Color coded: White and black (all conductors are 19 strand.)

Shielding is tinned copper braid with 90% minimum coverage per MIL-C-7078, and shield angle below 40 degrees for easy push-back.

Jackets over shields are extruded 105°C white polyvinyl chloride plastic per MIL-I-631, Class F; Color coded with stripes per MIL-STD-681, starting with 9.

All pairs are planetary cabled and contra-helically laid with a mylar tape serve over the cable bundle. The overall sheath is abrasion-resistant black 105°C vinyl thermoplastic per MIL-I-631, Class F.

Optional overall shielding of cabled bundle is 90% minimum coverage of tinned copper braid applied per MIL-C-7078 over the tape serve under sheath.

STANDARD PUT-UPS: 500 & 1000 FT. ON NO-DEPOSIT REELS.

TECHNICAL DATA

Insulation Breakdown Voltage: Greater than 5000 volts RMS, 60 hz.

Capacitance: (mmfd/ft.)

AWG	Wire-Wire	Wire-Shield
22	37	64
20	44	77
16	55	96

Insulation Leakage Resistance: 200 Megohms/1000 ft. min. at 500 VDC from any conductor to all else in cable.

Sheath Leakage Resistance: 10 Megohms/1000 ft. min. at 500 VDC from overall shield through sheath to saline bath at 25°C.

Usable Temperature Range: Suitable for continuous use from +105°C to −55°C when stationary. Flexing service: +105°C to −25°C.

Cold Bending Capability: All cables are suitable for bending to a circle diameter of 8 cable diameters from +105°C to −20°C. Recommended flex diameter should be greater than 20 cable diameters at −40°C.

Crosstalk: Common-mode, adjacent pairs: Worst case, −50 db @ 1 mhz; falling to −100 db below 100 khz. (Ref. MIL-C-23437 for test method.) For 100 ft. test length.

STANDARD CONSTRUCTIONS

WITHOUT OVERALL SHIELD

Part No.	No. Pairs	Cond. AWG	Jacket Thick.	Cable O.D.	Weight Per M′
NTP-722J	7	22	.062	.625	260 Lbs.
NTP-1222J	12	22	.070	.820	435 Lbs.
NTP-1922J	19	22	.080	.980	660 Lbs.
NTP-2722J	27	22	.080	1.115	910 Lbs.
NTP-3722J	37	22	.085	1.130	1,200 Lbs.
NTP-4822J	48	22	.090	1.520	1,570 Lbs.
NTP-720J	7	20	.070	.685	300 Lbs.
NTP-1220J	12	20	.080	.890	500 Lbs.
NTP-1920J	19	20	.080	1.065	755 Lbs.
NTP-2720J	27	20	.085	1.270	1,055 Lbs.
NTP-3720J	37	20	.090	1.445	1,400 Lbs.
NTP-716J	7	16	.075	.845	430 Lbs.
NTP-1216J	12	16	.080	1.105	700 Lbs.
NTP-1916J	19	16	.085	1.325	1,075 Lbs.

WITH OVERALL SHIELD

Part No.	No. Pairs	Cond. AWG	Jacket Thick.	Cable O.D.	Weight Per M′
NTP-722SJ	7	22	.062	.650	310 Lbs.
NTP-1222SJ	12	22	.070	.845	500 Lbs.
NTP-1922SJ	19	22	.075	1.005	700 Lbs.
NTP-2722SJ	27	22	.080	1.120	1,000 Lbs.
NTP-3722SJ	37	22	.085	1.355	1,290 Lbs.
NTP-4822SJ	48	22	.090	1.545	1,700 Lbs.
NTP-720SJ	7	20	.070	.710	355 Lbs.
NTP-1220SJ	12	20	.080	.920	570 Lbs.
NTP-1920SJ	19	20	.080	1.090	840 Lbs.
NTP-2720SJ	27	20	.085	1.295	1,155 Lbs.
NTP-3720SJ	37	20	.090	1.470	1,500 Lbs.
NTP-716SJ	7	16	.080	.870	500 Lbs.
NTP-1216SJ	12	16	.080	1.130	795 Lbs.
NTP-1916SJ	19	16	.085	1.350	1,185 Lbs.

MIL-SPEC FOR ROUGH USAGE & EXTREME ENVIRONMENTS

TEFLON® -INSULATED CABLES

SIGNAL & CONTROL CABLES

National Wire & Cable Corp., manfactures a standard line of TEFLON®-INSULATED multi-conductor signal and control cables designed for extreme environments and rough usage.

Construction is widely used in aerospace and industrial applications requiring a near-ultimate in cable physical and electrical performance plus high reliability.

Conductors are stranded silver-plated copper, insulated with .010″ of extruded TFE Teflon®; rated at 600 volts working from −65°C to +260°C per MIL-W-16878 Type E. Conductors are color coded using 10 standard colors plus spiral stripes on white per MIL-STD-681. (All conductors are 19 strand.)

All conductors are planetary cabled and contra-helically laid for optimum flexibility, with a Mylar tape wrap over the cabled bundle. The outer sheath is abrasion-resistant black Neoprene per MIL-S-6855, Class 2, Grade 60.

Optional overall shield is a 90% coverage tinned copper braid over the tape wrap per MIL-C-7078.

STANDARD PUT-UPS: 250 FT. LENGTHS ON NO-DEPOSIT REELS.

® Trademark, E. I. Dupont Co.

TECHNICAL DATA

Insulation Breakdown Voltage: Greater than 4000 volts RMS, 60 hz.

Capacitance: Nominal capacitance from a wire to all else in cable ranges from 25 to 45 mmfd/ft. dependent on gauge and position in cable bundle.

Insulation Leakage Resistance: 5000 Megohms per 1000 ft.; minimum from any wire to all else in cable.

Sheath Leakage Resistance: 20 Megohms/ft. minimum; from shield through sheath to saline bath after 24 hr. at 25°C.

Usable Temperature Range: Suitable for continuous use from −55°C to +75°C in flexing service or stored.

Cold Bending Capability: All cables are suitable for bending to a circle diameter as small as 4 times their diameter from −55°C to +75°C. Continuous flexing to less than 6 times diameter is not recommended below −40°C.

General Performance: All materials are self-extinguishing after exposure to flame. Non-nutrient to fungus. Highly resistant to ozone, oils, mild acids and bases, high humidity.

STANDARD CONSTRUCTIONS

Part No.	No. Cond.	Cond. AWG	Jacket Thick.	Cable O.D.	Weight Per M′
NZ-720J	7	20	.062	.300	70 Lbs.
NZ-1220J	12	20	.062	.365	100 Lbs.
NZ-1920J	19	20	.078	.445	145 Lbs.
NZ-2720J	27	20	.078	.505	210 Lbs.
NZ-3720J	37	20	.093	.590	260 Lbs.
NZ-4820J	48	20	.093	.650	330 Lbs.
NZ-6020J	60	20	.093	.705	400 Lbs.
NZ-716J	7	16	.062	.355	95 Lbs.
NZ-1216J	12	16	.078	.470	160 Lbs.
NZ-1916J	19	16	.078	.540	235 Lbs.
NZ-2716J	27	16	.093	.655	325 Lbs.
NZ-3716J	37	16	.093	.720	435 Lbs.
NZ-4816J	48	16	.093	.805	545 Lbs.

Part No.	No. Cond.	Cond. AWG	Jacket Thick.	Cable O.D.	Weight Per M′
NZ-720SJ	7	20	.062	.325	80 Lbs.
NZ-1220SJ	12	20	.062	.400	115 Lbs.
NZ-1920SJ	19	20	.078	.470	165 Lbs.
NZ-2720SJ	27	20	.078	.535	240 Lbs.
NZ-3720SJ	37	20	.093	.616	300 Lbs.
NZ-4820SJ	48	20	.093	.675	370 Lbs.
NZ-6020SJ	60	20	.093	.730	450 Lbs.
NZ-716SJ	7	16	.062	.380	110 Lbs.
NZ-1216SJ	12	16	.078	.495	190 Lbs.
NZ-1916SJ	19	16	.078	.565	270 Lbs.
NZ-2716SJ	27	16	.093	.680	370 Lbs.
NZ-3716SJ	37	16	.093	.745	485 Lbs.
NZ-4816SJ	48	16	.093	.830	605 Lbs.

NATIONAL WIRE & CABLE CORPORATION

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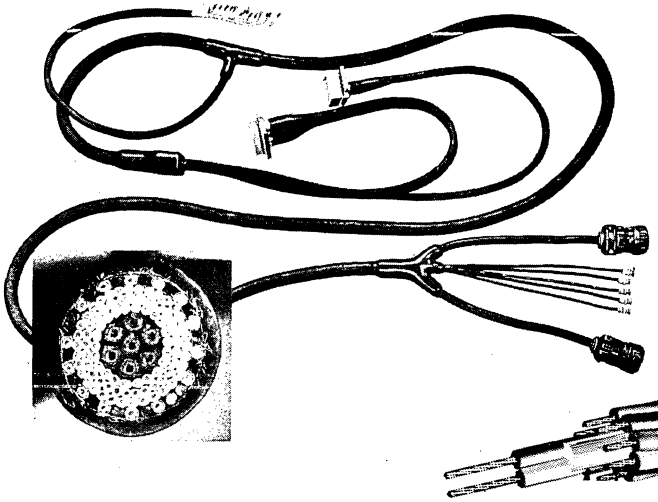
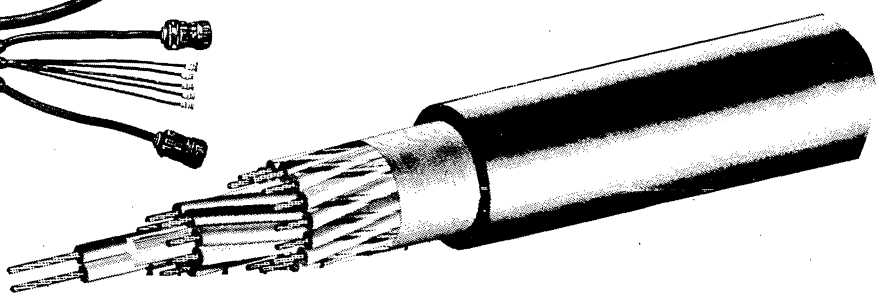


COMPLETE WIRE MILL & CABLE MILL FACILITIES TO MEET YOUR NEEDS



CUSTOM-MADE CABLE TO YOUR OWN SPECIFICATIONS....

IS AVAILABLE PROMPTLY – AND AT LOWER COST THAN YOU MAY SUPPOSE . . .

BECAUSE NATIONAL HAS:

1- **The organization & experience** to handle short-runs or rush schedules with consistent quality.

2- **All types of mill machinery** for fabricating cable and all intermediate operations.

3- **An enormous wire inventory** to draw from for material for your cable. (over 100 million feet in stock)

4- **Technical consultants** to aid you in properly specifying your cable needs and construction.

Mr. DESIGNER: May we suggest:

A. **Request a copy of our complete Master Catalog. Write to us on your company letterhead, or phone us directly in Los Angeles with your request**
Then . . .

B. Check our catalog section and the instrumentation cable section for any of our standard stock cables which may meet your needs.

C. Review our cable designer's check list in the "Technical Information" section of the Master Catalog. Note any topics on which you may need information or recommendations.

D. Call National Wire & Cable Corp. (213-225-5611) and discuss your needs with our Technical Consultants. They speak your language and will have the answers you need.

E. Our Consultants will assist you in design, obtain cost and delivery information, and provide formal quotations and drawings, and assist with sales and procurement liaison.

F. Send us your prints for your custom cables for review and quotation. Where necessary, National Wire and Cable will provide engineering at no cost to fit your needs.

TRY OUR SERVICE, AND SEE!

NATIONAL WIRE & CABLE CORPORATION IS UNIQUE AMONG THE LEADING MANUFACTURERS OF CONTROL AND INSTRUMENTATION CABLE FOR THE ELECTRONIC AND AEROSPACE INDUSTRY. UNIQUE, DUE TO OUR HUGE WIRE INVENTORY – OVER 100 MILLION FEET IN STOCK – WHICH ALLOWS VERY RAPID DELIVERY OF CABLE, AND EXCELLENT SERVICE TO OUR WIRE CUSTOMERS.

COMPLETE FACILITIES FOR FABRICATING ALL CONSTRUCTIONS.

COPPER CONDUCTOR FABRICATION
CONDUCTOR INSULATION EXTRUSION
INSULATION CODING & STRIPING
ELECTRICAL SHIELDING
TWISTING & SUBCABLE FABRICATION
PLANETARY CABLE FABRICATION
CABLE SHEATH EXTRUSION
CABLE ASSEMBLY FABRICATION

NATIONAL WIRE & CABLE CORPORATION

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DIGITAL DATA TRANSMISSION CABLES

Manufactured by our affiliate, Dynatronic Cable Engineering Corp.

THE D-200 SERIES CABLES ARE MULTIPLE-PAIR FLEXIBLE CABLES DESIGNED FOR TRANSMISSION OF DIGITAL PULSE SIGNALS BETWEEN A COMPUTER AND ITS PERIPHERAL EQUIPMENT.

These cables are specifically designed for use with TTL, ECL, DTL or RTL logic systems. They feature signal pairs with a uniform high surge impedance, low delay, low capacitance and attenuation.

The cables may be directly driven by I.C.'s in either balanced or single-ended systems. The compact cable dimensions allow convenient connector installation and tight installation bends.

All cables have an overall shield and black vinyl outer sheath.

The D-200 series cables are designed to be used in either balanced or single-ended systems without the need for individual shields on each pair. By omitting the shields, the surge impedance is kept high yet the cable size is small. The cable geometry, pair and layer lay lengths, rotation directions, and the insulation materials and sizes have been carefully designed for low cross-talk and exact surge impedance.

All cable lengths are factory-tested for surge impedance accuracy using time-domain reflectometry techniques; and are certified to meet the impedance tolerances specified.

STANDARD DATA CABLE CONSTRUCTIONS

Part No.	No. of Pairs	Z_0	Delay ns/ft.	Cond. AWG	Cable Diam.	Sheath
D-200-15	15	110.	1.61	24	.500	PVC
D-200-20	20	110.	1.61	24	.550	PVC
D-200-24	24	110.	1.61	24	.680	PVC
D-200-27	27	110.	1.61	24	.690	PVC
D-200-30	30	110.	1.61	24	.710	PVC
D-200-33	33	110.	1.61	24	.750	PVC
D-200-42	42	110.	1.61	24	.850	PVC
D-200-48	48	110.	1.61	24	.890	PVC
D-200-50	50	110.	1.61	24	.910	PVC

All items available in 50 ft. multiples.

TECHNICAL DATA

Characteristic	Balanced**	Single-Ended*
Surge Impedance	110 ohms ±5%	78 ohms ±4%
Capacitance	14 pf/ft.	21 pf/ft.
Signal Delay	1.61 ns/ft.	1.61 ns/ft.
DC Resistance/100 ft.	5.6 ohms loop	2.8 ohms
Insulation Breakdown	6 KV min. DC	6 KV min. DC
Insulation Resistance	> 1000 megohms/M′	> 1000 megohms/M′
Temperature Range	−20°C up to +80°C	
Min. Bend Radius	6 x cable diameter	

* One conductor of each pair tied to common. ** Both driven, one inverted.

DESIGN FEATURES OF THE D-200 SERIES DIGITAL DATA CABLE

Unlike conventional flexible cable construction, the primary features offered by the D-200 series data cable are the high and accurately-controlled characteristic impedance of every pair, regardless of its position in the cable;† and special geometry chosen to reduce crosstalk.†

ADVANTAGES:

1—Less crosstalk and noise from mismatched loads, due to proper matching.

2—Uniform light loading on drivers allows direct I.C. drive, accurate prediction of current demands from power supply, and driver power dissipation.

3—Proper load match reduces re-reflection and inversion noise where driver end is not matched to line (typical of TTL).

4—Special geometry and pair construction provides exceptionally close capacitance balance between pair wires, reducing differential crosstalk.†

USAGE:

We recommend use of **balanced drive** and **differential-input line receivers** for lowest crosstalk and best pulse-reproduction, utilizing the 110 ohm balanced impedance of the pairs. With such a system, TTL and MECL speeds have been used on D-200 cable at 1 mc data rates over 1000 ft.

Where the system is single-ended drive and receive, all pairs exhibit the 78 ohm impedance. Since these line receivers cannot discriminate between noise and the desired signal, crosstalk limits the cable distance over which transmission is reliable. Typical runs for DTL having 50 ns risetimes are 200 ft. Where risetimes can be slowed to longer than 100 ns, run lengths are practical to 500 ft. Without differential line reception, runs over 500 ft. are not recommended for D-200 cable due to external noise aspects. The **D-210** series cable is recommended for high-noise or long-run application (utilizing individual shields).

† Patent pending

Although use of balanced drive and differential line reception will avoid most noise problems, there are some installations where the expected external noise is unknown but assumed to be very great. Here, the use of data cables having individually-shielded pairs may be considered as conservative engineering practice. The assurance of a lower received noise may justify the increased size, cost and risetime.

For these high-noise long-run applications, Dynatronic Cable Engineering Corp. has developed the D-210 series data cables. Electrical performance is essentially the same as the D-200 series cables, which use only an overall shield. An overall tinned-copper shield braid may be specified on either series by the suffix -RF on the part number. Standard D-200 shield is aluminum-mylar foil.

STANDARD DATA CABLE CONSTRUCTIONS

D-210 Series Cables			Individually-shielded Data Pairs			
Part No.	No. of Pairs	Z_0	Delay ns/ft.	Cond. AWG	Cable Diam.	Sheath
D-210-12	12	110.	1.61	24	.980	PVC
D-210-15	15	110.	1.61	24	1.06	PVC
D-210-20	20	110.	1.61	24	1.20	PVC
D-210-30	30	110.	1.61	24	1.42	PVC
D-210-40	40	110.	1.61	24	1.69	PVC
D-210-48	48	110.	1.61	24	1.76	PVC

TECHNICAL DATA

Characteristic	Balanced**	Single-Ended*
Surge Impedance	110 ohms ±5%	63 ohms ±4%
Capacitance	14 pf/ft.	23.5 pf/ft.
Signal Delay	1.61 ns/ft.	1.61 ns/ft.
DC Resistance/100 ft.	5.6 ohms loop	2.8 ohms
Insulation Breakdown	6 KV min. DC	6 KV min. DC
Insulation Resistance	> 1000 megohms/M′	> 1000 megohms/M′
Temperature Range	−20°C up to +80°C	
Min. Bend Radius	9 x cable diameter	

** Both driven, one inverted. * One conductor of each pair tied to common.

National Cable Molding Corp., Division of:

NATIONAL WIRE & CABLE CORPORATION

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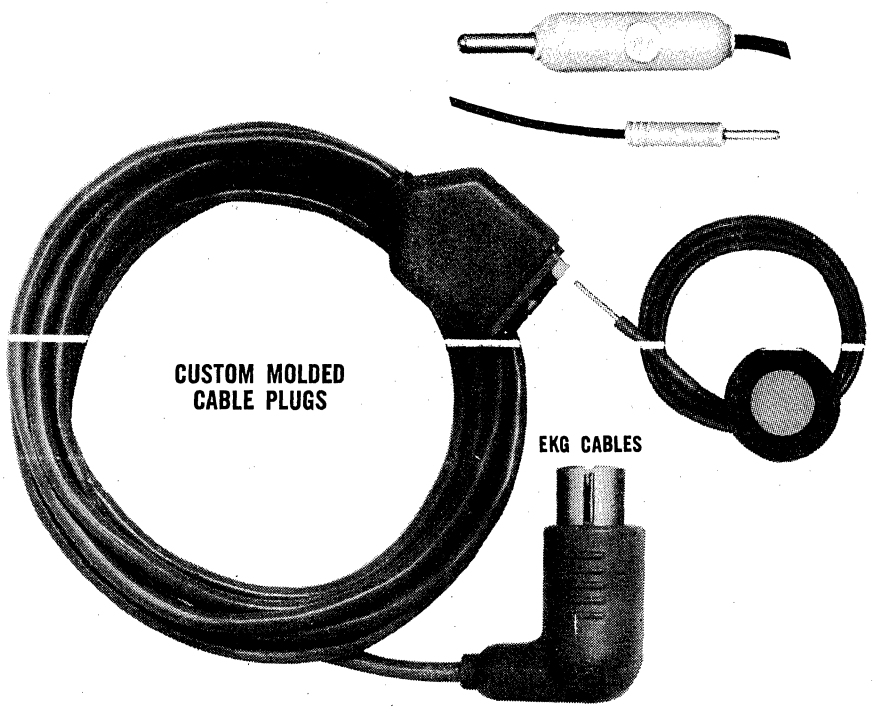
CONNECTOR/CABLE ASSEMBLIES — INTEGRAL-MOLDED

WE SPECIALIZE IN HI-SPEED INJECTION-MOLDING OF CONNECTORS DIRECTLY ONTO CABLES.

Connectors Are Created Directly on Cable by Injection of Plastic Around Contacts, Cable & Hardware; Using Our Proprietary High-Production Techniques.

WE MANUFACTURE:

- MOLDED TEST LEADS
- MOLDED SCOPE PROBES
- MOLDED MEDICAL CABLES
- MOLDED ELECTRODES
- MOLDED CORD CONNECTORS
- MOLDED PATCH CABLES
- MOLDED COMPUTER PLUGS
- MOLDED CABLE ASSEMBLIES



WE ARE A COMPLETE SOURCE:

MANUFACTURING: Since we manufacture all wire, cable, contacts, hardware, molding and tooling within our own facilities, we can ensure consistent quality and dependable delivery. Complete wire & cable mill plus injection-molding plant.

STANDARD ITEMS: We have many standard cables and molded connector styles; all available without tooling or setup expense.

ENGINEERING: Complete engineering and design services to assist you. Cables and molded connectors custom-designed to your requirements. Extra-flexible and low-capacitance construction are our specialty.

CALL OR WRITE FOR INFORMATION & PRICES

O.E.M. ANNUAL USAGE CONTRACTS INVITED.

How to use eem

to find manufacturers of a specific product

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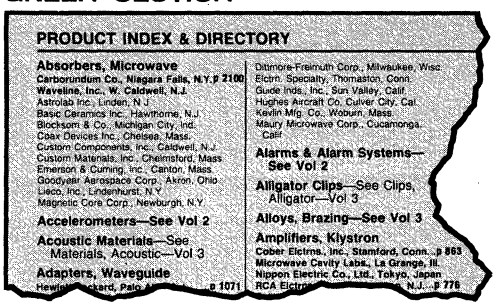
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Gude Inds., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

Amplifiers, Klystron
Cober Elctrns., Inc., Stamford, Conn. p 863
Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Electron ... N.J. p 776

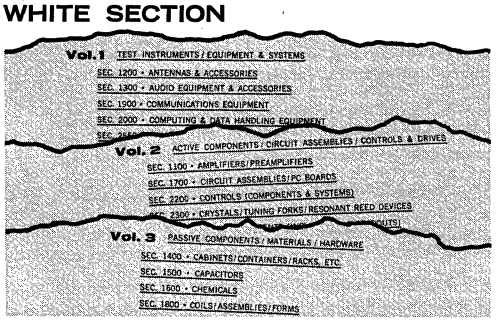
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION


Vol. 1 TEST INSTRUMENTS / EQUIPMENT & SYSTEMS
SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS/TUNING FORKS/RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS/CONTAINERS/RACKS, ETC
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

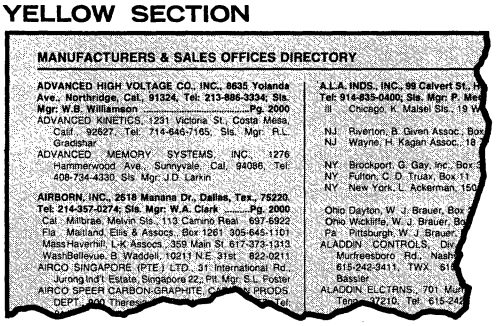
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION


MANUFACTURERS & SALES OFFICES DIRECTORY

ADVANCED HIGH VOLTAGE CO., INC., 8635 Yolanda Ave., Northridge, Cal., 91324, Tel: 213-886-3334; Sls. Mgr: W.B. Williamson ..... Pg. 2000
ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165, Sls. Mgr: R.L. Gradshar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal, 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

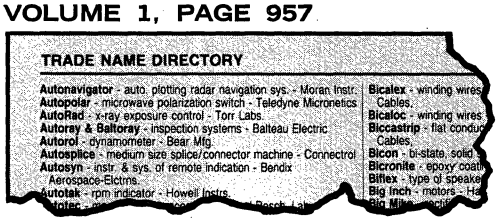
AIRBORN, INC., 2618 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-0274; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real - 697-6922
Fla: Maitland, Ellis & Assocs., Box 1261 305-645-1101
Mass-Haverhill, L-K Assocs., 359 Main St. 617-373-1213
WashBellevue, D. Waddell, 10211 N.E. 31st., 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l Estate, Singapore 22; Pit. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, ... PRODS. DEPT., ... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Me...
Ill: Chicago, K. Maisel Sls., 19 W...
NJ: Riverton, B. Given Assoc., Box...
NJ: Wayne, H. Kagan Assoc., 18...
NY: Brockport, G. Gay, Inc., Box...
NY: Fulton, C. D. Truax, Box 11...
NY: New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa: Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Dis... Murfreesboro Rd., Nash... 615-242-9411, TWX: 61... Bassler
ALADDIN ELCTRNS., 701 Mur... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - X-ray exposure control - Torr Labs.
Autorey & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotak - rpm indicator - Howell Instrs.
... - Bosch ...
Bicalex - winding wires... Cables
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables
Bicon - bi-state, solid ...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Ha...
... - ...

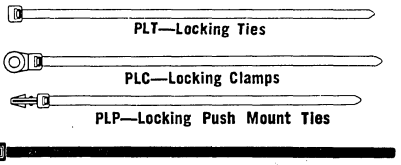
If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

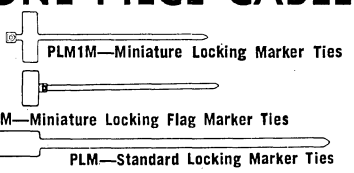
if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

PANDUIT® wiring components

PAN-TY® ONE PIECE CABLE TIES





**** Part Number System:**

PLT 2 S-M 6

Type — Size — Cross-Section Size — Pkg. Size — Color

For clamps the letter and number after cross-section designate hole size. Example: -S6 is #6 screw.

STANDARD PACKAGING*

**Part Number	Max. Bundle Dia.	Approx. Shpg. Wt. Lbs./1000	Price Per 100	
			Base Price 100-400	500
PLT1M-C	3/4"	1	$2.88	$2.30
PLT1.5M-C	1 1/4"	1.2	3.05	2.44
PLT1.5I-C	1 1/4"	1.2	3.13	2.50
PLT2I-C	2"	2.5	4.12	3.30
PLT3I-C	3"	3.8	7.25	5.80
PLT4I-C	4"	4.7	9.35	7.48
PLT2S-C	1 3/4"	2.9	4.00	3.20
PLT3S-C	3"	4.2	8.50	6.80
PLT4S-C	4"	5.3	9.25	7.40
PLT4H-C	4"	12	13.13	10.50
PLT8H-L	8"	24	30.00	24.00
PLC1M-S4-C	3/4"	1.2	4.75	3.80
PLC1.5I-S8-C	1 1/4"	2.2	5.38	4.30
PLC2S-S6-C	1 3/4"	3.8	6.13	4.90
PLC2S-S10-C	1 3/4"	3.8	5.13	4.10
PLC4H-S25-L	4"	13.5	19.38	15.50
PLM1M-C	3/4"	1.2	6.13	4.90
PLF1M-C	3/4"	1.2	6.13	4.90
PLM2S-C	1 3/4"	3.2	9.00	7.20
PLM4S-C	4"	6	15.00	12.00
PLP1.5I-C	1 1/4"	1.6	5.20	4.16
PLP2S-C	1 3/4"	3.4	6.50	5.20
†PRT2S-C20	2"	2.5	4.50	3.60

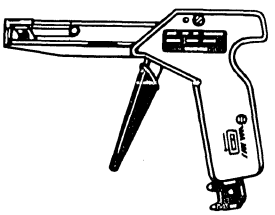
BULK PACKAGING*

These items available in bulk packaging quantities only as designated.

**Part Number	Price Per M (1000)			
	1M-24.5M	25M-49.5M	50M-99.5M	100M
PLT1M-M	$13.20	$12.60	$11.99	$11.55
PLT1.5M-M	17.44	16.64	15.85	14.49
PLT1.5I-M	18.02	17.20	16.39	15.02
PLT2I-M	21.71	20.73	19.74	18.11
PLT3I-M	43.56	41.58	39.60	36.30
PLT4I-M	48.51	46.30	44.10	—
PLT2S-M	22.18	21.17	20.16	18.48
PLT3S-M	46.20	44.10	42.00	—
PLT4S-M	50.82	48.51	46.20	—
PLT4H-D	80.30	76.40	72.77	—
PLT8H-D	171.10	163.30	155.50	—
PLC1M-S4-M	29.50	28.30	27.10	—
PLC1.5I-S8-M	35.00	31.00	29.80	—
PLC2S-S6-M	40.00	36.00	34.00	—
PLC2S-S10-M	31.00	29.50	27.90	—
PLC4H-S25-D	125.00	113.00	106.00	—
PLM1M-M	40.00	36.00	34.00	—
PLF1M-M	40.00	36.00	34.00	—
PLM2S-D	50.00	47.50	45.00	—
PLM4S-D	93.00	86.00	81.00	—
PLP1.5I-M	31.10	29.40	28.00	—
PLP2S-M	40.00	36.00	34.00	—
†PRT2S-M20	26.40	25.20	24.00	22.00

*Packaging quantities indicated by letter suffix in part no. L = 50; C = 100; D = 500; M = 1000.
†PRT2S Standard color is -20 Pigmented Black. Other colors — 10% additional price.
Total quantity per item, shipment and order determines price. Order by Number of Pieces Required.
Colors: Standard Color — Natural Nylon White. Other Colors — 10% additional price.

Hand Operated Installation Tools



GS2B — Manual $25.00 ea. net. Installs Miniature, Intermediate and Standard Cable Ties. Uniform tensioning and cutoff.

GS4H — Manual $50.00 ea. net. Heavy Duty — Installs Standard and Heavy Cable Ties. Uniform tensioning and cutoff.

PANDUCT® PLASTIC WIRING DUCT

Type E — Open Slot

PANDUCT® PLASTIC WIRING DUCT

PANDUCT® PLASTIC WIRING DUCT—CHANNEL ONLY

Nominal Width x Height (Inches)	Approx. Shpg. Wt. Per 100'	Price/Foot		
		Under 200 ft.	200 to 1999 ft.	2000 to 4999 ft.
.5x.5	11 lbs.	$0.49	$0.38	$0.35
.5x.62	12 lbs.	.51	.41	.38
.5x1	16 lbs.	.55	.44	.42
.5x1.25	16 lbs.	.63	.50	.45
.5x1.75	16 lbs.	.66	.53	.50
.75x.75	14 lbs.	.54	.43	.41
.75x1	16 lbs.	.55	.44	.42
.75x1.5	19 lbs.	.66	.52	.49
.75x2	23 lbs.	.80	.64	.59
1x1	16 lbs.	.55	.45	.42
1x1.5	18 lbs.	.73	.60	.55
1x2	21 lbs.	.78	.62	.58
1x3	31 lbs.	.99	.80	.73
1.5x1.5	20 lbs.	.78	.63	.57
1.5x2	20 lbs.	.85	.68	.62
1.5x3	30 lbs.	1.07	.86	.79
1.5x4	40 lbs.	1.37	1.10	1.01
2x1	18 lbs.	.77	.62	.55
2x2	23 lbs.	.86	.69	.63
2x3	36 lbs.	1.11	.88	.81
2x4	48 lbs.	1.42	1.14	1.05
2.5x3	41 lbs.	1.18	.94	.87
3x1	20 lbs.	.93	.73	.69
3x2	33 lbs.	1.01	.80	.73
3x3	43 lbs.	1.21	.96	.88
3x4	53 lbs.	1.49	1.20	1.10
4x1.5	33 lbs.	1.06	.85	.79
4x2	38 lbs.	1.08	.87	.80
4x3	48 lbs.	1.29	1.04	.95
4x4	58 lbs.	1.60	1.28	1.18

CORRESPONDING PANDUCT® COVER ONLY

Nominal Width (Inches)	Approx. Shpg. Wt./100'	Price/Foot		
		Under 200 ft.	200 to 1999 ft.	2000 to 4999 ft.
.5	4 lbs.	$0.11	$0.09	$0.08
.75	6 lbs.	.12	.10	.09
1	9 lbs.	.16	.12	.11
1.5	10 lbs.	.18	.15	.14
2	12 lbs.	.23	.18	.16
2.5	14 lbs.	.27	.23	.19
3	17 lbs.	.32	.26	.24
4	22 lbs.	.41	.32	.29

PART NUMBER SYSTEM

Channel Only — Example

E 1.5 x 2 LG 6

Type — 1.5" Wide — 2" High — Light Gray — 6' Long

Cover Only — Example

C 1.5 LG 6

Cover — 1.5" Wide — Light Gray — 6' Long

Color Code:
Dark Gray (DG);
Light Gray (LG);
White (WH).

Order by Total No. of Ft. Req'd. (must be multiple of length per part). Standard Mounting Holes: No Charge — Supplied Only if Specified — See Duct Catalog for Dimensions.
NOTE: Standard Length: 6 ft. Standard Color: Light Gray. White and Dark Gray available. NOTE: Type "S" has solid walls and no wire slots or openings.
NOTE: Total length of all sizes of duct and cover, ordered for shipment at one time to one location, determines price columns.

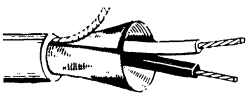
Delivery: F.O.B. Our plant. Minimum Billing: $25.00 net, each customer-designated shipment. Terms: Cash Discount 2%, 10 net 30. FREIGHT ALLOWED via PANDUIT routing on domestic shipments of $300.00 or more net billing. All prices subject to change without notice.

PANDUIT CORP. 17301 Ridgeland Ave., Tinley Park, Ill. 60477 • Phone: 312 — 532-1800 • TELEX 25-4560

SAXTON PRODUCTS INC. is a Complete Source for all Types of Industrial, Commercial and Military Wire and Cable. Listed here are only a few of the Product Groups which Saxton regularly carries in Stock. Many more Stock types are available and countless types can be made to order. We specialize in small quantities and immediate deliveries.

AUDIO CABLES

ALUMINUM FOIL — 100% SHIELDING



Tinned copper, vinyl insulation, aluminum polypropylene foil, tinned copper drain wire, chrome vinyl jacket.

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Nom. OD	Suggested Working Voltage
1291	2	22	7 x 30	.012	.165	350
1292	3	22	7 x 30	.012	.173	350
1293	2	20	10 x 30	.016	.195	350
1294	3	20	10 x 30	.016	.204	350
1295	2	18	16 x 30	.016	.213	450
1296	3	18	16 x 30	.016	.223	450
1297	2	16	19 x 29	.018	.241	600
1298	3	16	19 x 29	.018	.258	600

1291, 1292 have 24 AWG Drain; 1293, 1294 have 22 AWG Drain; 1295, 1296 have 20 AWG Drain; 1297, 1298 have 18 AWG Drain.
Color Code: 1 - Black, 2 - Red, 3 - White.

BRAID SHIELD — UNJACKETED

TINNED COPPER, VINYL INSULATION, BRAIDED TINNED COPPER SHIELD

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Nom. OD	Suggested Working Voltage
1445	2	22	Solid	.012	.120	350
1450	2	20	10 x 30	.016	.146	350
1451	2	18	16 x 30	.016	.180	450
1451/R*	2	18	16 x 30	.016	.180	450
1452	2	16	19 x 29	.018	.206	450

1451R — 2 CONDUCTOR SHIELDED WITH 20 AWG SOLID TINNED COPPER RUNNER

* Meets New York City Board of Education Specification.

BRAID SHIELD — JACKETED

TINNED COPPER, VINYL INSULATION, TINNED COPPER BRAID SHIELD, CHROME VINYL JACKET

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Nom. OD	Suggested Working Voltage
1456	2	20	Solid	.016	.194	350
1458	2	22	7 x 30	.012	.180	350
1459	2	20	10 x 30	.016	.210	350
1459/1	3	20	10 x 30	.016	.217	350
1460	2	18	16 x 30	.016	.225	450

Color Code: 1 - Black, 2 - Red, 3 - White.

SPIRAL WRAP SHIELD — JACKETED

TINNED COPPER, VINYL INSULATION, SPIRAL WRAP TINNED COPPER SHIELD, CHROME VINYL JACKET

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Nom. OD	Suggested Working Voltage
1400	1	22	7 x 30	.012	.105	350
1401	2	22	7 x 30	.012	.150	350
1403	2	20	10 x 30	.016	.200	350
1404	3	20	10 x 30	.016	.209	350
1406	2	18	16 x 30	.016	.218	450
1407	2	16	19 x 29	.018	.246	450

Color Code: 1 - Black, 2 - Red, 3 - White.

TWISTED PAIRS AND TRIPLETS

SOLID TINNED COPPER, VINYL INSULATION, CABLED

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Suggested Working Voltage
1318	2	22	Solid	.012	350
1320	2	20	Solid	.016	350
1321	3	20	Solid	.016	350
1322	2	18	Solid	.018	450

Color Code: 1 - Black, 2 - Red, 3 - White.

TINNED COPPER, VINYL INSULATION, CABLED

Saxton No.	Conductors No.	AWG	Strands	Wall Thick	Suggested Working Voltage
1326	2	22	7 x 30	.012	350
1327	3	22	7 x 30	.012	350
1328	2	20	10 x 30	.012	350
1329	3	20	10 x 30	.012	350
1330	2	18	16 x 30	.012	450
1331	3	18	16 x 30	.012	450
1332	2	16	19 x 29	.012	600

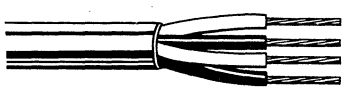
Color Code: 1 - Black, 2 - Red, 3 - White.

FIRE AND BURGLAR ALARM WIRE

One Conductor tinned, one bare, vinyl insulation, cabled brown or ivory.

Saxton No.	Conductors No.	AWG	Strands	Wall Thick
2600	2	22	Solid	.025
2601	2	22	7 x 30	.025
2602	2	20	10 x 30	.025
2603	2	20	10 x 30	.025
2605	2	18	16 x 30	.025

MULTICONDUCTOR CABLES — NOT PAIRED



Saxton No.	Conductors No.	AWG	Strands	Ins. Thick	Nom. OD	Suggested Working Voltage
1370	2	22	7 x 30	.012	.155	200
1371	3	22	7 x 30	.012	.160	200
1372	4	22	7 x 30	.012	.165	200
1373	5	22	7 x 30	.012	.187	200
1374	6	22	7 x 30	.012	.215	200
1375	7	22	7 x 30	.012	.218	200
1376	8	22	7 x 30	.012	.220	200
1378	10	22	7 x 30	.012	.260	200
1379	12	22	7 x 30	.012	.270	200
3144	15	22	7 x 30	.012	.320	200
3145	20	22	7 x 30	.012	.345	200
3146	25	22	7 x 30	.012	.370	200
3147	30	22	7 x 30	.012	.405	200

Saxton PRODUCTS, INC.
215 N. ROUTE 303, CONGERS, N. Y. 10920

MULTICONDUCTOR CABLES — NOT PAIRED

TINNED COPPER, VINYL INSULATION, CABLED, CHROME VINYL JACKET

Saxton No.	Conductors No.	AWG	Strands	Ins. Thick	Nom. OD	Suggested Working Voltage
1334	2	22	Solid	.012	.150	200
1335	3	22	Solid	.012	.155	200
1336	4	22	Solid	.012	.160	200
1337	5	22	Solid	.012	.175	200
1338	6	22	Solid	.012	.200	200
1340	8	22	Solid	.012	.205	200
1342	10	22	Solid	.012	.230	200
1343	12	22	Solid	.012	.250	200
1345	2	20	Solid	.016	.178	350
1346	3	20	Solid	.016	.187	350
1381	2	20	10 x 30	.016	.190	350
1382	3	20	10 x 30	.016	.199	350
1383	4	20	10 x 30	.016	.225	350
1384	5	20	10 x 30	.016	.235	350
1385	6	20	10 x 30	.016	.270	350

TINNED COPPER, VINYL INSULATION, CABLED, CHROME VINYL JACKET

1357	2	18	Solid	.016	.194	450
1358	3	18	Solid	.016	.203	450
1359	4	18	Solid	.016	.220	450
1393	2	18	16 x 30	.016	.208	450
1394	3	18	16 x 30	.016	.218	450
1395	4	18	16 x 30	.016	.258	450
1396	5	18	16 x 30	.016	.268	450
1397	6	18	16 x 30	.016	.288	450

TINNED COPPER, VINYL INSULATION, CABLED CHROME VINYL JACKET

1800	2	16	19 x 29	.018	.236	600
1801	3	16	19 x 29	.018	.253	600
1802	4	16	19 x 29	.018	.282	600

MULTICONDUCTOR PAIRED — SOUND CABLES

TINNED COPPER, VINYL INSULATION, PAIRED CABLED, CHROME VINYL JACKET

Saxton No.	Conductors No. Pairs	AWG	Strands	Ins. Thick	Nom. OD	Suggested Working Voltage
1412	2	22	Solid	.012	.185	200
1413	3	22	Solid	.012	.220	200
1414	6	22	Solid	.012	.235	200
1415	7	22	Solid	.012	.295	200
1416	9	22	Solid	.012	.355	200
1417	11	22	Solid	.012	.385	200
1418	13	22	Solid	.012	.410	200
1419	15	22	Solid	.012	.455	200
1421	27	22	Solid	.012	.520	200

TINNED COPPER, VINYL INSULATION, PAIRED, CHROME VINYL JACKET

Saxton No.	Conductors No. Pairs	AWG	Strands	Ins. Thick	Nom. OD	Suggested Working Voltage
1426	2	22	7 x 30	.012	.197	200
1427	3	22	7 x 30	.012	.250	200
1428	4	22	7 x 20	.012	.255	200
1429	5	22	7 x 30	.012	.285	200
1430	6	22	7 x 30	.012	.320	200
1431	9	22	7 x 30	.012	.380	200
1432	11	22	7 x 30	.012	.425	200
1433	15	22	7 x 30	.012	.480	200
1434	27	22	7 x 30	.012	.575	200

COAXIAL CABLES

CONDUCTOR AND SHIELD

SBC - solid bare copper; **BC** - bare copper; **SC** - silver coated copper; **TC** - tinned copper; **SBCW** - solid bare copperweld; **BCW** - bare copperweld; **SCW** - silver coated copperweld.

JACKET

PVC - polyvinychloride; **NCV** - non contaminating vinyl; **PE** - polyethylene.

SCCW - silver coated copperweld; **TFE** - polytetrafluoroethylene; **FGB** - fiberglass braid; **FEP** - fluorinated ethylene propylene.
All Shields are braided unless otherwise noted.

DIELECTRIC

PE - polyethylene; **SSPE** - semi-solid polyethylene; **FOAM** - unicellular polyethylene foam.

COAXIAL CABLE

POLYETHEYLENE DIELECTRICS

Saxton No.	RG/U	Center Cond. AWG-Matl.	Dielectric	No. Type/Shield	Jkt. Matl.	Nom. OD	Nom. Imp.	Nom. Cap.	Nominal Loss Characteristics Frequency in MHz db/100' 100	200	400	1000
1582	8 Type	7 (.0285) BC	PE	1 BC Com.	PVC	.405	52	29.5	2.4	3.7	5.0	9.5
8282	8	7 (.0285) BC	PE	1 BC Max.	PVC	.405	52	29.5	2.2	3.2	4.6	9.0
1583	8 Type	7 (.0285) BC	Foam	1 BC Com.	PVC	.405	50	29.5	2.1	3.1	4.4	8.8
8283	8 Type	7 (.0285) BC	Foam	1 BC Max.	PVC	.405	50	29.5	2.1	3.0	4.2	8.5
1584	8A	7 (.0285) BC	PE	1 BC	NCV	.405	52	29.5	2.2	3.2	4.6	9.0
8009B	9B	7 (.0285) SC	PE	2 SC	NCV	.420	50	30.8	2.2	3.2	4.6	9.0
1585	11	7 (.0159) BC	PE	1 BC	PVC	.405	75	20.6	2.2	3.2	4.6	9.0
1586	11 Type	14 Solid BC	Foam	1 BC	PVC	.405	75	20.6	2.0	3.0	4.2	8.6
1587	11A	7 (.0159) BC	PE	1 BC	NCV	.405	75	20.6	2.2	3.2	4.6	9.0
8055B	55B	.320 SC	PE	2 TC	Clear PE	.206	53.5	28.5	4.3	6.0	8.8	16.5
8089	58	20 Solid BC	PE	1 TC	PVC	.195	53.5	28.5	4.6	7.0	10.0	17.5
1590	58A	19 (.0071) TC	PE	1 TC	PVC	.195	53.5	28.5	4.9	7.3	11.0	20.0
1591	58C	19 (.0071) TC	PE	1 TC	NCV	.195	50.0	30.8	4.9	7.3	11.0	20.0
1589	58 Type	20 Solid BC	PE	1 BC	PVC	.195	53.5	28.5	4.8	7.2	10.3	17.9
1600	58A Type	19 (.0071) TC	Foam	1 TC	PVC	.195	50.0	28.5	4.8	6.8	9.7	17.2

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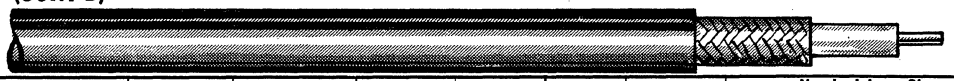
COAXIAL CABLE — (CONT'D)



Saxton No.	RG/U	Center Cond. AWG-Matl.	Dielectric	No. Type/Shield	Jkt. Matl.	Nom. OD	Nom. Imp.	Nom. Cap.	Nominal Loss Characteristics Frequency in MHz db/100′ 100	200	400	1000
8062	62	22 SBCW	SSPE	1 BC	PVC	.242	93	13.5	2.8	3.7	5.2	8.5
8062A	62A	22 SBCW	SSPE	1 BC	NCV	.242	93	13.5	2.8	3.7	5.2	8.5
8062B	62B	7 (.0080) BCW	SSPE	1 BC	NCV	.242	93	13.5	3.0	4.3	6.0	10.5
8063B	63B	22 SBCW	SSPE	1 BC	NCV	.405	125	10.0	1.5	2.3	3.4	5.7
8071	71	22 SBCW	SSPE	2 TC	PVC	.250	93	13.5	2.8	3.7	5.2	8.5
8122	122	27 (.0050) TC	PE	1 TC	NCV	.160	50	29.4	6.9	11.0	16.6	29.2
8174	174	7 (.0063) BCW	PE	1 TC	PVC	.100	50	30.8	8.9	12.0	17.5	31.0
8213	213	7 (.0296) BC	PE	1 BC	NCV	.405	50	30.8	2.2	3.2	4.6	9.0
8214	214	7 (.0296) SC	PE	2 SC	NCV	.425	50	30.8	2.2	3.2	4.6	9.0
8223	223	.035 SC	PE	2 SC	NCV	.216	50	30.8	4.3	6.0	8.8	16.5
TEFLON DIELECTRIC												
8141	141A	.0359 SCCW	TFE	1 SC	FGB	.190	50	29.4	3.9	5.5	8.0	13.0
8142B	142B	.0390 SCCW	TFE	2 SC	FEP	.195	50	29.4	3.9	5.5	8.0	13.0
8178B	178B	7 (.0040) SCCW	TFE	1 SC	FEP	.075	50	29.4	13.3	20.0	27.5	45.0
8179B	179B	7 (.0040) SCCW	TFE	1 SC	FEP	.100	95	19.5	9.8	12.7	15.8	25.0
8180B	180B	7 (.0040) SCCW	TFE	1 SC	FEP	.145	95	15.4	5.1	7.3	10.4	16.5
8187A	187A	7 (.0040) SCCW	TFE	1 SC	TFE	.110	75	19.5	9.8	12.7	15.8	25.0
8188A	188A	7 (.0067) SCCW	TFE	1 SC	TFE	.110	50	29.4	11.5	15.0	16.6	30.0
8196	196	7 (.0040) SCCW	TFE	1 SC	TFE	.080	50	29.4	13.3	20.0	27.5	45.0
8303	303	.0390 Solid SCCW	TFE	1 SC	FEP	.170	50	29.4	3.9	5.5	8.0	13.0
8316	316	7 (.0067) SCCW	TFE	1 SC	FEP	.102	50	29.4	11.5	15.0	16.5	30.0

SPECIFICATIONS & SWEEP TEST DATA RG59/U TYPE & ALUMINAX CABLES

Cat. No.	Type	Illustration	Inner Cond.	Dielectric	Shield Type	Jacket Type	Nom. OD	Nom. Imped. Ohms	Cap. MMF/Ft.	Nom. Vel. Prop.	Nominal Attenuation/100 Ft. MHz	db Loss
1592	RG 59/U Regular	PVC Jacket / Braided Shield	22 Solid BCW*	Poly	BC Braid	PVC	.242	73	21.0	66%	54-60 82-88 174-180 210-216	2.8 3.6 6.2 6.8
1594	RG 59/U Regular Foam	PVC Jacket / Braided Shield	22 Solid BCW*	Unicel Foam	BC Braid	PVC	.242	75	16.3	78%	54-60 82-88 174-180 210-216 470 890	2.4 3.2 4.5 4.8 7.3 16.0
1598	All Channel RG 6/U Type	PVC Jacket / Braided Shield	22 Solid BCW*	Unicel Foam	BC Braid	PVC	.28	72	17.0	78%	54-60 82-88 174-180 210-216 470 890	1.9 2.2 2.9 3.3 4.0 6.7
1599	Aluminax 75	4 Drain Wires / Jacket / Alum. Shield	22 Solid BCW*	Unicel Foam	1 100% Aluminum Foil Shield	PVC	.237	75	16.5	78%	54-60 82-88 174-180 210-216 470 890	2.3 3.1 3.4 3.7 4.6 9.0
1601	Aluminax 82 Channel RG 6/U Type	4 Drain Wires / Jacket / Alum. Shield	18 Solid Bare Copper	Unicel Foam	1 100% Aluminum Foil Shield	PVC	.242	75	17.3	78%	54-60 82-88 174-180 210-216 470 890	1.7 2.0 2.7 3.0 3.7 6.5
1602	Aluminax Double Shielded 82 Channel RG 6/U Type	Jacket / 4 Drain Wires / Shield #2 / Shield #1	18 Solid Bare Copper	Unicel Foam	2 100% Aluminum Foil Shields	PVC	.248	75	17.3	78%	54-60 82-88 174-180 210-216 470 890	1.6 1.8 2.6 2.8 3.4 6.3
8292	RG 59/U Regular Max. Coverage	PVC Jacket / Max. Braided Shield	22 Solid BCW*	Poly	1 Max. Coverage BC Braid	PVC	.242	73	21.0	66%	54-60 82-88 174-180 210-216 470 890	2.5 3.5 5.2 5.8 9.0 22.5
8294	RG 59/U Foam Max. Coverage	PVC Jacket / Max. Braided Shield	22 Solid BCW*	Unicel Foam	1 Max. Coverage BC Braid	PVC	.242	75	16.3	78%	54-60 82-88 174-180 210-216 470 890	2.4 3.1 4.0 4.3 5.0 9.5

100% Sweep Tested

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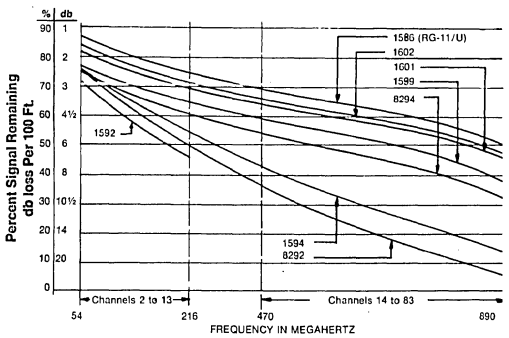
ATTENUATION CURVES FOR CABLES
(NOMINAL VALUES)



TV CHANNELS TABLE

Channel No.	Freq. Range	Channel No.	Freq. Range	Channel No.	Freq. Range
2	54-60	28	554-560	56	722-728
3	60-66	29	560-566	57	728-734
4	66-72	30	566-572	58	734-740
5	76-82	31	572-578	59	740-746
6	82-88	32	578-584	60	746-752
FM	88-108	33	584-590	61	752-758
7	174-180	34	590-596	62	758-764
8	180-186	35	596-602	63	764-770
9	186-192	36	602-608	64	770-776
10	192-198	37	608-614	65	776-782
11	198-204	38	614-620	66	782-788
12	204-210	39	620-626	67	788-794
13	210-216	40	626-632	68	794-800
UHF		41	632-638	69	800-806
14	470-476	42	638-644	70	806-812
15	476-482	43	644-650	71	812-818
16	482-488	44	650-656	72	818-824
17	488-494	45	656-662	73	824-830
18	494-500	46	662-668	74	830-836
19	500-506	47	668-674	75	836-842
20	506-512	48	674-680	76	842-848
21	512-518	49	680-686	77	848-854
22	518-524	50	686-692	78	854-860
23	524-530	51	692-698	79	860-866
24	530-536	52	698-704	80	866-872
25	536-542	53	704-710	81	872-878
26	542-548	54	710-716	82	878-884
27	548-554	55	716-722	83	884-890

MIL-W-76B
ELECTRONIC HOOK-UP WIRE 80°C

Single Conductor Tinned Copper Vinyl Insulated Rated 80°C Per U.S. Military Specification Mil-W-76B.

TYPE MW — 600V — .016 NOMINAL WALL VINYL

Saxton No.	Type Designation	Stranding	Nom. OD	Wt./M
MW 241	MWC 24 (1) U	Solid	.052	2.70
MW 247	MWC 24 (7) U	7/32	.056	2.75
MW 221	MWC 22 (1) U	Solid	.057	3.25
MW 227	MWC 22 (7) U	7/30	.062	3.50
MW 201	MWC 20 (1) U	Solid	.064	4.75
MW 2010	MWC 20 (10) U	10/30	.070	5.25
MW 181	MWC 18 (1) U	Solid	.072	6.75
MW 1816	MWC 18 (16) U	16/30	.078	6.75
MW 161	MWC 16 (1) U	Solid	.083	10.0
MW 1626	MWC 16 (26) U	26/30	.089	10.0
MW 1441	MWC 14 (41) U	41/30	.103	15.0
MW 1265	MWC 12 (65) U	65/30	.122	22.5

Colors: Available with Nylon MWC-J, AWG 22-18; Shield MWC-S, AWG 24-18; Shielded w/Nylon MWCSJ, AWG 22-18.
Specify color when ordering.

MIL-W-76B — (CONT'D)

TYPE LW — 300V — .010 NOMINAL WALL VINYL

Saxton No.	Type Designation	Stranding	Nom. OD	Wt./M
LW 287	LW-C 28 (7) U	7/36	.035	1.05
LW 267	LW-C 26 (7) U	7/34	.039	1.60
LW 247	LW-C 24 (7) U	7/32	.044	2.10
LW 227	LW-C 22 (7) U	7/30	.050	3.00
LW 2010	LW-C 20 (10) U	10/30	.058	4.90

TYPE LW — 300V — .010 NOMINAL WALL VINYL-NYLON

LWN 227	LW-C 22 (7) J	7/30	.053	3.25
LWN 207	LW-C 20 (7) J	7/20	.065	4.75

TYPE HW — 2500V — .031 NOMINAL WALL VINYL

HW-18	HW-C 18 (16) U	16/30	.108	10.5
HW-16	HW-C 16 (26) U	26/30	.119	12.5
*HW-14	HW-C 14 (41) U	41/30	.170	18.0
*HW-12	HW-C 12 (65) U	65/30	.186	28.0
*HW-10	HW-C 10 (105) U	105/30	.210	40.0
*HW-8	HW-C 8 (133) U	133/29	.260	73.0

* AWG 6-14 Rated 600V.

MIL-W-16878
ELECTRONIC HOOK-UP WIRE 105°C

Single Conductor Tinned Copper, Vinyl Insulation Rated 105°C Per U.S. Military Specification MIL-16878D.
Resists the effect of salt water, aviation fuel, motor oil, ethylene glycol and alcohols (methyl or ethyl).

TYPE B — 600V — .010 NOMINAL WALL VINYL

Saxton No.	Type AWG	Stranding AWG	Approx. OD	Approx. Shipping Wt
B-307	B-30	7/38	.032	.075
B-287	B-28	7/36	.035	1.10
B-267	B-26	7/34	.039	1.5
B-247	B-24	7/32	.044	2.0
B-2419	B-24	10/36	.045	2.0
B-227	B-22	7/30	.050	3.0
B-2219	B-22	19/34	.051	3.0
B-207	B-20	7/28	.058	4.5
B-2019	B-20	19/32	.060	4.5
B-187	B-18	7/26	.068	6.5
B-1619	B-16	19/29	.077	9.0

TYPE BN — 600V — .010 NOMINAL WALL VINYL-CLEAR NYLON JACKET

Saxton No.	Type AWG	Stranding AWG	Approx. OD	Approx. Shipping Wt.
BN-247	BN-24	7/32	.048	2.25
BN-227	BN-22	7/30	.054	3.25
BN-207	BN-20	7/28	.062	4.75
BN-187	BN-18	7/26	.073	7.0

TYPE C — 1000V — .018 WALL NOMINAL VINYL

C-247	C-24	7/32	.058	2.75
C-227	C-22	7/30	.064	3.75
C-207	C-20	7/28	.072	5.50
C-187	C-18	7/26	.082	8.0
C-1616	C-16	16/29	.091	10.0
C-1416	C-14	16/27	.108	15.0

TYPE CN — 1000V — .018 WALL NOMINAL VINYL NYLON JACKET — TINNED COPPER VINYL INSULATED

CN-227	C-22	7/32	.068	4.0
CN-207	C-20	7/30	.077	6.0
CN-187	C-18	7/28	.087	8.5
CN-1616	C-16	16/29	.097	10.75
CN-1427	C-14	16/27	.112	15.50

Saxton PRODUCTS, INC.
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MIL-W-16878/3 — TYPE D — 3000V — VINYL

Saxton No.	Type AWG	Stranding AWG	Approx. OD	Approx. Shipping Wt.
D-1819	D-18	19/30	.110	10.5
D-1619	D-16	19/29	.119	12.7
D-1419	D-14	19/27	.134	18.0
D-1219	D-12	19/25	.170	28.0
D-1049	D-10	49/27	.190	40.5
D-8133	D-8	133/29	.260	73.7

Nylon Jacket Available: Inquire at Factory for Availability. Cables to Mil-W-16878D Shield or Unshielded available on request.

MIL-W-16878

EXTRUDED TEFLON HOOK-UP WIRE

Construction: Single conductor silver plated copper, extruded TFE teflon insulation rated per U.S. Military Specification MIL-W-16878D. #E. I. Dupont — Name for Polytetrafluoroethylene.

TYPE E — 600V — .010 NOMINAL WALL

Type and Approximate Size AWG	Stranding AWG	Approximate OD Inches	Approximate Shipping Weight Lbs./M Ft.
E-307	7/38	.032	1.13
E-281	Solid	.035	1.40
E-287	7/36	.035	1.45
E-261	Solid	.039	1.89
E-267	7/34	.039	1.95
E-2619	19/38	.040	2.05
E-241	Solid	.044	2.57
E-247	7/32	.044	2.69
E-2419	19/36	.044	2.75
E-221	Solid	.050	3.60
E-227	7/30	.050	3.75
E-2219	19/34	.051	3.84
E-201	Solid	.056	4.95
E-207	7/28	.058	5.42
E-2019	19/32	.059	5.64
E-187	7/26	.069	7.98
E-1819	19/30	.070	8.37
E-1619	19/29	.080	10.80
E-1419	19/27	.094	16.00
E-1219	19/25	.113	24.20

TYPE EE — 1000V — .012 NOMINAL WALL

Type and Approximate Size AWG	Stranding AWG	Approximate OD Inches	Approximate Shipping Weight Lbs./M Ft.
EE-281	Solid	.045	2.07
EE-287	7/36	.045	2.13
EE-261	Solid	.049	2.62
EE-267	7/34	.049	2.69
EE-269	19/38	.050	2.80
EE-241	Solid	.054	3.41
EE-247	7/32	.054	3.53
EE-249	19/36	.054	3.58
EE-221	Solid	.060	4.55
EE-227	7/30	.060	4.70
EE-229	19/34	.061	4.81
EE-201	Solid	.066	5.98
EE-207	7/28	.068	6.50
EE-209	19/32	.069	6.75
EE-187	7/26	.079	9.37
EE-189	19/30	.080	9.63
EE-169	19/29	.089	12.05

Available in 10 standard colors: + tracers — pairs, triplets quads. Available with silver plated or tinned copper shield — Vinyl or wrap TFE jacket.

TYPE ET — 250V — .006 NOMINAL WALL

Type and Approximate Size AWG	Stranding AWG	Approximate OD Inches	Approximate Shipping Weight Lbs./M Ft.
ET-281	Solid	.027	.92
ET-287	7/36	.027	.97
ET-261	Solid	.031	1.32
ET-267	7/34	.031	1.38
ET-269	19/38	.032	1.46
ET-241	Solid	.036	1.92
ET-247	7/32	.036	2.04
ET-249	19/36	.037	2.11
ET-221	Solid	.042	2.83
ET-227	7/30	.042	2.98
ET-229	19/34	.043	3.06
ET-207	7/28	.050	4.48
ET-209	19/32	.051	4.69

TINNED COPPER WIRE SHIELDING BRAIDS (TUBULAR)

FEDERAL SPECIFICATION QQ-B-575A

Nom. Inside Dia.	Wire Size AWG	No. of Wires	Constr.	Braid Size AWG	Cir. Mil Area	Ft. Per Lb.	Lbs. Per 1000′
1/32″	36	24	24-1-36	22	600	500	2.0
1/16″	34	32	16-2-34	19	1,351	233	4.3
1/16″	36	48	24-2-36	19	1,200	250	4.0
5/64″	36	72	24-3-36	18	1,800	167	6.0
7/64″	34	64	16-4-34	16	2,544	114	8.8
7/64″	36	96	24-4-36	16	2,400	122	8.2
1/8″	34	72	24-3-34	16	2,862	109	9.2
1/8″	36	120	24-5-36	15	3,000	97.0	10.3
11/64″	34	120	24-5-34	13	4,770	64.1	15.6
11/64″	36	168	24-7-36	14	4,200	69.9	14.3
13/64″	34	192	24-8-34	11	7,632	35.8	27.9
13/64″	36	312	24-13-36	11	7,800	35.7	28.0
1/4″	36	344	16-14-36 8-15-36	11	8,600	30.4	32.9
1/4″	36	384	24-16-36	10	9,600	29.0	34.5
3/8″	34	240	48-5-34	10	9,540	30.6	32.7
3/8″	36	384	48-8-36	10	9,600	29.0	34.5
1/2″	34	336	48-7-34	9	13,356	21.0	47.7
1/2″	36	528	48-11-36	9	13,200	21.0	47.7
25/32″	36	864	48-18-36	7	21,600	13.6	73.5
7/8″	30	336	48-7-30	5	33,600	8.5	110
1″	30	384	48-8-30	4	38,400	7.4	135

LITZ WIRE

Saxton has available Type 1 thru 4 constructions using gauges 28 thru 44. Insulations available are Formvar, Polyurethane (soldereze), Nyleze, silk, cotton, dacron and glass.

0. Formvar 1. Polyurethane 2. Nyleze 3. Silk 4. Cotton 5. Dacron 6. Glass

Saxton No.	No. Strands	AWG Size	Nom. Circular Mil. Area	Max. Dia.	Approx. Ft./Lb.
544-2	5	44	20.0	.0085	13,330

For inquiries to the factory please specify stranding, and insulation. It is not possible to list all items due to number of strands, Awgs, and insulations available. ex. 544-2_{15}5 strand 44 Awg, with a Nyleze insulation.

Saxton PRODUCTS, INC.
215 N. ROUTE 303, CONGERS, N. Y. 10920

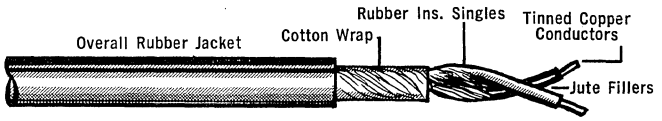
MIL-C-2486C

CABLE, SPECIAL PURPOSE, ELECTRICAL WM-46/U

This specification covers one type of ten conductors, Buna S insulated and jacketed cable designated as Cable, Special Purpose, Electrical WM-46/U. Eight of the conductors are equivalent to No. 20 AWG, four of which are shielded, and two of the conductors are equivalent to No. 16 AWG, one of which is shielded.

MIL-C-3432D

CABLE AND WIRE, ELECTRICAL (POWER AND CONTROL; SEMI-FLEXIBLE, FLEXIBLE, AND EXTRA-FLEXIBLE, 300 AND 600V)



Component	Component Cable No. Conductors	Class	Flexibility	Type Designation No. and Size of Cond.	Outside Diameter
* CO	02	L G	F-Flexible E-Extra Flexible	2/18	0.250″

L-Light M-Medium H-Heavy G-General Purpose O-Oil Resistant L-Low Temperature

This specification covers light duty, medium duty, and heavy duty, semi-flexible, flexible, and extra-flexible, single-conductor wires and multi-conductor cables, shielded and unshielded, for use in circuits of 300 and 600 volts root mean square (rms). It also covers heavy duty, multi-conductor, unshielded cables containing ground wires. The latter cables are limited to two, three, and four conductors, all of the conductors being of the same size, ranging from No. 500 MCM to No. 8 AWG, inclusive.

STOCK CABLES

Light Duty	Medium Duty	Heavy Duty
CO-01 LGF 1/14	CO-01 MGF 1/18	CO-02 HLF 2/18
CO-02 LGF 2/20	CO-01 MGF 2/20	CO-02 HGF 2/16
CO-02 LGF 2/18	CO-02 MGF 2/18	CO-02 HGF 2/14
CO-03 LGF 3/22	CO-02 MGF 2/16	CO-02 HGF 2/12
CO-04 LOF 2/22-2/22 SI	CO-02 MGF 2/14	CO-02 HGF 2/10
CO-04 LGF 4/18	CO-03 MGF 3/18	CO-03 HGF 3/16
CO-04 LOF 4/14	CO-03 MGF 3/16	CO-03 HGF 3/14
CO-05 LGF 5/16	CO-04 MGF 4/18	CO-03 HGF 3/12
CO-09 LOF 7/22-2/22 SI	CO-04 MGF 4/16	CO-04 HGF 4/14
CO-18 LOF 14/22-4/22 SI	CO-04 MGF 4/14	CO-06 HGF 6/18

The above cables and many not listed here are available in Light, Medium or Heavy duty; General purpose, Oil resistant, Low temperature, D-Low temperature, Oil resistant, Heat resistant; Flexible or Extra-flexible.

MIL-C-3884

CORD, ELECTRICAL (SHORT LAY)

This specification covers multiwire, extra-flexible electrical cord, in which all wires are of the same wire size, for use in applications where severe flexing is a major consideration.

Type Designation (This Specification)	Type (Superseded Specification)	Type Designation (This Specification)	Type (Superseded Specification)	Type Designation (This Specification)	Type (Superseded Specification)
COS-2 (23)	CO-219	COS-2 (18)	CO-144	COS-3 (20)	CO-122-B
COS-2 (22)	CO-119-B	COT-2 (18)	DCOP-1½	COS-3 (18)	CO-145
COS-2 (20)	CO-119-A	COS-3 (22)	CO-122-A	COS-4 (20)	CO-146

MIL-C-5898B (USAF)

CORDS, ELECTRICAL

This specification covers cords used to make up combination headset — microphone extension cords and microphone extension cords for installation in military aircraft equipped with intercommunication sets.

Type	No. of Conductors	OD (Inch)
WF-5/U	4	0.280 ± 0.010
WF-14/U	4	0.300 ± 0.010
WD-34/U	2	0.160 ± 0.010
WM-53/U	5	0.280 ± 0.010
WM-85/U	5	0.305 ± 0.010

MIL-C-10392B

CORDAGE

Extra flexible miniature multi-conductor Jacketed cable. Designed primarily for communication equipment, but can be used for voltages up to 300 (rms).

Tinned Cadmium bronze conductors, Buna S insulation, twisted around staycord, with outer jacket of smooth dense Buna. This cable can also be furnished to Addendum #2, using tinned copper conductors. Both constructions are less Paragraph 3.13. (Marking of outer jacket.)

MIL-C-10392B Type	Conductors Total No.	Conductors No. Each Size	Conductors AWG Size	Stranding	Circular Mils (Nom.)	Insulation Min. Wall	Insulation Max. OD	Cable Diam. +.010 −.005
WD-27 A/U	2	2	24	41/40	404	.010	.059	0.146
WT-15 A/U	3	3	24	41/40	404	.010	.059	0.212
WF-11 A/U	4	4	24	41/40	404	.010	.059	0.212
WM-59 A/U	5	5	24	41/40	404	.010	.059	0.212
WM-70 B/U	8	2	18	168/40T	1620	.010	.097	.280
		6	24	41/40	404	.010	.059	
WM-111 A/U	7	2	18	168/40T	1620	.010	.097	.280
		5	24	41/40	404	.010	.059	

MIL-C-13486B CABLE

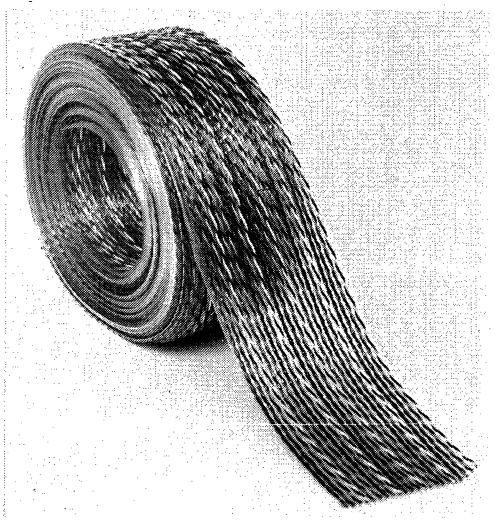
SPECIAL PURPOSE, ELECTRICAL: LOW-TENSION HEAVY DUTY SINGLE-CONDUCTOR AND MULTI-CONDUCTOR

Specify Mil Spec and dash number when inquiring. Cable shall be furnished in the size or combination of sizes and arrangement of conductors shown in the applicable specification sheet or drawing.

Saxton PRODUCTS, INC.
215 N. ROUTE 303, CONGERS, N. Y. 10920

SPECTRA-STRIP® CORPORATION

P.O. Box 415, Garden Grove, Cal. 92642 • Phone (714) 892-3361 • TWX 910-596-1314 • P.O. Box 6023, Hamden, Conn. 06517 • Phone (203) 281-3200 • TWX 710-465-1020



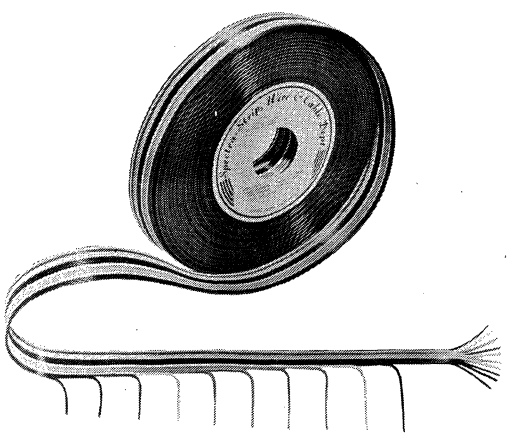
NEW 3C CONTROLLED CHARACTERISTICS CABLE

Spectra-Strip Corporation now offers electronic equipment designers a permanent solution to the problem of predicting and controlling the electrical, electronic and mechanical characteristics of multi-conductor cable.

A new development known as 3C or Controlled Characteristics Cable provides multi-conductor cable with spacing between conductors specified and controlled to tolerances of ±.003 inch.

With this precise spacing, the electronic equipment designer can predict, specify and control capacitance, impedance, reactance, attenuation, transient and thermal noise, and other parameters. The exact spacing also means accurate matching of conductors with connector and circuit board pin arrangements.

Because conductors are at fixed distance apart, 3C Cable means fast, error-free termination with automatic equipment. This new product is available as cable of virtually any length and number of conductors, or as ready-to-install harnesses or IC interconnect assemblies in a wide range of insulation, sizes, styles, and color coding. Some of the standard, widely-used Spectra-Strip ribbon cable products such as Spectra-Flex, twisted pair and coax in XL PVC, TEFLON and other special insulations are available in this new 3C spaced cable.



SPECTRA-STRIP® FLAT RIBBON CABLE*

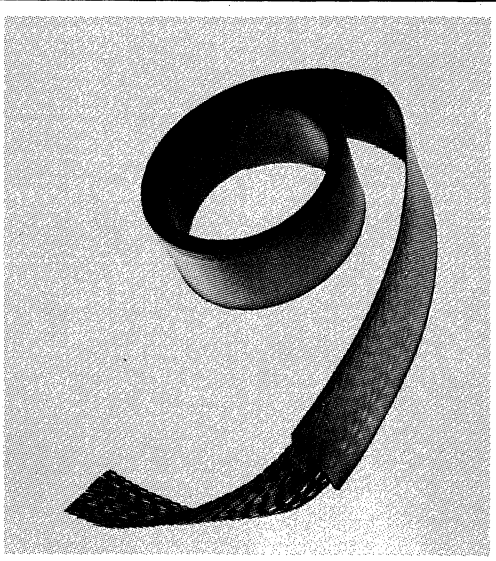
The original and still most popular cable in our line, Spectra-Strip ribbon cable is the general-purpose cable that pioneered the flat bonded ribbon concept in the electronic industry. It is PVC-insulated to meet all requirements of MIL-W-16878D, Types B, C, and D, and is UL approved over a wide range of wire sizes and stranding. Spectra-Strip ribbon cable is usable over an operating temperature range of −55°C to +105°C.

There is practically no limit to the number of conductors, size of conductors, or length of cable that can be assembled. Cabling in stock for immediate delivery ranges from 10 to 40 conductors, 14 to 30 gauge and 7 to 105 strands.

Spectra-Strip ribbon cable is readily available on a standard 10-color code, although special sequences or colors can be furnished. Special cables that can be made up (many from stock) include coaxial, shielded, and twisted pairs.

UL-Approved

Underwriters' Laboratories approval covers Spectra-Strip round conductor flat ribbon cable consisting of 2-100 round wire conductors of 16-28 gauge bonded in ribbon form in cable and harnesses of virtually unlimited length and configuration. Flat ribbon cable consisting of up to 50 twisted pairs of conductors is also covered. Spectra-Strip cable is covered under UL style designation 2444.



NEW JACKETING PROTECTS CABLES FOR A FRACTION OF COST

Stops Moisture, Contamination, Dirt, Abrasion, Other Damage

Spectra-Strip has developed a complete new line of protective jacketing for cable to protect external cables against moisture, contamination, dirt, abrasion, and other damage.

Major use of this new jacketing will be to protect external cabling connecting computer bays, central processors and peripheral devices, and other electronic systems involving multi-conductor cabling between equipment bays.

Money saving price is a major benefit of this new type of cable jacketing, with typical cost pegged at a fraction of the more conventional type protective jacketing.

The jacketing, made from tough PVC, is available in a variety of styles. For example, both sides of the jacketing can be solid, both can be clear or you can have a combination of clear and solid color. And if either or both sides are solid color, choice is available in one of Spectra-Strip's 10 industry-standard colors, the same offered in the company's widely used flat ribbon cable.

The jacketing comes in 15, 20 and 40 mil thicknesses, heavy and tough enough to meet UL requirements for external cable protection, yet pliable enough to accommodate accordion folds and flexing if necessary.

According to Spectra-Strip spokesmen, key to use of their new protective jacketing is pre-planning by the equipment designer with respect to initially specifying external cabling supplied complete with the jacketing.

*U. S. patents 3,006,739; 3,208,896/Gt. Britain 930434/Australia 257318/France 1310622/others pending.

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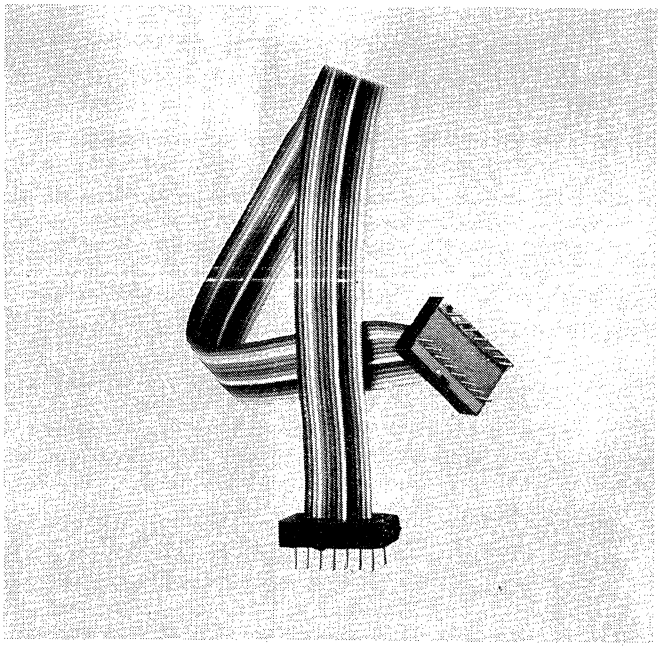
RIBBON CABLE IC INTERCONNECT ASSEMBLIES NOW PRICED LESS THAN $1.00



The cost of interconnecting IC circuitry in computers and other electronic equipment has just come down radically with introduction of Spectra-Strip's interconnect assembly priced less than $1.00.

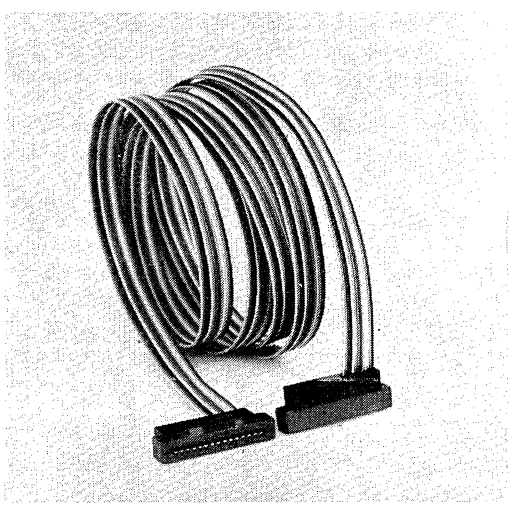
The new price breakthrough offers a 1-foot, 14-conductor cable terminated at one end with a high-reliability 14-pin IC connector and the other end ready for stripping, tinning and whatever termination desired.

Conductors in this new low-cost assembly can be 24 to 30 AWG. PVC is the standard insulation, although many other types are available.

Spectra-Strip's unique IC interconnect assemblies have significantly changed IC circuitry interconnection techniques since their introduction about two years ago. Equipment designers now have a simple, fast and inexpensive method of connecting PC boards, motherboards, backplanes and other IC circuit elements without complicated and costly crossovers.

With the price reduction of the interconnect assemblies now down to less than $1.00 in volume quantities, both the cost and technical advantages of Spectra-Strip's approach to the problem have become obvious.

LOW-PROFILE EDGE BOARD CONNECTOR DESIGN SAVES SPACE



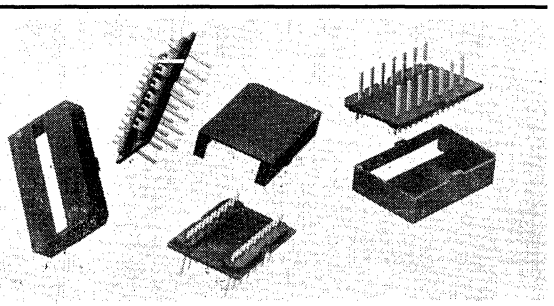
Designers using edge connected PC boards in their electronic equipment will find important space-saving benefits by specifying a new low-profile Spectra-Strip connector for linking multiconductor cable to the boards.

The new connector combines an edge board connector element and a special mounting block in such a way that branching of all cable conductors for termination takes place within the combined dimensions of the two connector elements.

The complete connector unit, with 75 mil center-to-center pin spacing, is substantially smaller than conventional connectors, making more head room available — especially important in compact equipment using IC circuitry.

The new connectors are primarily designed for use with 1/32 inch PC boards. The accompanying photograph shows a 15-conductor ribbon cable with one of the new connectors at each end. However, the new connector design is readily adaptable to almost any type of edge board — 38-pin, 52-pin, or whatever your equipment involves.

14-PIN IC CONNECTORS — 19¢ EACH



Volume users of IC circuitry can take advantage of a Spectra-Strip advance in production techniques that now offers 14-pin IC connectors for as little as 19 cents each.

And just as significant as the low price is the fact that the connectors are high reliability types with permanent molded-in pins that won't loosen or press out during terminating, installation or use.

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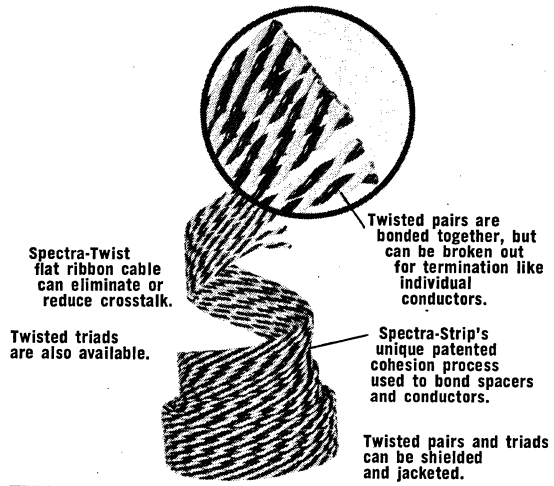


SPECTRA-TWIST® FLAT RIBBON CABLE*

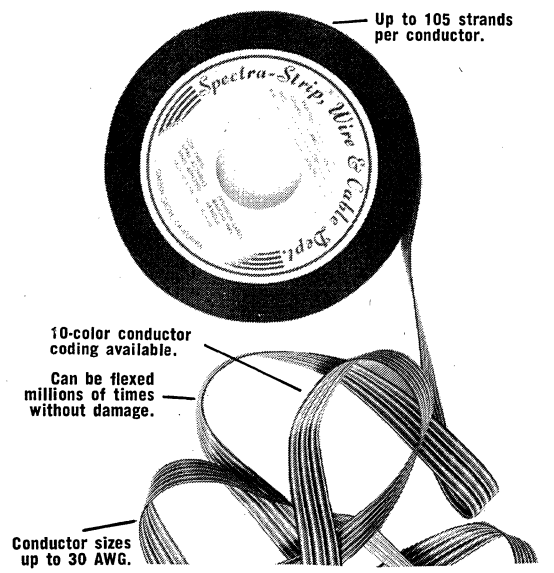
In Spectra-Twist, round wire conductors of desired size are twisted together. These twisted pairs are then bonded by the patented Spectra-Strip cohesion process to form a ribbon cable. Each pair can then be treated like an individual conductor and broken out, stripped, tinned or otherwise prepared for termination or connector.

Spectra-Twist Effective Against Crosstalk

Using twisted pairs of conductors instead of shielding to reduce or eliminate crosstalk saves space and is substantially less expensive than shielding.

Tests have shown that Spectra-Twist cables hold crosstalk spikes to voltages far below the level that might falsely trigger gates or other logic devices. Minimal loss of signal amplitude can be detected; Spectra-Twist transmits signals with virtually no signal degradation in the form of attenuation or distortion.

A recent test demonstrating the crosstalk reduction capability of Spectra-Twist was made on a cable of 26 twisted pairs of 24 gauge conductors. Signals were 5 volts at 3Mhz, using both TTL and DTL logic. No noise spikes of more than 0.5 volts were detected.



SPECTRA-FLEX® ULTRA-FLEXIBLE FLAT BONDED RIBBON CABLE

Up to 105 Strands per Conductor for Superlimpness, Superflexibility

Spectra-Flex is an ultra-flexible version of the general purpose Spectra-Strip flat ribbon cable. It has the same important advantages of our basic round conductor flat ribbon cable with respect to reducing weight, space and labor, ability to break out individual conductors in any desired pattern, and termination with any standard type of connector.

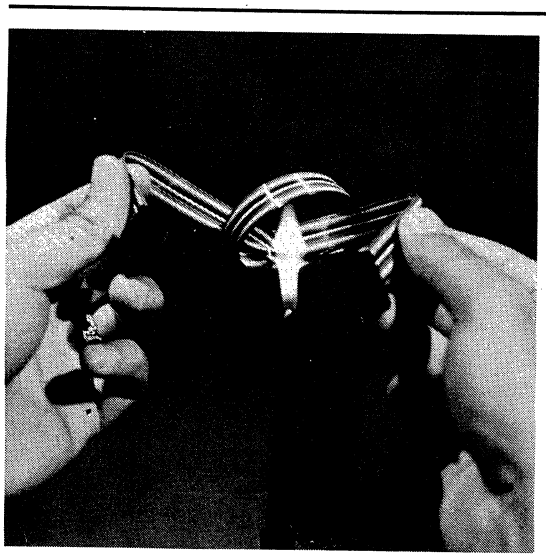
In addition, it offers the electronic equipment designer unusual limpness and flexibility in a cable because conductors can contain up to 105 strands of wire. This makes Spectra-Flex especially suited for applications involving intermittent or continuous flexing, or in equipment with doors and drawers that bend, hinge, fold and slide. Spectra-Flex cable can undergo literally millions of flexings without physical damage and without altering its electrical and mechanical properties.

AWG and Stranding

Spectra-Flex is available with 26, 64 or 105 strands per conductor in sizes ranging from 18 to 30 AWG. Cables of up to 100 conductors can be assembled. When required, cables using different size conductors can be provided.

Insulation and Shielding

Spectra-Flex insulation is normally PVC, meeting requirements of MIL-W-16878D, Types B or C. Shielding, with either a standard braided shield or the more flexible spiral type, can be provided.



CROSSLINKED XL PVC FLAT RIBBON CABLE*

Tougher, Costs Less Than TFE

FEATURES

- Withstands hot soldering irons @ 350°C.
- Resists distortion at elevated temperatures due to current overload.
- Resists abrasion.
- Operates continuously at 115°C.
- Withstands temperatures up to 150°C for short periods.
- Costs much less than TFE.

Irradiated crosslinked PVC-insulated wire with many of the advantages of TFE at half the cost is now being made into round conductor flat ribbon cable by Spectra-Strip.

Like TFE, crosslinked PVC won't melt, smoke or shrinkback if hit by a hot soldering iron. It's more solvent-resistant than ordinary PVC and several times tougher than TFE against cutting, crushing and abrasion.

Form stability and stable dielectric properties at higher temperatures and overloads are XL PVC's most important benefits. Using this insulation, Spectra-Strip's unique bonded flat ribbon cable, harnesses and cable assemblies are rated at 115°C for continuous operations, intermittent service at 150°C and momentary temperatures up to 350°C.

XL PVC meets all requirements of MIL-W-16878D, Types B, C and D and carries UL approval.

WIRE & CABLE FOR PRODUCTION . . . RESEARCH . . . PROTOTYPE

Government Military Specifications . . . Commercial Specifications or Approved Manufacturers Specifications.

IMMEDIATE DELIVERY

• Most Military Specifications • High Temperature Wire & Cable • Telemetering Supervisory Control Cable • Complex Instrument Cable • Telephone & Inter-Communicating Cable • Electrical & Electronic Instrument Wire • Coaxial Cables • Thermocouple Wire • Multiple Pair Control Cable • Microphone Cable • Computer Cable • Many more

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FOR THE FIRST TIME IN THE WIRE & CABLE INDUSTRY . .

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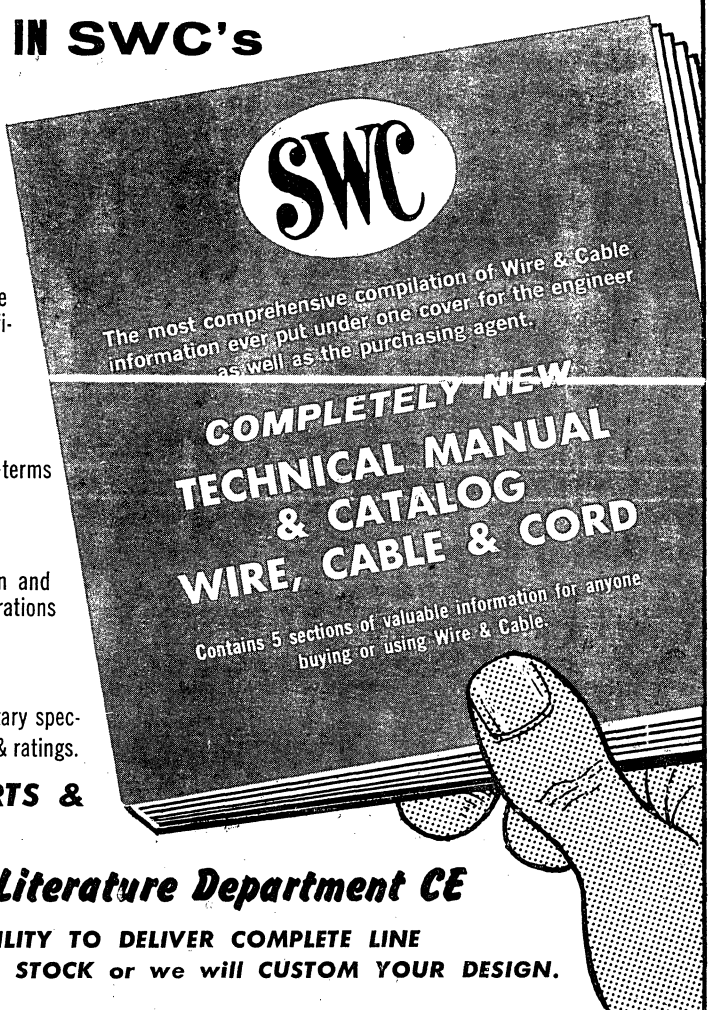

1. *COMPREHENSIVE CATALOG* . . . complete technical information on Wire & Cable Products. (convenient alphabetical and military specification index.)

2. *COMPREHENSIVE GLOSSARY OF WIRE & CABLE TERMINOLOGY* . . . includes many special-terms and expressions.

3. *MANUAL OF COAXIAL CABLE* . . . complete listing of coaxial cable . . . application and theory . . . definitions . . . complete tables . . . illustrations . . . figures.

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How to use eem

to find manufacturers of a specific product

GREEN SECTION

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Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Coev Devices Inc., Chelsea, Mass.
Custom Components, Inc., Caldwell, N.J.
Custom Materials, Inc., Chelmsford, Mass.
Emerson & Cuming, Inc., Canton, Mass.
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Microwave Cavity Labs., La Grange, Ill.
Nippon Electric Co., Ltd., Tokyo, Japan
RCA Elctrn... N.J., p 775

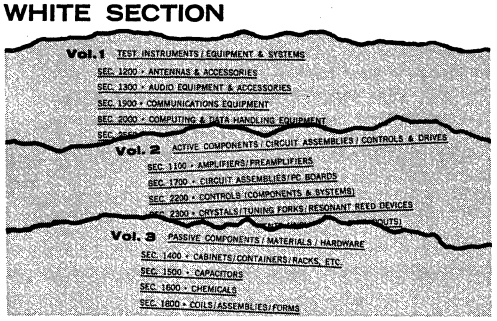
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION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SEC. 1200 • ANTENNAS & ACCESSORIES
SEC. 1300 • AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 • COMMUNICATIONS EQUIPMENT
SEC. 2000 • COMPUTING & DATA HANDLING EQUIPMENT
Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 • AMPLIFIERS / PREAMPLIFIERS
SEC. 1700 • CIRCUIT ASSEMBLIES / PC BOARDS
SEC. 2200 • CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2300 • CRYSTALS / TUNING FORKS / RESONANT REED DEVICES
Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 • CABINETS / CONTAINERS / RACKS, ETC.
SEC. 1500 • CAPACITORS
SEC. 1600 • CHEMICALS
SEC. 1800 • COILS / ASSEMBLIES / FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

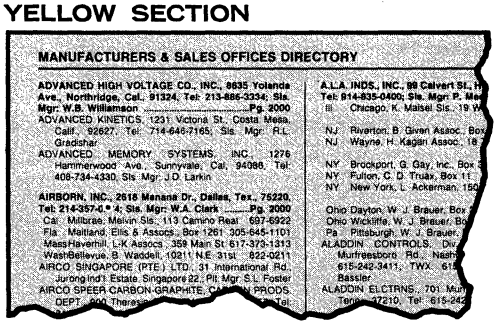
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION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ADVANCED KINETICS, 1231 Victoria St., Costa Mesa, Calif., 92627, Tel: 714-646-7165; Sls. Mgr: R.L. Gradishar
ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330, Sls. Mgr: J.D. Larkin

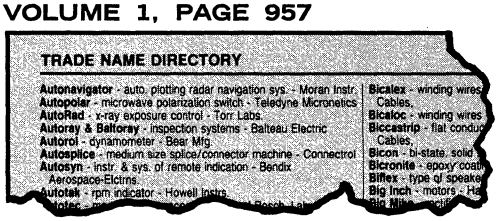
AIRBORN, INC., 2518 Manana Dr., Dallas, Tex., 75220, Tel: 214-357-6*4; Sls. Mgr: W.A. Clark ..... Pg. 2000
Cal: Millbrae, Melvin Sls., 113 Camino Real 697-6922
Fla.: Maitland, Ellis & Assocs., Box 1261, 305-645-1101
Mass: Haverhill, L.K. Assocs., 358 Main St. 617-373-1313
Wash: Bellevue, B. Waddell, 10211 N.E. 31st 822-0211
AIRCO SINGAPORE (PTE.) LTD., 31 International Rd., Jurong Ind'l. Estate, Singapore 22, Plt. Mgr: S.L. Foster
AIRCO SPEER CARBON-GRAPHITE, CA... PRODS. DEPT., 900 Thera... Tel:

A.L.A. INDS., INC., 99 Calvert St., H... Tel: 914-835-0400; Sls. Mgr: P. Mas...
Ill. Chicago, K. Maisel Sls., 19 W...
NJ Riverton, B. Given Assoc., Box...
NJ Wayne, H. Kagan Assoc., 18...
NY Brockport, G. Gay, Inc., Box...
NY Fulton, C. D. Truax, Box 11...
NY New York, L. Ackerman, 150...
Ohio Dayton, W. J. Brauer, Box...
Ohio Wickliffe, W. J. Brauer, Bo...
Pa. Pittsburgh, W. J. Brauer, ...
ALADDIN CONTROLS, Div. ... Murfreesboro Rd., Nashv... 615-242-3411, TWX 61... Bassler
ALADDIN ELCTRNS., 701 Mu... Tenn., 37210, Tel: 615-242...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem**, listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

VOLUME 1, PAGE 957


TRADE NAME DIRECTORY

Autonavigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Micronetics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Baltoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotalk - rpm indicator - Howell Instrs.
Autovac... Bosch Lab...
Bicalex - winding wires Cables,
Bicaloc - winding wires
Biccastrip - flat conduc... Cables,
Bicon - bi-state, solid...
Bicronite - epoxy coati...
Biflex - type of speake...
Big Inch - motors - Hel...
Big Nine... motors...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

Tensolite HIGH TEMPERATURE WIRE & CABLE

SUMMARY OF STANDARD MIL SPECIFICATION COMPONENT WIRES

Specification	Type	AWG	Nom. Wall Thick.	Conductor	Insulation	Temp. Rating°C	Rating Vrms	Usage & Former Spec. No.
MIL-W-16878	ET (/6A)	32-20	.006	SPC/NPC	Teflon®-TFE	200/260	250	Miniature Wall Hook-Up
	E (/4A)	32-10	.010	SPC/NPC	Teflon-TFE	200/260	600	Hook-Up
	EE (/5A)	32-8	.015	SPC/NPC	Teflon-TFE	200/260	1000	Heavy Wall Hook-Up
	KT (/13)	32-20	.006	TPC/SPC	Teflon-FEP	135/200	250	Miniature Wall Hook-Up
	K (/11)	32-10	.010	TPC/SPC	Teflon-FEP	135/200	600	Hook-Up
	KK (/12B)	32-4/0	.015	TPC/SPC	Teflon-FEP	135/200	1000	Heavy Wall Hook-Up
MIL-W-22759	22759/1&/2	22-4/0	.025-.065	SPC/NPC	TFE/Glass Tape & Braid	200/260	600	Airframe, Heavy Wall Mil-W-7139, Cl.1 & Cl.2
	22759/3	22-2/0	.020-.055	NPC	TFE/Glass-TFE	260	600	Airframe, Medium Wall
	22759/4	22-2/0	.021-.060	SPC	TFE/Glass + FEP	200	600	Airframe, Medium Wall MS-90294
	*22759/5&/6	24-4	.025-.044	SPC/NPC	Mineral Filled Extruded TFE	200/260	600	Airframe, Heavy Wall MS-17411 & 17412
	22759/7&/8	24-4	.018-.034	SPC/NPC	Mineral Filled Extruded TFE	200/260	600	Airframe, Medium Wall MS-18000 & 18001
	22759/9&10	28-8	.014-.017	SPC/NPC	Extruded TFE	200/260	1000	Heavy Wall Hook-Up MS-18113 & 18114
	22759/11&/12	28-16	.009	SPC/NPC	Extruded TFE	200/260	600	Hook-Up MS-21985 & 21986
MIL-W-81381	81381/3&/4	26-2	.012-.016	SPC/NPC	**Kapton®	200	600	Airframe or Hook-Up
	81381/7&/8	26-10	.006	SPC/NPC	Kapton	200	600	Airframe or Hook-Up
	81381/9&/10	26-10	.006	SP/N Alloy	Kapton	200	600	Lightweight Hook-Up
	81381/11&/12	24-2	.008-.016	SPC/NPC	Kapton	200	600	Lightweight Hook-Up
	81381/13&/14	26-20	.009	SP/N Alloy	Kapton	200	600	Lightweight Hook-Up

TPC — Tin Plated Copper SPC — Silver Plated Copper NPC — Nickel Plated Copper ®Dupont **Polyimide/FEP Type F Film

Above component wires available in shielded and jacketed multiconductor cables. Typical cable specs are: MIL-C-7078 and MIL-C-27500.

*Available from Tensolite through AWG 2/0.

UL LISTED HIGH TEMPERATURE Appliance & Equipment Wire File No. E20123

Material	Nominal Wall	UL Style No.	Material	Nominal Wall	UL Style No.
TFE	.0055-.020 .010 1/64 .020-.045	1371 1212, 1213 1164, 1180 1198, 1199	Kynar™	.004 .005 .006 .010 .010	1423 1422 1426 1327 1351
FEP	.0055-.020 .010 1/64 .020-.045	1371 1226, 1227 1332, 1333 1330, 1331	Kapton	.004 .0055	1470 1450
TFE or FEP	Coaxial Cable	1354	TV Wire High Voltage	5-40 KV dc Rating	3239
FEP/Nylon	.006/.003	1292	SEE BULLETIN NO. 114		

CSA Approvals available in 150, 300 and 600 volt rating, TFE Insulated.

TM PENNWALT

RG/U TFE DIELECTRIC COAXIAL CABLE

PER — MIL-C-17D SEE BULLETIN NO. 116

Miniature Max. OD .075" - .155"	Medium Max. OD .175" - .335"	Heavy Max. OD .420" - .525"
178B/U* 179B/U* 180B/U* 187A/U* 188A/U* 195A/U* 196A/U* 316/U*	140/U 141A/U* 142B/U* 143A/U 302/U 303/U* 304/U	87A/U* 116/U 119/U 120/U 144/U 165/U 166/U 225/U 227/U 393/U

*Off-the-shelf Delivery.

OTHER HIGH TEMPERATURE WIRE AND CABLE PRODUCTS FOR INDUSTRIAL AND COMMERCIAL USAGE

1. Thermoplastic Wire & Cable Bulletin 109A	Insulations & Jackets — PVC Nylon, Kynar Polyurethane, FEP, Polysulfone, etc.
2. Ultra-Thin Hook-Up Wire Bulletin 112	100 Vrms Type UT wire, sizes 36 through 26 in solid conductors, and 28 through 36 in stranded conductors. Wall thickness from .0015" to .004"
3. Instrumentation and Control Cables	Fluorocarbon, polyimide or high temperature thermoplastic insulated multi-conductor cables for instrumentation, signal, and control cable applications.
4. Heater Cables	TFE and Polyimide insulated resistance alloy conductors. Ratings to 500°F.
5. Power Cables	600 and 1000 Vrms ratings in sizes AWG 22 through 4/0. Copper and aluminum conductors.
6. Transmission Lines Bulletin 110	Flat laminated or extruded constructions, including tri-line cables.
7. Medical Wire	Insulated 26-42 AWG conductors SS#316, copper other alloys and precious metals.
8. Parallel Wrapped PVC and TFE Insulations	Increased flexibility for phonograph tone arms and hearing aids. High dielectric strength for TV and radio wiring.
9. Computer Wire Bulletin 110	Wide variety of insulation and conductors for use in automatic wiring equipment. TFE, FEP, Kynar, Tefzel®, Polyimide overcoated Kapton, etc.
10. Tufflite™ Polyimide Insulated Wires Bulletin 108B	Medium and heavy wall constructions to MIL-W-81381. Thin wall, .0045", construction also available.
11. Ribbon Cables Bulletin 102A	Bonded and woven high temperature Teflon, Kapton, and thermoplastic components.
12. Railite™ Bulletin 117	High temperature, non-flammable, modified fluorocarbon locomotive and car wiring.
13. Teflon Polyimide-Tuffcote™ Bulletin 113	For airframe and computer back panel use where cut-through resistance is required.
14. Thermocouple	High temperature Teflon and Kapton insulated.

For detailed information on these products, send for Tensolite's 200 page Product and Technical Handbook, or contact the Tensolite representative in your area.

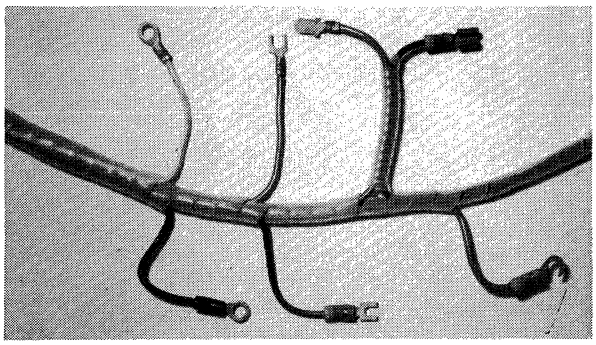
TM TENSOLITE

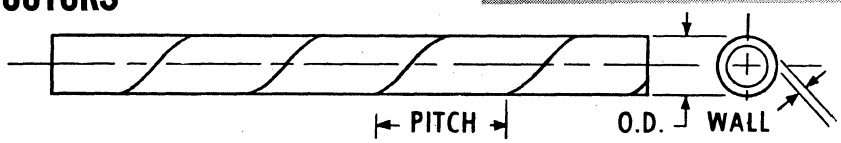
Division of Carlisle Corporation
WEST MAIN ST., TARRYTOWN, N. Y. 10591
(914) 631-2300 • TWX 710-567-1202

Transcon ENGINEERED HARDWARE IS THE STANDARD OF INDUSTRY

CABLE-rap®

SPIRAL WRAPPING FOR FLEXIBLE HARNESSES, CABLES, GROUPS OF LEADS OR CONDUCTORS





POLYETHYLENE (Natural) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-0001	1/8″	.125	.031	1/4	.5″	100′
500-0002	3/16″	.187	.031	1/4	1.5″	100′
500-0003	1/4″	.250	.031	3/8	2.0″	100′
500-0004	1/4″	.250	.040	3/8	2.0″	100′
500-0006	3/8″	.375	.062	7/16	3.0″	100′
500-0007	1/2″	.500	.062	9/16	4.0″	100′
500-0008	5/8″	.625	.062	5/8	5.0″	100′
500-0009	3/4″	.750	.062	7/8	6.0″	100′
500-0012	1″	1.000	.083	7/8	8.0″	100′

Conforms to: Grade C Fed. Spec. L.P. 390 MIL-I-631D MIL-P-26692

OUTDOOR POLYETHYLENE (Black) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-1001	1/8″	.125	.031	1/4	.5″	100′
500-1002	3/16″	.187	.031	1/4	1.5″	100′
500-1003	1/4″	.250	.031	3/8	2.0″	100′
500-1004	1/4″	.250	.040	3/8	2.0″	100′
500-1006	3/8″	.375	.062	7/16	3.0″	100′
500-1007	1/2″	.500	.062	9/16	4.0″	100′
500-1008	5/8″	.625	.062	5/8	5.0″	100′
500-1009	3/4″	.750	.062	7/8	6.0″	100′
500-1012	1″	1.000	.083	7/8	8.0″	100′

Conforms to: Grade C Fed. Spec. L.P. 390 MIL-I-631D MIL-P-26692

NYLON (Natural) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-2001	1/8″	.125	.016	1/4	.5″	100′
500-2002	3/16″	.187	.016	1/4	1.0″	100′
500-2013	1/4″	.250	.020	3/8	2.0″	100′
500-2003	1/4″	.250	.031	3/8	2.0″	100′
500-2004	3/8″	.375	.031	7/16	3.0″	100′
500-2005	1/2″	.500	.031	9/16	4.0″	100′
500-2006	5/8″	.625	.031	5/8	5.0″	100′
500-2007	3/4″	.750	.040	7/8	6.0″	100′
500-2008	7/8″	.875	.040	7/8	7.0″	100′
500-2009	1″	1.000	.040	1	8.0″	100′

Conforms to: MIL-M-22096

OUTDOOR NYLON (Black) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-3001	1/8″	.125	.016	1/4	.5″	100′
500-3002	3/16″	.187	.016	1/4	1.0″	100′
500-3013	1/4″	.250	.020	3/8	2.0″	100′
500-3003	1/4″	.250	.031	3/8	2.0″	100′
500-3004	3/8″	.375	.031	7/16	3.0″	100′
500-3005	1/2″	.500	.031	9/16	4.0″	100′
500-3006	5/8″	.625	.031	5/8	5.0″	100′
500-3007	3/4″	.750	.040	7/8	6.0″	100′
500-3008	7/8″	.875	.040	7/8	7.0″	100′
500-3009	1″	1.000	.040	1	8.0″	100′

Conforms to: MIL-M-22096

RULAN (Flame Retardant Polyethylene) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-4001	1/8″	.125	.030	1/4	.5″	100′
500-4002	1/4″	.250	.062	3/8	2.0″	100′
500-4003	3/8″	.375	.062	7/16	3.0″	100′
500-4004	1/2″	.500	.062	9/16	4.0″	100′

TEFLON* (Natural) CABLE-rap®

Part Number	Nom. Size	O.D.	Wall	Pitch	Max. Bundle	Std. Package
500-5001	1/8″	.125	.030	1/4	.5″	100′
500-5002	3/16″	.187	.030	1/4	1.0″	100′
500-5003	1/4″	.250	.030	3/8	2.0″	100′
500-5004	3/8″	.375	.030	7/16	2.5″	100′
500-5005	1/2″	.500	.030	9/16	3.0″	100′
500-5006	5/8″	.625	.030	5/8	3.5″	100′
500-5007	3/4″	.750	.040	7/8	4.0″	100′
500-5008	7/8″	.875	.040	7/8	5.0″	100′
500-5009	1″	1.000	.040	1	6.0″	100′

Conforms to: MIL-I-22129B AMS 3651B, 3653 *TEFLON — duPont Trademark

OTHER LENGTHS AVAILABLE UPON REQUEST

For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

Transcon MANUFACTURING CO. BOX 20825 • DALLAS, TEXAS 75220 • (214) 357-8301

TEFLON* TFE EXTRUDED TUBING

THIN WALL TEFLON* TUBING AMS-3655

Part No.	AWG	I.D.	Wall
550-0001	30	.012	.009
550-0002	28	.015	.009
550-0003	26	.018	.009
550-0004	24	.022	.009
550-0005	23	.026	.009
550-0006	22	.027	.009
550-0007	21	.032	.012
550-0008	20	.034	.012
550-0009	19	.038	.012
550-0010	18	.042	.012
550-0011	17	.047	.012
550-0012	16	.053	.012
550-0013	15	.059	.012
550-0014	14	.066	.012
550-0015	13	.076	.012
550-0016	12	.085	.012
550-0017	11	.095	.012
550-0018	10	.106	.012
550-0019	9	.118	.015
550-0020	1/8"	.125	.015
550-0021	8	.133	.015
550-0022	7	.148	.015
550-0023	6	.166	.015
550-0024	5	.188	.015
550-0025	4	.208	.015
550-0026	3	.234	.015
550-0027	1/4"	.250	.015
550-0028	2	.263	.015
550-0029	1	.294	.015
550-0030	5/16"	.312	.015
550-0031	0	.330	.015

STANDARD WALL TEFLON* TUBING MIL-I-22129 AMS-3653

Part No.	AWG	I.D.	Wall
550-1001	30	.012	.010
550-1002	28	.015	.010
550-1003	26	.018	.010
550-1004	24	.022	.012
550-1005	23	.026	.012
550-1006	22	.027	.012
550-1007	21	.032	.014
550-1008	20	.034	.016
550-1009	19	.038	.016
550-1010	18	.042	.016
550-1011	17	.047	.016
550-1012	16	.053	.016
550-1013	15	.059	.016
550-1014	14	.066	.016
550-1015	13	.076	.016
550-1016	12	.085	.016
550-1017	11	.095	.016
550-1018	10	.106	.016
550-1019	9	.118	.020
550-1020	1/8"	.125	.020
550-1021	8	.133	.020
550-1022	7	.148	.020
550-1023	6	.166	.020
550-1024	5	.188	.020
550-1025	4	.208	.020
550-1026	3	.234	.020
550-1027	1/4"	.250	.020
550-1028	2	.263	.020
550-1029	1	.294	.020
550-1030	5/16"	.312	.020
550-1031	0	.330	.020

LIGHTWEIGHT TEFLON* TUBING AMS-3654

Part No.	AWG	I.D.	Wall
550-2001	30	.012	.006
550-2002	28	.015	.006
550-2003	26	.018	.006
550-2004	24	.022	.006
550-2005	23	.026	.006
550-2006	22	.027	.006
550-2007	21	.032	.006
550-2008	20	.034	.006
550-2009	19	.038	.006
550-2010	18	.042	.006
550-2011	17	.047	.006
550-2012	16	.053	.006
550-2013	15	.059	.006
550-2014	14	.066	.008
550-2015	13	.076	.008
550-2016	12	.085	.008
550-2017	11	.095	.008
550-2018	10	.106	.008
550-2019	9	.118	.008
550-2020	1/8"	.125	.008
550-2021	8	.133	.008
550-2022	7	.148	.008
550-2023	6	.166	.010
550-2024	5	.186	.010
550-2025	4	.208	.010
550-2026	3	.234	.010
550-2027	1/4"	.250	.010
550-2028	2	.263	.010
550-2029	1	.294	.010
550-2030	5/16"	.312	.012
550-2031	0	.330	.012

FRACTIONAL INDUSTRIAL TEFLON* TUBING

PART NO.	I.D.	O.D.	WALL
550-3001	1/8"	.185	.030
550-3002	3/16"	.248	.030
550-3003	1/4"	.310	.030
550-3004	5/16"	.372	.030
550-3005	3/8"	.435	.030
550-3006	7/16"	.498	.030
550-3007	1/2"	.560	.030
550-3008	9/16"	.622	.030
550-3009	5/8"	.685	.030
550-3010	11/16"	.747	.030
550-3011	3/4"	.830	.040
550-3012	7/8"	.965	.045
550-3013	1"	1.090	.045
550-3014	1-1/8"	1.215	.045
550-3015	1-1/4"	1.340	.045
550-3016	1-1/2"	1.600	.050

Notes:

1. Standard Color—Natural, but any of 10 solid colors can be supplied.
2. Supplied in 100′ coils or spools. Specify if longer or shorter spools are required.
3. Industry standard tolerances apply to diameter and wall thickness unless otherwise specified.
4. Certificate of compliance to MIL-I-22129C furnished upon request.
5. Quotation for special services, such as bondable treatment or etching, furnished promptly upon request.

*Teflon - DuPont Trademark.

CLEAR POLYURETHANE TUBING

Part No.	I.D.	O.D.	Wall
511-2001	1/16"	1/8"	1/32"
511-2002	1/8"	3/16"	1/32"
511-2003	1/8"	1/4"	1/16"
511-2004	1/8"	1/2"	3/16"
511-2005	3/16"	1/4"	1/32"
511-2006	3/16"	5/16"	1/16"
511-2007	3/16"	7/16"	1/8"
511-2008	1/4"	5/16"	1/32"
511-2009	1/4"	3/8"	1/16"
511-2010	1/4"	7/16"	3/32"
511-2011	1/4"	1/2"	1/8"

Part No.	I.D.	O.D.	Wall
511-2012	5/16"	3/16"	1/16"
511-2013	5/16"	1/2"	3/32"
511-2014	5/16"	9/16"	1/8"
511-2015	3/8"	1/2"	1/16"
511-2016	3/8"	9/16"	3/32"
511-2017	3/8"	5/8"	1/8"
511-2018	7/16"	9/16"	1/16"
511-2019	7/16"	5/8"	3/32"
511-2020	1/2"	5/8"	1/16"
511-2021	1/2"	11/16	3/32"
511-2022	1/2"	3/4"	1/8"

Part No.	I.D.	O.D.	Wall
511-2023	9/16"	3/4"	3/32"
511-2024	5/8"	3/4"	1/16"
511-2025	5/8"	7/8"	1/8"
511-2026	11/16"	7/8"	3/32"
511-2027	3/4"	15/16"	3/32"
511-2028	3/4"	1"	1/8"
511-2029	7/8"	1 1/16"	3/32"
511-2030	7/8"	1 1/8"	1/8"
511-2031	1"	1 3/16"	3/32"
511-2032	1"	1 1/4"	1/8"

NOTES:

1. **Abrasion Resistance:** Tubing made of Polyurethane will often outwear other materials by a margin of 5 to 50 / one when severe abrasion is a factor.
2. **Oil and Solvent Resistance.**
3. **Load-Bearing Capacity:** Polyurethane has a higher load-bearing capacity than any conventional rubber.
4. **Tear Resistance:** Tear-strength ranges between 500-1000 lbs/linear inch.
5. **Heat and Cold Resistance:** Continuous use above 225°F. is not recommended nor is urethane recommended in hot water over 175°F. At low temperatures polyurethane will remain flexible down to −90°F. A gradual stiffening will occur at 0°F. but will not become pronounced until much lower temperatures are obtained.
6. **Weather Resistance:** Outstanding resistance to oxygen and ozone.
7. **Electrical Properties:** Polyurethane has excellent electrical insulating properties and is used successfully in many wire and cable harness assemblies.
8. **Bonding to Metal:** When polyurethane is molded directly onto metal inserts, outstanding bonds are obtained.
9. **Flex-Life:** Most formulations offer extremely high flex-life and can be expected to outlast other elastomeric materials where this feature is an important requirement.

STANDARD LENGTH IS 100′ COILS—OTHER LENGTHS AVAILABLE UPON REQUEST

For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

Transcon ENGINEERED HARDWARE IS THE STANDARD OF INDUSTRY

VINYL (PVC) TUBING

Non-Toxic Flexible Clear Vinyl Tubing is chemical resistant, odorless, tasteless. Formulated with compounds that have been approved by the U. S. Food & Drug Administration. Used for food and beverage tubing, laboratory tubing and medical tubing.

General Purpose Clear Vinyl Tubing is tough, flexible, long-lasting. Used for water lines, refrigerating tubing, chemical and industrial applications.

Non-Toxic Part No.	Gen. Purpose Part No.	I.D.	O.D.	Wall
512-4001	512-4101	.120	.170	.025
512-4002	512-4102	1/8	1/4	1/16
512-4003	512-4103	3/16	5/16	1/16
512-4004	512-4104	3/16	3/8	3/32
512-4005	512-4105	3/16	7/16	1/8
512-4006	512-4106	1/4	3/8	1/16
512-4007	512-4107	1/4	7/16	3/32
512-4008	512-4108	1/4	1/2	1/8
512-4009	512-4109	5/16	7/16	1/16
512-4010	512-4110	5/16	1/2	3/32
512-4011	512-4111	5/16	9/16	1/8
512-4012	512-4112	3/8	1/2	1/16
512-4013	512-4113	3/8	9/16	3/32

Non-Toxic Part No.	Gen. Purpose Part No.	I.D.	O.D.	Wall
512-4014	512-4114	3/8	5/8	1/8
512-4015	512-4115	7/16	9/16	1/16
512-4016	512-4116	7/16	5/8	3/32
512-4017	512-4117	7/16	11/16	1/8
512-4018	512-4118	1/2	5/8	1/16
512-4019	512-4119	1/2	11/16	3/32
512-4020	512-4120	1/2	3/4	1/8
512-4021	512-4121	1/2	13/16	5/32
512-4022	512-4122	9/16	3/4	3/32
512-4023	512-4123	9/16	13/16	1/8
512-4024	512-4124	9/16	7/8	5/32
512-4025	512-4125	5/8	13/16	3/32
512-4026	512-4126	5/8	7/8	1/8

Non-Toxic Part No.	Gen. Purpose Part No.	I.D.	O.D.	Wall
512-4027	512-4127	11/16	15/16	1/8
512-4028	512-4128	11/16	1″	5/32
512-4029	512-4129	3/4	1″	1/8
512-4030	512-4130	3/4	1-1/16	5/32
512-4031	512-4131	3/4	1-1/4	1/4
512-4032	512-4132	7/8	1-1/8	1/8
512-4033	512-4133	7/8	1-3/16	5/32
512-4034	512-4134	1″	1-1/4	1/8
512-4035	512-4135	1″	1-3/8	3/16
512-4036	512-4136	1″	1-1/2	1/4
512-4037	512-4137	1-1/4	1-1/2	1/8
512-4038	512-4138	1-1/4	1-3/4	1/4

Size A.W.G. or I.D. (Inches)	LOW TEMP. MIL-I-7444 +80°C [+176°F] −65°C [− 85°F]		HIGH TEMPERATURE MIL-I-631 +105°C [+221°F] −20°C [−4°F]			EXTRA HIGH TEMP. 125°C +125°C [+257°F] −40°C [−40°F]		U.L. 105°C +105°C [+221°F] −20°C [−4°F]		Nom. I.D.	Nom. Wall	Spool or Coil	Standard Length in Feet	Size A.W.G. or I.D. (Inches)
	Clear Part No.	Black Part No.	White Part No.	Clear Part No.	Black Part No.	Clear Part No.	Black Part No.	Clear Part No.	Black Part No.					
24	512-0001	512-0101	512-0901	512-1001	512-1201	512-0601	512-0701	512-1301	512-1401	.022	.012	S	1000	24
22	512-0002	512-0102	512-0902	512-1002	512-1202	512-0602	512-0702	512-1302	512-1402	.027	.012	S	1000	22
20	512-0003	512-0103	512-0903	512-1003	512-1203	512-0603	512-0703	512-1303	512-1403	.034	.016	S	1000	20
19	512-0004	512-0104	512-0904	512-1004	512-1204	512-0604	512-0704	512-1304	512-1404	.038	.016	S	1000	19
18	512-0005	512-0105	512-0905	512-1005	512-1205	512-0605	512-0705	512-1305	512-1405	.042	.016	S	1000	18
17	512-0006	512-0106	512-0906	512-1006	512-1206	512-0606	512-0706	512-1306	512-1406	.047	.016	S	1000	17
16	512-0007	512-0107	512-0907	512-1007	512-1207	512-0607	512-0707	512-1307	512-1407	.053	.016	S	1000	16
15	512-0008	512-0108	512-0908	512-1008	512-1208	512-0608	512-0708	512-1308	512-1408	.059	.016	S	1000	15
14	512-0009	512-0109	512-0909	512-1009	512-1209	512-0609	512-0709	512-1309	512-1409	.066	.016	S	500	14
13	512-0010	512-0110	512-0910	512-1010	512-1210	512-0610	512-0710	512-1310	512-1410	.076	.016	S	500	13
12	512-0011	512-0111	512-0911	512-1011	512-1211	512-0611	512-0711	512-1311	512-1411	.085	.016	S	500	12
11	512-0012	512-0112	512-0912	512-1012	512-1212	512-0612	512-0712	512-1312	512-1412	.095	.016	S	500	11
10	512-0013	512-0113	512-0913	512-1013	512-1213	512-0613	512-0713	512-1313	512-1413	.106	.016	S	500	10
9	512-0014	512-0114	512-0914	512-1014	512-1214	512-0614	512-0714	512-1314	512-1414	.118	.020	S	500	9
1/8″	512-0015	512-0115	512-0915	512-1015	512-1215	512-0615	512-0715	512-1315	512-1415	.125	.020	S	500	1/8″
8	512-0016	512-0116	512-0916	512-1016	512-1216	512-0616	512-0716	512-1316	512-1416	.133	.020	S	500	8
7	512-0017	512-0117	512-0917	512-1017	512-1217	512-0617	512-0717	512-1317	512-1417	.148	.020	S	500	7
6	512-0018	512-0118	512-0918	512-1018	512-1218	512-0618	512-0718	512-1318	512-1418	.166	.020	S	500	6
5	512-0019	512-0119	512-0919	512-1019	512-1219	512-0619	512-0719	512-1319	512-1419	.186	.020	S	250	5
4	512-0020	512-0120	512-0920	512-1020	512-1220	512-0620	512-0720	512-1320	512-1420	.208	.020	C	250	4
3	512-0021	512-0121	512-0921	512-1021	512-1221	512-0621	512-0721	512-1321	512-1421	.234	.020	C	250	3
1/4″	512-0022	512-0122	512-0922	512-1022	512-1222	512-0622	512-0722	512-1322	512-1422	.250	.020	C	200	1/4″
2	512-0023	512-0123	512-0923	512-1023	512-1223	512-0623	512-0723	512-1323	512-1423	.263	.020	C	200	2
1	512-0024	512-0124	512-0924	512-1024	512-1224	512-0624	512-0724	512-1324	512-1424	.294	.020	C	200	1
0	512-0025	512-0125	512-0925	512-1025	512-1225	512-0625	512-0725	512-1325	512-1425	.330	.020	C	200	0
5/16″	512-0026	512-0126	512-0926	512-1026	512-1226	512-0626	512-0726	512-1326	512-1426	.313	.025	C	200	5/16″
3/8″	512-0027	512-0127	512-0927	512-1027	512-1227	512-0627	512-0727	512-1327	512-1427	.375	.025	C	200	3/8″
7/16″	512-0028	512-0128	512-0928	512-1028	512-1228	512-0628	512-0728	512-1328	512-1428	.438	.025	C	100	7/16″
1/2″	512-0029	512-0129	512-0929	512-1029	512-1229	512-0629	512-0729	512-1329	512-1429	.500	.025	C	100	1/2″
9/16″	512-0030	512-0130	512-0930	512-1030	512-1230	512-0630	512-0730	512-1330	512-1430	.562	.030	C	100	9/16″
5/8″	512-0031	512-0131	512-0931	512-1031	512-1231	512-0631	512-0731	512-1331	512-1431	.625	.030	C	100	5/8″
3/4″	512-0032	512-0132	512-0932	512-1032	512-1232	512-0632	512-0732	512-1332	512-1432	.750	.035	C	50	3/4″
7/8″	512-0033	512-0133	512-0933	512-1033	512-1233	512-0633	512-0733	512-1333	512-1433	.875	.035	C	50	7/8″
1	512-0034	512-0134	512-0934	512-1034	512-1234	512-0634	512-0734	512-1334	512-1434	1.000	.035	C	50	1
1-1/16″	512-0035	512-0135	512-0935	512-1035	512-1235	512-0635	512-0735	512-1335	512-1435	1.062	.035	C	50	1-1/16″
1-1/8″	512-0036	512-0136	512-0936	512-1036	512-1236	512-0636	512-0736	512-1336	512-1436	1.125	.040	C	50	1-1/8″
1-1/4″	512-0037	512-0137	512-0937	512-1037	512-1237	512-0637	512-0737	512-1337	512-1437	1.250	.040	C	50	1-1/4″
1-3/8″	512-0038	512-0138	512-0938	512-1038	512-1238	512-0638	512-0738	512-1338	512-1438	1.375	.040	C	50	1-3/8″
1-1/2″	512-0039	512-0139	512-0939	512-1039	512-1239	512-0639	512-0739	512-1339	512-1439	1.500	.045	C	50	1-1/2″
1-3/4″	512-0040	512-0140	512-0940	512-1040	512-1240	512-0640	512-0740	512-1340	512-1440	1.750	.055	C	50	1-3/4″
2	512-0041	512-0141	512-0941	512-1041	512-1241	512-0641	512-0741	512-1341	512-1441	2.000	.060	C	50	2″
2-1/4″	512-0042	512-0142	512-0942	512-1042	512-1242	512-0642	512-0742	512-1342	512-1442	2.250	.065	C	50	2-1/4″
2-1/2″	512-0043	512-0143	512-0943	512-1043	512-1243	512-0643	512-0743	512-1343	512-1443	2.500	.070	C	50	2-1/2″

OTHER COLORS AND LENGTHS AVAILABLE UPON REQUEST

For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

Transcon MANUFACTURING CO. BOX 20825 • DALLAS, TEXAS 75220 • (214) 357-8301

SHRINKABLE TUBING

IRRADIATED POLYOLEFIN SHRINKABLE TUBING RATIO: 2x1 (50% SHRINK)

Black Part No.	Clear Part No.	Red Part No.	Yellow Part No.	Blue Part No.	White Part No.	Expanded Inside Diameter Minimum (Inches)		Recovered Inside Diameter Maximum (Inches)	Nominal Wall Thickness After Shrinking (Inches)
514-0101	514-0001	514-0201	514-0301	514-0401	514-0501	3/64	.046	.023	.016
514-0102	514-0002	514-0202	514-0302	514-0402	514-0502	1/16	.063	.031	.017
514-0103	514-0003	514-0203	514-0303	514-0403	514-0503	3/32	.093	.046	.020
514-0104	514-0004	514-0204	514-0304	514-0404	514-0504	1/8	.125	.062	.020
514-0105	514-0005	514-0205	514-0305	514-0405	514-0505	3/16	.187	.093	.020
514-0106	514-0006	514-0206	514-0306	514-0406	514-0506	1/4	.250	.125	.025
514-0107	514-0007	514-0207	514-0307	514-0407	514-0507	3/8	.375	.187	.025
514-0108	514-0008	514-0208	514-0308	514-0408	514-0508	1/2	.500	.250	.025
514-0109	514-0009	514-0209	514-0309	514-0409	514-0509	3/4	.750	.375	.030
514-0110	514-0010	514-0210	514-0310	514-0410	514-0510	1	1.000	.500	.035
514-0111	514-0011	514-0211	514-0311	514-0411	514-0511	1-1/2	1.500	.750	.040
514-0112	514-0012	514-0212	514-0312	514-0412	514-0512	2	2.000	1.000	.045
514-0113	514-0013	514-0213	514-0313	514-0413	514-0513	3	3.000	1.500	.050
514-0114	514-0014	514-0214	514-0314	514-0414	514-0514	4	4.000	2.000	.055

SPECIFICATION (SHRUNK): MIL-I-23053 (135°C)—STANDARD LENGTH: 100 FT. (25 FOUR FT. LENGTHS)

VINYL SHRINKABLE TUBING RATIO: 2x1 (50% SHRINK)

Clear Part No.	Black Part No.	Red Part No.	White Part No.	Expanded Inside Diameter Minimum (Inches)		Recov. Inside Diam. Max. (Inches)	Nom. Wall Thick. After Shrinking (In.)
513-1903	513-1803	513-1753	513-1703	1/8	.125	.063	.025
513-1904	513-1804	513-1754	513-1704	3/16	.187	.093	.025
513-1905	513-1805	513-1755	513-1705	1/4	.250	.125	.025
513-1906	513-1806	513-1756	513-1706	3/8	.375	.187	.030
513-1907	513-1807	513-1757	513-1707	1/2	.500	.250	.035
513-1908	513-1808	513-1758	513-1708	3/4	.750	.375	.040
513-1909	513-1809	513-1759	513-1709	1	1.000	.500	.045

SPECIFICATIONS (Shrunk): MIL-I-631D UL 105°C

TEFLON* HEAT SHRINKABLE TUBING THIN WALL 2x1 (50% SHRINK)

Natural Part No.	Ordered As A.W.G. Size	Expanded Inside Diam. Minimum (Inches)	Recovered Inside Diam. Maximum (Inches	Nominal Wall Thickness After Shrinking Wall	±Tolerance
551-0501	30	.034	.015	.009	±.002
551-0502	28	.038	.018	.009	±.002
551-0503	26	.046	.022	.009	±.002
551-0504	24	.050	.027	.010	±.002
551-0505	22	.055	.032	.010	±.002
551-0506	20	.060	.039	.012	±.003
551-0508	18	.076	.049	.012	±.003
551-0510	16	.093	.061	.012	±.003
551-0512	14	.120	.072	.012	±.003
551-0514	12	.150	.089	.012	±.003
551-0516	10	.191	.112	.012	±.003
551-0518	8	.240	.141	.015	±.004
551-0520	6	.302	.178	.015	±.004
551-0522	4	.370	.224	.015	±.004
551-0524	2	.430	.278	.015	±.004
551-0526	0	.470	.347	.015	±.004

EXPANDED FROM: AMS 3655 MIL-I-23053B/12

*TEFLON—DuPont Trademark

TEFLON* HEAT SHRINKABLE TUBING STANDARD WALL 2x1 (50% SHRINK)

Natural Part No.	Ordered As A.W.G. Size	Expanded Inside Diam. Minimum (Inches)	Recovered Inside Diam. Maximum (Inches)	Nominal Wall Thickness After Shrinking Wall	±Tolerance
551-1504	24	.045	.027	.012	±.002
551-1505	22	.050	.032	.012	±.002
551-1506	20	.055	.039	.016	±.003
551-1507	19	.060	.043	.016	±.003
551-1508	18	.065	.049	.016	±.003
551-1509	17	.080	.054	.016	±.003
551-1510	16	.090	.061	.016	±.003
551-1511	15	.110	.067	.016	±.003
551-1512	14	.120	.072	.016	±.003
551-1513	13	.130	.080	.016	±.003
551-1514	12	.140	.089	.016	±.003
551-1515	11	.160	.102	.016	±.003
551-1516	10	.180	.112	.016	±.003
551-1517	9	.200	.124	.020	±.004
551-1518	8	.230	.141	.020	±.004
551-1519	7	.240	.158	.020	±.004
551-1520	6	.290	.178	.020	±.004
551-1521	5	.310	.198	.020	±.004
551-1522	4	.370	.224	.020	±.004
551-1523	3	.390	.249	.020	±.004
551-1524	2	.430	.278	.020	±.004
551-1525	1	.450	.311	.020	±.004
551-1526	0	.470	.347	.020	±.004

EXPANDED FROM: AMS 3653 MIL-I-22129 MIL-I-23053B/12

TEFLON* HEAT SHRINKABLE TUBING FRACTIONAL INDUSTRIAL 4x1 (SHRINK RATIO)

Natural Part No.	Expanded Inside Diameter Minimum (Inches)		Recovered Inside Diam. Maximum (Inches)	Nominal Wall Thickness After Shrinking Wall	±Tolerance
551-3501	5/64	.078	.025	.009	±.002
551-3502	1/8	.125	.037	.010	±.002
551-3503	1/4	.250	.063	.012	±.003
551-3504	3/8	.375	.096	.012	±.003
551-3505	1/2	.500	.144	.015	±.004
551-3506	5/8	.625	.178	.015	±.004
551-3507	3/4	.750	.224	.015	±.004
551-3508	1	1.000	.278	.015	±.004
551-3509	1-1/4	1.250	.347	.015	±.004

STANDARD PACKAGE IS 100 FEET EXCEPT 1" & 1¼" ARE 25 FEET MIL-I-23053B/12

STANDARD PACKAGE IS 100'—OTHER LENGTHS AVAILABLE UPON REQUEST

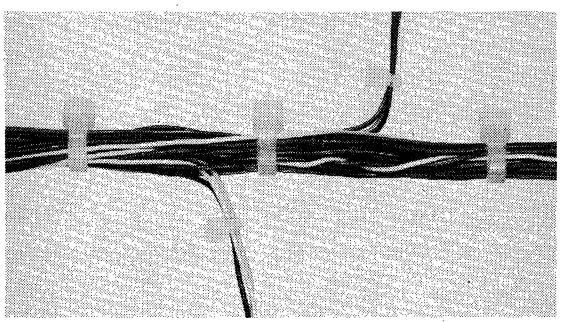
Colors to MIL-STD-104 Also Available

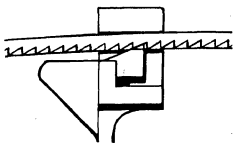
For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

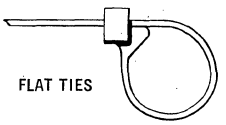
Transcon ENGINEERED HARDWARE IS THE STANDARD OF INDUSTRY

CABLE & WIRE TIES

"TUF-TIES"®







Use standard pistol-type tool or simply wrap the tie around the cable, slip tail through the head, and pull tight. Snip off excess tail.

BEADED "TUF-TIES"® (WIRE TIES)

PART NO.	COLOR	LENGTH	BUNDLE DIA.	MATERIAL
700-0001	Red	5.0″	1.5″	Polypropylene
700-0002	Yellow	5.0″	1.5″	Polypropylene
700-0003	Blue	5.0″	1.5″	Polypropylene
700-0004	Natural	5.0″	1.5″	Polypropylene
700-0020	Red	10.5″	3.0″	Polypropylene
700-0021	Yellow	10.5″	3.0″	Polypropylene
700-0022	Blue	10.5″	3.0″	Polypropylene
700-0023	Natural	10.5″	3.0″	Polypropylene
700-1001	Natural	5.0″	1.5″	Nylon
700-1002	Natural	10.5″	3.0″	Nylon

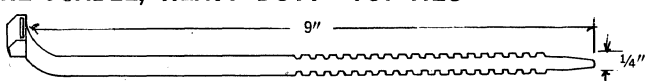
FLAT "TUF-TIES"® (CABLE TIES)

PART NO.	MIL. SPEC.*	COLOR	LENGTH	WIDTH	BUNDLE DIA. (Max.)	MATERIAL
700-3501	MS-18034-4	Natural	4.00″	.110″	1.00″	Nylon
700-3502	MS-17821-4	Black	4.00″	.110″	1.00″	Nylon
700-3401	MS-18034-1	Natural	6.75″	.188″	1.75″	Nylon
700-3402	MS-17821-1	Black	6.75″	.188″	1.75″	Nylon
700-3421	MS-18034-2	Natural	14.00″	.188″	4.00″	Nylon
700-3422	MS-17821-2	Black	14.00″	.188″	4.00″	Nylon

*Meets or exceeds military specifications.

Patent No. 3,484,905

RE-USABLE, HEAVY DUTY "TUF-TIES"

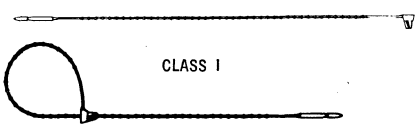


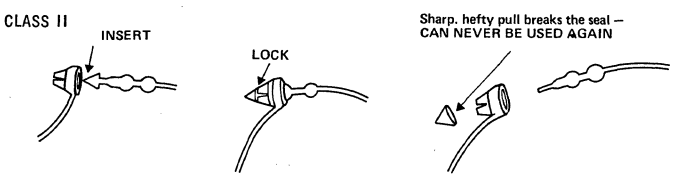
This "Tuf-Tie" can be snuggly looped around cables and locked in place, without the use of tools.

You can release the "Tuf-Tie" as often as required without damage to itself and without any loss in its holding efficiency.

Part No.	Color	Length
700-3551	Natural	9″
700-3552	Black	9″

"TINY-TIES"® (NYLON)





NYLON ADJUSTABLE — Class I

PART NUMBER	COLOR	LENGTH
700-3661	Natural	5″
700-3662	Black	5″

NYLON FIXED — Class II

PART NUMBER	COLOR	LENGTH
700-3601	Natural	3″
700-3602	Black	3″
700-3621	Natural	5″
700-3622	Black	5″
700-3641	Natural	8″
700-3642	Black	8″

AVAILABLE IN ALL STANDARD COLORS

NYLON CABLE HANGERS

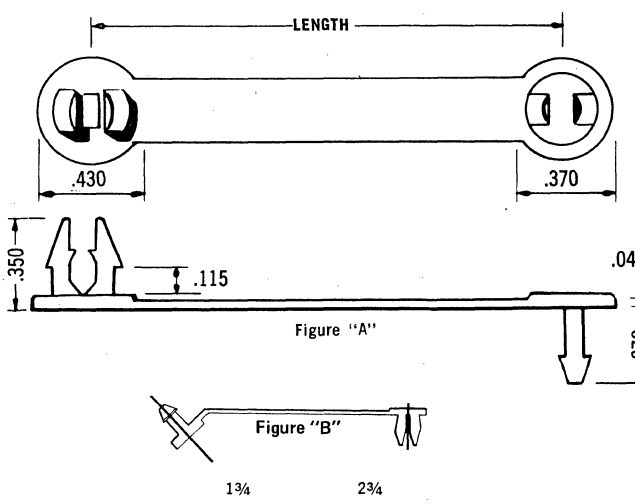
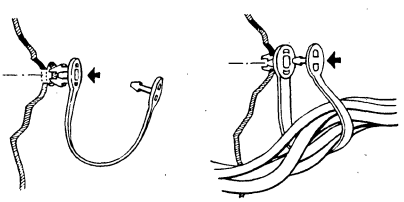


Figure "B"



Plugs into a .250″ hole in material up to .100″ thick. Wire bundle or tubing hangs secure in loop formed.

FIG.	PART NUMBER NYLON	PART NUMBER POLY-PROPYLENE	COLOR	LENGTH	WIRE BUNDLE or TUBE SIZE
A	720-0001	720-0101	Natural	1.75″	⅜″
A	720-0002	720-0102	Black	1.75″	⅜″
B	720-0021	720-0121	Natural	1.75″	⅜″
B	720-0022	720-0122	Black	1.75″	⅜″
A	720-0003	720-0103	Natural	2.75″	⅝″
A	720-0004	720-0104	Black	2.75″	⅝″
B	720-0023	720-0123	Natural	2.75″	⅝″
B	720-0024	720-0124	Black	2.75″	⅝″
A	720-0005	720-0105	Natural	3.75″	1″
A	720-0006	720-0106	Black	3.75″	1″

OTHER COLORS AVAILABLE ON REQUEST

For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

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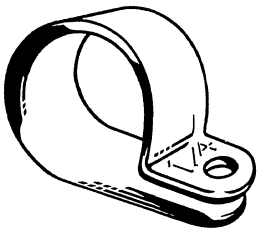
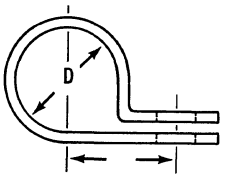
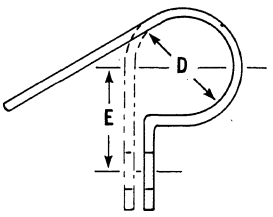
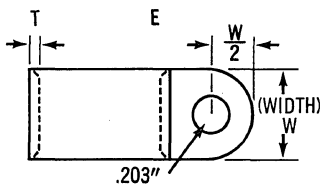
CABLE CLAMPS — STANDARD AND HEAVY DUTY









NYLON CABLE CLAMPS — 3/8" WIDE

Standard Part No.		Heavy Duty Part No.		Dimensions			
Natural	Black	Natural	Black	"D"	"E"	H.D. "T"	Std. "T"
713-0001	713-0501	710-0001	710-0501	1/8	.360	.050	.047
713-0002	713-0502	710-0002	710-0502	3/16	.391	.050	.047
713-0003	713-0503	710-0003	710-0503	1/4	.423	.050	.047
713-0004	713-0504	710-0004	710-0504	5/16	.454	.050	.047
713-0005	713-0505	710-0005	710-0505	3/8	.485	.050	.047
713-0006	713-0006	710-0006	710-0506	7/16	.516	.050	.047
713-0007	713-0507	710-0007	710-0507	1/2	.548	.050	.047

POLYPROPYLENE CABLE CLAMPS — 1/2" WIDE

STANDARD COLOR IS "MILKY WHITE' (NATURAL)

Standard Part No.	Heavy Duty Part No.	Dimensions			
		"D"	"E"	H.D. "T"	Std. "T"
713-3001	710-3001	1/8	.360	.060	.047
713-3002	710-3002	3/16	.391	.060	.047
713-3003	710-3003	1/4	.423	.060	.047
713-3004	710-3004	5/16	.454	.060	.047
713-3005	710-3005	3/8	.485	.060	.047
713-3006	710-3006	7/16	.516	.060	.047
713-3007	710-3007	1/2	.548	.060	.047
713-3008	710-3008	9/16	.579	.060	.047
713-3009	710-3009	5/8	.610	.060	.047
713-3010	710-3010	11/16	.641	.060	.047
712-3011	710-3011	3/4	.673	.060	.047
713-3013	710-3013	7/8	.735	.060	.047
713-3014	710-3014	1	.798	.060	.047
713-3015	710-3015	1-1/8	.880	.060	.047
—	710-3016	1-3/16	.912	.060	.047
713-3017	710-3017	1-1/4	.943	.060	.047
—	710-3018	1-3/8	1.068	.060	.047
—	710-3019	1-1/2	1.163	.060	.047

ETHOCEL CABLE CLAMPS — 1/2"WIDE

STANDARD COLOR IS AMBER.

Standard Part No.	Heavy Duty Part No.	Dimensions			
		"D"	"E"	H.D. "T"	Std. "T"
713-4001	710-4001	1/8	.360	.060	.047
713-4002	710-4002	3/16	.391	.060	.047
713-4003	710-4003	1/4	.423	.060	.047
713-4004	710-4004	5/16	.454	.060	.047
713-4005	710-4005	3/8	.485	.060	.047
713-4006	710-4006	7/16	.516	.060	.047
713-4007	710-4007	1/2	.548	.060	.047
713-4008	710-4008	9/16	.579	.060	.047
713-0410	710-4010	5/8	.610	.060	.047
713-4011	710-4011	11/16	.641	.060	.047
713-4012	710-4012	3/4	.673	.060	.047
713-4013	710-4013	7/8	.735	.060	.047
713-4014	710-4014	1	.798	.060	.047
713-4015	710-4015	1-1/8	.880	.060	.047
—	710-4016	1-3/16	.912	.060	.047
713-4017	710-4017	1-1/4	.945	.060	.047
—	710-4019	1-3/8	1.068	.060	.047
—	710-4021	1-1/2	1.163	.060	.047

NYLON CABLE CLAMPS — 1/2" WIDE

Standard Part No.		Heavy Duty Part No.		Dimensions			
Natural	Black	Natural	Black	"D"	"E"	H.D. "T"	Std. "T"
713-0102	713-0602	710-0102	710-0602	1/8	.360	.060	.047
713-0103	713-0603	710-0103	710-0603	3/16	.391	.060	.047
713-0104	713-0604	710-0104	710-0604	1/4	.423	.060	.047
713-0105	713-0605	710-0105	710-0605	5/16	.454	.060	.047
113-0106	713-0606	710-0106	710-0606	3/8	.485	.060	.047
713-0107	713-0607	710-0107	710-0607	7/16	.516	.060	.047
713-0108	713-0608	710-0108	710-0608	1/2	.548	.060	.047
713-0109	713-0609	710-0109	710-0609	9/16	.579	.060	.047
713-0110	713-0610	710-0110	710-0610	5/8	.610	.060	.047
713-0111	713-0611	710-0111	710-0611	11/16	.641	.060	.047
713-0112	713-0612	710-0112	710-0612	3/4	.673	.060	.047
713-0113	713-0613	710-0113	710-0613	7/8	.735	.060	.047
713-0114	713-0614	710-0114	710-0614	1	.798	.060	.047
713-0115	713-0615	710-0115	710-0615	1-1/8	.880	.060	.047
—	—	710-0116	710-0616	1-3/16	.912	.060	.047
713-0117	713-0617	710-0117	710-0617	1-1/4	.943	.060	.047
—	—	710-0119	710-0619	1-3/8	1.068	.060	.047
—	—	710-0121	710-0621	1-1/2	1.163	.060	.047

HEAVY DUTY NYLON — 5/8" WIDE

Part Number		Dimensions		
Natural	Black	"D"	"E"	"T"
710-0212	710-0712	1-1/2	1.163	.060

NYLON CABLE CLAMPS — 5/8" WIDE

Part Number		Dimensions		
Natural	Black	"D"	"E"	"T"
713-0212	713-0712	1-1/2	1.163	.057

ALL ITEMS CAN BE SUPPLIED IN COLORS AND OTHER PACKAGING OR DIFFERENT MOUNTING HOLE SIZE, PRICES FOR SPECIALS ON REQUEST.

Nylon Cable Clamps are stronger than most other cable clamp material. They resist acids better and have a higher operating temperature, +135°C (+275°F). Basically conforms to MIL-P-17091A* and amendment 2, MIL-P-17091B*, MIL-M-20693A type 1*, NAS-1397, MS-39014*, MIL-P-20693.

*Conforms to dimensional requirements and materials specifications.

Polypropylene Clamps are stronger and stand higher temperatures than Ethocel and at a lower cost.

Ethocel clamps have satisfied unlimited fastening problems throughout the electrical/electronic industry. It is light weight, yet very durable with excellent shock resisting properties in a temperature range from 185°F to −40°F.

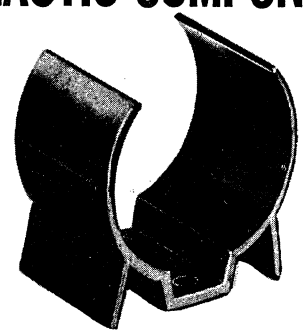
USED IN:
Television and Radio
Business Machines
Industrial Machines
Electrical and Electronics
Aircraft
Home Appliances
Vending Machines

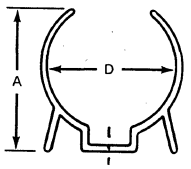
USED FOR:
Durability
Electrical Properties
Strength
Corrosion Resistance
Economy
Moisture Resistance
Abrasion Resistance
Resilience
Lightness of Weight
Single Wires
Group Wires
Pipe
Tubing

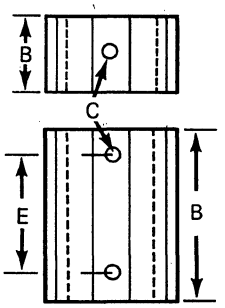
For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

Transcon ENGINEERED HARDWARE IS THE STANDARD OF INDUSTRY

PLASTIC COMPONENT CLIPS



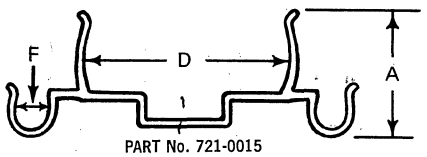




TRANSCON Plastic Component Clips are a convenient and economical means for fastening a wide variety of electrical and electronic components, accessories and parts. They are designed for fast, easy insertion, hold firmly and yet are easily removed. Typical applications are capacitors, resistors, lamps, batteries and fuses.

The clips are made of a strong combination of rigid vinyl and polypropylene with insulating properties having higher di-electric strength.

The floor of the clip is punched with one or two holes for screws or other fastening devices.



PART No. 721-0015

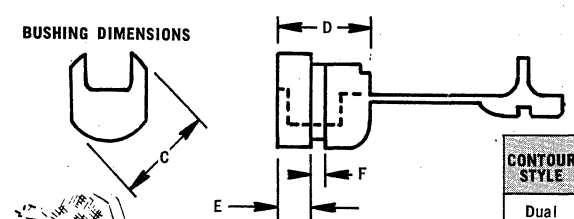
DIMENSIONS (Inches)

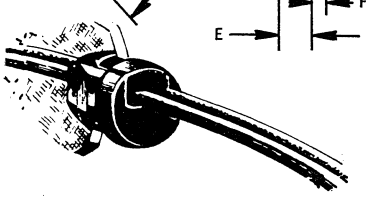
PART NO.	D DIA. OF PART TO BE HELD	HEIGHT A	LENGTH B	DIA. OF HOLE C	BETWEEN HOLES E	F DIA. OF PART TO BE HELD
721-0001	1/4	11/32	1/2	3/32		
721-0002	5/16	15/32	1/2	3/32		
721-0003	3/8	1/2	1/2	3/32		
721-0004	7/16	1/2	1/2	3/32		
721-0005	1/2	5/8	1/2	3/32		
721-0006	9/16	5/8	1/2	3/32		
721-0007	5/8	5/8	1/2	3/32		
721-0008	11/16	3/4	1/2	5/32		
721-0009	3/4	7/8	1/2	5/32		
721-0010	7/8	1	1/2	5/32		
721-0011	1	1-1/4	1/2	5/32		
721-0012	1-3/8	1-15/32	1-1/8	5/32	3/4	
721-0013	1	1-1/4	1-1/8	5/32	3/4	
721-0014	1-3/8	1-15/32	1-1/8	5/32		
721-0015	1-15/32 x 17/32	1	1-19/32	5/32	3/4	17/64

U.S. Pat. No. 2,541,828

STRAIN RELIEF BUSHINGS

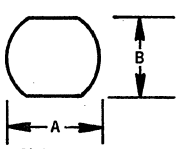
BUSHING DIMENSIONS





MOUNTING HOLES

Style "A"



Style "B"

CONTOUR STYLE

(FLAT)

(DUAL)

(ROUND)

These bushings will cut your production cost because there is no need to knot or tie your cords to avoid strain on connections! They are quickly and easily installed with specially designed pincers or even with ordinary pliers.

Once installed they lock the cords to the chassis panel in a vice-like grip and are locked there until deliberately removed for servicing or trouble shooting.

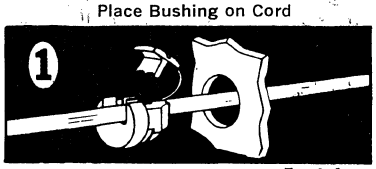
TRANSCON Bushings on an appliance are a symbol of highest quality.

SPECIAL PINCERS FOR SPEEDIER INSTALLATION ARE AVAILABLE.

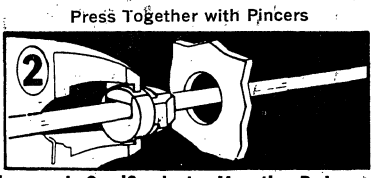
CONTOUR STYLE	PART NO.	WIRES ACCOMMODATED	APPROX. WIRE SIZE	A MOUNTING HOLES	B MOUNTING HOLES	C	D	E	F MAX. PANEL THICKNESS
Dual	722-0001 Black 722-0002 White	SP-1, SPT-1	.120 x .220	.437	.395	.460	.410	.160	.062
Flat	722-0003 Black	SP-2, SPT-2 #18/2 HPN #18/2	.15 x .28	.500	.465	.570	.500	.171	.100
	722-0004 White	SP2, SPT-2, #16/2 HPN #16/2	.16 x .30	.515					
Flat	722-0005 Black*	SPT-3 #18/2	.19 x .35	.730	.560	.775	.680	.275	.125
		SPT-3 #18/3	.19 x .39						
	722-0006 White*	SPT-3 #16/2	.20 x .37						
		SPT-3 #16/3	.20 x .43						
Round	722-0007 Black	SV. SVT #18/2	.250	.500	.465	.560	.430	.165	.100
		SV, SVT #18/3	.265	.515					
	722-0008 White	HPD #18/2	.270	.500					
		HPD #16/2	.290	.515					
Round	722-0009 Black	SJ, SJT, SJO #18/2	.300	.656	.570	.730	.680	.275	.125
		SJ, SJT, SJO #18/3	.330						
	722-0010 White	SJ, SJT, SJO #16/2	.325	.687					
		SJ, SJT, SJO #16/3	.355						
Flat	722-0013 Black	SP-1, SPT-1	.11 x .21	.375	.345	.425	.410	.155	.062
	722-0014 White	XT (Clock Wire)	.09 x .18						
Flat	722-0015 Black	SP-1, SPT-1	.11 x .21	.375	.345	.425	.410	.155	.125
	722-0016 White	XT (Clock Wire)	.09 x .18						

* Use Style "B" Mounting Hole Only.

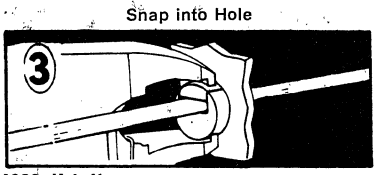
Place Bushing on Cord



Press Together with Pincers



Snap into Hole



For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

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LACING TAPE AND CORD

NYLON (POLYAMIDE) TWINE (CORD) TO MEET MIL-T-713C (Supersedes MIL-T-713A)

PART NUMBER		Type	Class	Tensile Strength	Finish	Nominal Diameter (Inches)	Yards per Pound	Standard Put-up
Natural	Black							
730-0101	730-0001	P Waxed	1	70 Lbs.	B	.039	550	1 Lb. Spool
730-0102	730-0002	P Waxed	2	48 Lbs.	B	.029	750	1 Lb. Spool
730-0103	730-0003	P Waxed	3	32 Lbs.	B	.025	1100	1 Lb. Spool

NYLON (POLYAMIDE) FLAT BRAIDED TAPE TO MEET MIL-T-43435

PART NUMBER		Type	Size	Tensile Strength	Finish	Nominal Width (Inches)	Nominal Thickness (Inches)	Standard Put-up
Natural	Black							
730-0105	730-0005	I	1	135 Lbs.	B	.225	.114	250 Yd. Spool
730-0106	730-0006	I	2	80 Lbs.	B	.125	.012	250 Yd. Spool
730-0107	730-0007	I	3	50 Lbs.	B	.090	.012	500 Yd. Spool
730-0108	730-0008	I	4	25 Lbs.	B	.062	.012	500 Yd. Spool
730-0109	730-0009	I	5	15 Lbs.	B	.050	.012	500 Yd. Spool

DACRON (POLYESTER) FLAT BRAIDED TAPE TO MEET MIL-T-43435

PART NUMBER		Type	Size	Tensile Strength	Finish	Nominal Width (Inches)	Nominal Thickness (Inches)	Standard Put-up
Natural	Black							
730-0115	730-0015	II	1	135 Lbs.	B	.225	.014	250 Yd. Spool
730-0114	730-0014	II	2	80 Lbs.	B	.125	.012	250 Yd. Spool
730-0113	730-0013	II	3	50 Lbs.	B	.090	.012	500 Yd. Spool
730-0112	730-0012	II	4	25 Lbs.	B	.062	.012	500 Yd. Spool
730-0113	730-0013	II	5	15 Lbs.	B	.050	.012	500 Yd. Spool

TEFLON* (TETRAFLUOROCARBON) FLAT BRAIDED TAPE TO MEET MIL-T-43435

PART NUMBER		Type	Size	Tensile Strength	Finish	Nominal Width (Inches)	Nominal Thickness (Inches)	Standard Put-up
Brown								
730-0222		III	2	30 Lbs.	B	.120	.011	250 Yd. Spool
730-0224		III	4	15 Lbs.	B	.065	.011	250 Yd. Spool
730-0227		III	2	30 Lbs.	B	.120	.011	50 Yd. Spool
730-0229		III	4	15 Lbs.	B	.065	.011	50 Yd. Spool

GLASS & TEFLON* FLAT BRAIDED TAPE FIBER GLASS, TEFLON* COATED (FOR 550°F.) TO MEET MIL-T-43435

PART NUMBER		Type	Size	Tensile Strength	Finish	Nominal Width (Inches)	Nominal Thickness (Inches)	Standard Put-up
White								
730-0261		IV	1	200 Lbs.	D	.225	.016	250 Yd. Spool
730-0262		IV	2	100 Lbs.	D	.125	.016	250 Yd. Spool
730-0263		IV	3	75 Lbs.	D	.090	.016	500 Yd. Spool
730-0264		IV	4	70 Lbs.	D	.062	.016	500 Yd. Spool
730-0265		IV	5	60 Lbs.	D	.050	.016	500 Yd. Spool
730-0266		IV	1	200 Lbs.	D	.225	.016	100 Yd. Spool
730-0267		IV	2	100 Lbs.	D	.125	.016	100 Yd. Spool
730-0268		IV	3	75 Lbs.	D	.090	.016	100 Yd. Spool
730-0269		IV	4	70 Lbs.	D	.062	.016	100 Yd. Spool
730-0270		IV	5	60 Lbs.	D	.050	.016	100 Yd. Spool

*TEFLON—DuPont Trademark

MIL-T-713C SPECIFICATIONS

TYPE

N, Waxed — Vegetable Fiber
P, Unwaxed — Polyamide (Nylon)
P, Waxed — Polyamide (Nylon)
SAR — Saponified Acetate

CLASS

1 — 70 Pound Breaking Strength
2 — 48 Pound Breaking Strength
3 — 32 Pound Breaking Strength

OTHER TYPES AND SIZES ARE AVAILABLE.

MIL-T-43435 SPECIFICATIONS

TYPE

I — Polyamide (Nylon)
II — Polyester
III — Tetrafluorocarbon
IV — Glass
V — Polyamide (Nylon), Heat Resistant

FINISH

A — Natural
B — Wax Impregnated
C — Synthetic Rubber Including Elastomer Coating
D — Tetrafluorocarbon Coating
E — Vinyl Chloride or Vinyl Chloride — Acetate Copolymer Coating
F — Silicone Resin Impregnated

For Information on Transcon's SemiConductor Mounting Pads, see Section 4800, Vol. II

MicroCoax®

Close-Tolerance Miniature Solid-Jacketed Coaxial Cables

Uses of close-tolerance MicroCoax cables include:

- Microwave transmission and delay lines
- Totally shielded connections (mixers, klystrons, stripline)
- High-speed computer leads
- Audio crosstalk suppression
- Low-noise amplifier isolation

Advantages:

- Low loss
- Essentially total RF shielding
- Easily soldered, stripped and connected
- Close tolerance, resulting in a high degree of uniformity and reliability, both mechanically and electrically
- Comprehensive mechanical and electrical test data available

Specifications and Technical Data—10, 25, 50, 70, and 93 Ohm MicroCoax Cables

CABLE TYPE	Impedance, ohms	Outside Diam. ± .001"	Jacket Material	Dielectric Diam. ± .001"	Dielectric Material	Center Cond. AWG (in.)	Center Cond. Material	Capacitance pF/ft.	Max. Temp. °C	Min. Bend Radius (in.)	Typical Attenuation db/100 ft. .5 GHz	1.0 GHz	5.0 GHz	10.0 GHz	Weight (Pounds/100 ft.)
UT-8	50	.008	Copper	.0045	TFE	.002	C	29.3	85	1/16	154	222	550	810	<0.1
UT-13	50	.013	Copper	.010	FEP	.0031	SPCW	29.3	85	1/16	105	152	381	592	<0.1
UT-20	50	.023	Copper	.017	FEP	.005	SPCW	29.3	85	1/16	50	76	225	370	.10
UT-34	50	.034	Copper	.027	TFE	# 32(.008)	SPCW	29.3	100	1/8	28	44	100	150	.13
UT-47	50	.047	Copper	.037	TFE	# 29(.0113)	SPCW	29.3	150	1/8	26	36	87	130	.53
UT-701	50	.070	Copper	.059	TFE	# 25(.0179)	SPC	29.3	150	1/8	14.7	19.9	45.5	66.2	.75
UT-85	50	.0865	Copper	.0658	TFE	# 24(.0201)	SPCW	29.3	150	1/8	12.0	17.0	42.0	62.0	1.4
UT-85C	50	.0865	Copper	.0658	TFE	# 24(.0201)	SPC	29.3	150	1/8	12.0	17.0	42.0	62.0	1.4
UT-141	48.8	.141	Copper	.116	TFE	# 19(.0359)	SPCW	29.5	200	1/4	7.5	10.7	26	40	3.2
UT-141A	50	.141	Copper	.1185	TFE	# 19(.0359)	SPCW	29.3	200	1/4	7.5	10.7	26	40	3.2
UT-141B	50	.141	Copper	.1185	TFE	# 19(.0359)	BeCu	29.3	200	1/4	8.0	11.6	28.5	44	3.2
UT-141C	50	.141	Copper	.1185	TFE	# 19(.0359)	SPC	29.3	200	1/4	7.5	10.7	26	40	3.2
UT-141-I	50	.141	Copper	.1185	MgO	# 25(.0179)	SPC	60	300	1/4	14.0	22.0	70	110	3.1
UT-141L	50	.141	Copper	.1185	TFE	# 19(.0359)	T	29.3	200	1/4	45.0	65.0	154.0	250.0	3.2
UT-141P	50	.141	Copper	.1185	IP	# 19(.0359)	C	29.3	200	1/4	22	35	115	190	3.1
UT-250A	50	.250	Copper	.210	TFE	# 14(.064)	SPC	29.3	200	3/8	3.7	5.8	16.2	25.0	10.0
UT-10	10	.043	Copper	.036	TFE	# 21(.0285)	C	146.5	100	1/4	62.0	86	195	375	.50
UT-25	25	.034	Copper	.024	TFE	# 28(.0126)	SPCW	58.5	100	1/8	48.0	68.0	145	200	.25
UT-70	70	.085	Copper	.056	TFE	# 29(.0113)	SPCW	20.6	175	1/4	13.0	19.0	42.0	63.0	1.4
UT-141-70	70	.141	Copper	.107	TFE	# 24(.0201)	SPCW	20.6	200	1/4	9.0	13.0	32.0	49.0	3.2
UT-851	93	.085	Copper	.073	TFE	# 32(.008)	SPCW	15.5	150	1/4	15.0	21.5	51.0	76.0	1.4
UT-93	93	.130	Copper	.1055	TFE	# 29(.0113)	SPCW	15.5	175	1/4	9.6	14.0	34.0	50.0	2.6
UT-20-SS	50	.020	304SS	.015	FEP	# 37(.0045)	SPCW	29.3	150	1/8	140	200	455	645	.10
UT-85-SS	50	.0865	304SS	.0658	TFE	# 24(.0201)	SPCW	29.3	200	1/4	26.5	39.0	95.0	140	1.3
UT-141-SS	50	.141	304SS	.119	TFE	# 19(.0359)	SPCW	29.3	250	1/2	17.0	25.0	57.0	84.0	3.1
UT-141-SSC	50	.141	304SS	.119	TFE	# 19(.0359)	SPC	29.3	250	1/2	17.0	25.0	57.0	84.0	3.1
UT-141AL	50	.141	Aluminum	.119	TFE	# 19(.0359)	SPCW	29.3	200	1/4	8.2	12	35	54	1.9
UT-250AL	50	.250	Aluminum	.214	TFE	# 14(.064)	SPC	29.3	200	3/8	5.0	7.5	20.0	34.0	6.4
UT-325	50	.325	Copper	.285	TFE	# 7X(.0312)	SPC	29.3	200	1/2	3.6	5.5	14.3	22.0	15.0
UT-852	75	.085	Copper	.067	TFE	# 29(.0113)	SPCW	19.3	150	1/8	14	20	46.5	68	1.4

NOTES: SPCW = Silver Plated Copperweld Wire; SPC = Silver Plated Copper Wire; C = Copper Wire; T = Tophet (1) C Wire; BeCu = Beryllium Copper Wire; 304SS = Stainless Steel, Type 304; TFE = Teflon (2) TFE Resin; FEP = Teflon (2) FEP Resin; IP = Irradiated Polyethylene. (1) = Trade Name W. B. Driver, (2) = Trade Name E. I. DuPont.

CONDUCTOR MATERIALS

Alloys or Pure Aluminum, Copper, Beryllium Copper, Iron, Nickel, Gold, Silver, Columbium (Niobium), Stainless Steel.

DIELECTRICS

ORGANICS: Teflon (TFE and FEP), KEL-F, PVC, RTV, Polystyrene, Polyethylene.

INORGANICS: Titanite, Alumina, Magnesium Oxide, Beryllium Oxide.

CABLE ASSEMBLIES

Fabricated from any of the standard MicroCoax cables, these assemblies are fully tested for VSWR and attenuation characteristics. A large stock of connectors assures the engineer rapid delivery of either straight or formed units. Comprehensive VSWR and attenuation test data is also available on request.

CUSTOM DELAY LINES

The fabrication of any of the MicroCoax cables listed in the above table into delay elements is one of our specialties. Obtaining the best combination of attenuation, size, shape, cost and weight can be best accomplished by discussing your delay requirements with our engineering staff.

STANDARD DELAY LINES

Stock delivery of delay elements is available for prototype or production requirements. Cable sizes include UT-250, UT-141-A, UT-85, UT-34 and UT-20. Delay values of 5, 10, 25, 50 and 100 nanoseconds allow the cascading of these elements to obtain specific delay and attenuation characteristics.

REQUEST COMPLETE CATALOG

UNIFORM TUBES, INC.

COLLEGEVILLE, PA. 19426

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WIRE AND CABLE CORP.

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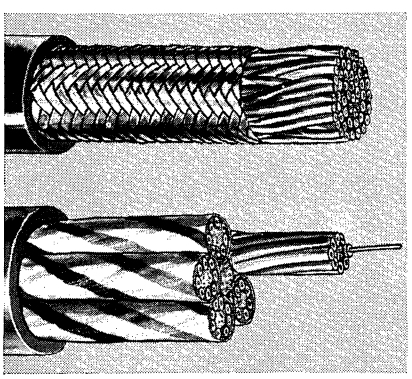
DESC and UL Approved
Approved in-plant test facilities by authorization of DESC and UL Underwriters

HOOK-UP WIRE

Hi voltage Teflon® wire • Aircraft wire to MIL-W-5086A and MIL-7078A • Business machine wire • High voltage Polyethylene and Rulan • Wire to meet MIL-W-76B and MIL-W-16878D • Kapton wrapped • Teflon® wrapped • Thermocouple • Test lead wire Types B, BN, C, CN, D, DN, E, EE, ET, F, FF, K, KK.

MULTI-CONDUCTOR CABLE



High, medium, and low temperature cables are available with over 200 conductors of various gages and lay patterns to meet specific termination and electrical requirements. Our engineering department is continually designing cables that reduce overall manufacturing costs.

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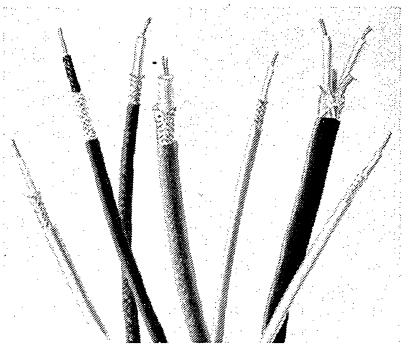

RG/U, over fifty Teflon® insulated and over 125 polyethylene insulated cables manufactured to MIL-C-17. SPECIALLY DESIGNED RG cables for specific RF requirements. These cables are designed to give the latest improved electrical characteristics. LOW CAPACITANCE • LOW ATTENUATION • MINIATURIZED • LOW NOISE • FOAMED DIELECTRICS • HIGH FLEXIBILITY • HIGH TEMPERATURE (1500°F) • LOW TEMPERATURE (−350°F).

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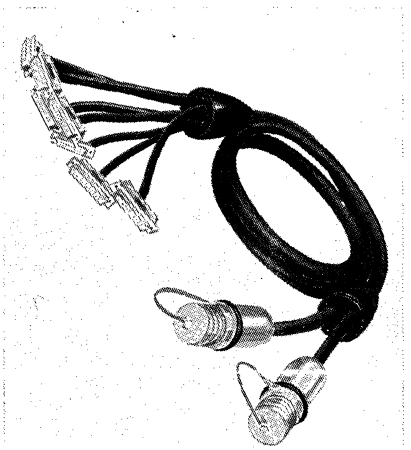

TERMINATIONS, MOLDINGS, HARNESSES

Victor Wire and Cable offers a service that is only equalled by the largest and most sohisticated cable companies. It is important to state that every production stage of termination, molding, and harnessing takes place at Victor Wire and Cable. Therefore we offer a quality controlled, in-house assembly program unequalled in the industry.

Victor Wire and Cable provides all types of termination and assembly work for Coaxial, Multi Conductor cable and harnesses with 100% accuracy and at low cost. Our custom engineering service is qualified to design cables, and cable assemblies to meet the most critical applications. Our customer guarantee is many years of experience.

OUR SPECIALTY

SPECIALLY DESIGNED AND ENGINEERED CABLE
SPECIAL COAXIAL CABLE TO CUSTOMER PRINTS AND ENGINEERED DESIGNS

VICTOR WIRE AND CABLE CORP.

WHITMOR WIRE AND CABLE CORPORATION

Manufacturers of custom, multiple conductor, Mil-Spec and U.L. approved cables.

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MULTI-CONDUCTOR STOCK CABLES / All wire 19 strand					DUR-X-THANE®		STOCK		DUR-X-THANE®	
PART NO.	COND. AWG.	NO. COND.	JKT. THICK.	CABLE O.D.	JKT. THICK.	CABLE O.D.	JKT. THICK.	CABLE O.D.	JKT. THICK.	CABLE O.D.
W-227*	22	7	.040	.280	.030	.260	.040	.305	.030	.285
W-2212*	22	12	.050	.380	.030	.340	.050	.405	.030	.365
W-2219*	22	19	.060	.450	.040	.410	.060	.475	.040	.435
W-2227*	22	27	.060	.530	.040	.490	.060	.555	.040	.515
W-2237*	22	37	.060	.580	.040	.540	.060	.605	.040	.565
W-2248*	22	48	.060	.660	.050	.640	.060	.685	.050	.665
W-2261*	22	61	.060	.710	.050	.690	.060	.735	.050	.715
W-2272*	22	72	.060	.775	.060	.775	.060	.800	.060	.800
W-207*	20	7	.040	.300	.030	.280	.040	.325	.030	.305
W-2012*	20	12	.050	.400	.030	.360	.050	.425	.030	.385
W-2019*	20	19	.060	.475	.040	.435	.060	.500	.040	.460
W-2027*	20	27	.060	.560	.040	.520	.060	.585	.040	.545
W-2037*	20	37	.060	.610	.040	.570	.050	.640	.040	.595
W-2048*	20	48	.060	.700	.050	.680	.060	.725	.050	.705
W-2061*	20	61	.060	.750	.060	.750	.060	.775	.060	.775
W-2072*	20	72	.060	.840	.060	.840	.060	.865	.060	.865
W-187*	18	7	.040	.335	.030	.315	.040	.360	.030	.340
W-1812*	18	12	.050	.450	.040	.430	.050	.475	.040	.455
W-1819*	18	19	.060	.550	.040	.510	.060	.575	.040	.535
W-1827*	18	27	.060	.650	.050	.630	.060	.675	.050	.655
W-1837*	18	37	.060	.720	.050	.700	.060	.745	.050	.725
W-1848*	18	48	.060	.820	.060	.820	.060	.845	.060	.845
W-1861*	18	61	.060	.890	.060	.890	.060	.915	.060	.915
W-1872*	18	72	.060	.995	.060	.995	.060	1.020	.060	1.020
W-167*	16	7	.040	.370	.030	.350	.040	.395	.030	.375
W-1612*	16	12	.050	.500	.040	.480	.050	.525	.040	.505
W-1619*	16	19	.060	.600	.040	.560	.060	.625	.040	.585
W-1627*	16	27	.060	.685	.050	.665	.060	.710	.050	.590
W-1637*	16	37	.060	.755	.060	.755	.060	.780	.060	.780
W-1648*	16	48	.060	.865	.060	.865	.060	.890	.060	.890
W-1661*	16	61	.060	.935	.060	.935	.060	.960	.060	.960
W-147*	14	7	.050	.420	.040	.400	.050	.445	.040	.425
W-1412*	14	12	.050	.550	.040	.530	.050	.575	.040	.555
W-1419*	14	19	.060	.645	.050	.625	.060	.670	.050	.650
W-1427*	14	27	.060	.775	.060	.775	.060	.800	.060	.800
W-125*	12	5	.050	.445	.040	.400	.050	.470	.040	.425
W-127*	12	7	.050	.480	.040	.460	.050	.505	.040	.485
W-1212*	12	12	.060	.650	.050	.650	.060	.675	.050	.675
W-1219*	12	19	.060	.820	.060	.820	.060	.845	.060	.845

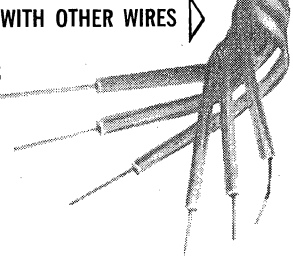
*Designate jacketing desired as follows: V=vinyl X=Dur-X-thane P=polyethylene N=neoprene - Mil-S-6855 - Class 2 - Grade 60
EXAMPLE: W-1827P=Cable w/27 conductors, 18 gauge wire, w/polyethylene jacketing. **Add "S" to PART NO. for Shielded cable.
Other constructions available on request using 1/32" PVC insulation (3000 V, Military Type D); (600 V, Style 1015 U.L. Commercial)

TECHNICAL DATA

Whitmor Wire and Cable Corporation manufactures a complete line of multiple conductor control cables. All conductors are Type C per MIL-W-16878, insulated for 1000 V and 105° C. Conductors are color coded per MIL-STD 681. All conductors are planetary cabled and contra-helically laid with Mylar tape over the cable bundle.

® Dur-X-thane is Whitmor's Registered T.M. for extruded Polyurethane.

SHIELDED CABLES: Same specifications as above with additions of tinned copper braided shield over cable complex with 85%-95% coverage to MIL-C-7078A, cables shipped on non-returnable reels.



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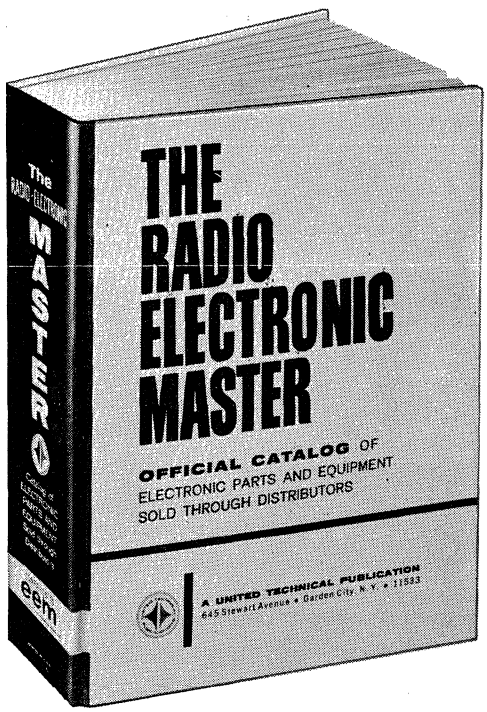

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Moody Machine Products Co.
Mueller Electric Co.
Multicore Solder

NT-T Sales, Division of National Tel-Tronics
National Wire & Cable Corp.
Newcomb Audio Products Co.
North Hills Electronics, Inc.

Oaktron Industries, Inc.
Ohmite Manufacturing Co., A North American Philips Co.
ORYX

Pamotor, Inc.
Panduit Corp.
Paragon Electronic Co., Inc. Sub. AMF, Inc.
Par-Metal Products Division of Eon Corporation
Penta Laboratories Div. of Kilovac Corp.
Petersen Radio Co., Inc.
Philmore Mfg. Co., Inc.
Plastic Capacitors, Inc.
Pomona Electronics Co., Inc.
Potter & Brumfield
Precision Electronics, Inc.
Premax Products, Div. of Chisholm-Ryder Co., Inc.
Premier Metal Prod. Co.

Quam-Nichols Co.

RAACO Corporation
RCA Corporation Electronic Components
Robertshaw Controls Co. Acro Division
Robins Electronics Corp.
Russell Industries, Inc.
Rye Industries Corp.

Sams & Co., Inc., Howard W.
Sanwa Corporation of America
Sarkes-Tarzian Inc.
Saxton Products, Inc.
Schrack Electrical Sales Corp.
Sealectro Corporation
Sennheiser Electronic Corp (N.Y.)
Shurite Meters
Signal Transformer Co., Inc.
Simpson Electric Co.
Singer Industrial Timer Corp.
Slaughter Company
Smith Inc., Herman H.
Sola Electric Div. Sola Basic Industries
South River Metal Products Co.
Specialties Mfg. Co.
Sprague Products Co.
Stackpole Carbon Company
Staco, Inc.
Sterling Transformer Corp.
Sticht Co., Inc., Herman H.
Superior Electric Co., The
Switchcraft, Inc.

Talk-A-Phone Co.
Tansistor Electronics, Inc.
Technical Apparatus Builders
Telvac Instrument Co.
Terado Corp.
Texas Crystals
Triad Distributuor Div. Litton Industries
Trimm, Inc.
Triplett Corp.
Trippe Manufacturing Company
Turner Microphone

Ungar, Div. of Eldon Industries, Inc.
Union Carbide Corporation Consumer Products Div.
United-Page, Inc.
United Transformer Co. Division of TRW, Inc.
University Sound Div. of Ling Altec, Inc.

Vaco Products Company
Varo, Inc., Semiconductor Div.
Vector Electronic Co., Inc.
Vero Electronics Inc.

Waber Electronics, Inc.
Waldom Electronics, Inc.
Wall Manufacturing Company
Wanlass Electric Co. Industrial Dist. Products Div.
Ward Leonard Electric Company
Weller Division, Cooper Industries, Inc.
Wharfedale Div. of British Industries
Workman Electronic Prod. Inc.
Worner Electronic Devices

Xcelite Incorporated

Zenith Sales Co.

Write – call your local electronic distributor listed on following pages!

Contact Your Local Distributor For The 1971 Radio-Electronic MASTER

ALABAMA

Andalusia—Wholesale Electronics Supply Co., 817 River Falls St.
Anniston—Southeastern Radio, 15 W. 15th St.
Birmingham—
Electronic Supplies, Inc., 2900 Bessemer Rd.
Forbes Distributing Co., 1416 4th Ave. So.
Decatur—
Forbes Distributing Co., 1522 Fifth Ave. S.E.
Mock Distrib. Co., Inc., 902 Bank St.
Dothan—Hand Supply Co., 705 S. Oates St.—P.O. Box 1430
Gadsden—Southeastern Radio, 304 So. 4th St.
Huntsville—Mock Electronics, Inc., 2310 Memorial Parkway, S.W.
Mobile—Forbes Electronics Dists. Inc., 14 Midtown Park, West
Grice Electronics, Inc., 1514 S. Beltline Hwy.
Nelson Radio & Supply, 1541 S. Beltline Hwy.
Montgomery—Forbes-Godfrey Electronics Inc., 915 S. Court St.
Handey's Electr. Center, Inc., 205 Commerce St.
Southeastern Radio, 635 E. Jefferson St.
Muscle Shoals—
Jones Electronics Inc., 902 Woodward Ave.
Selma—Southeastern Radio Parts Co., 729 Jefferson Davis Ave.
Sheffield—Mock Radio & Electronics, Inc., 107 No. Montgomery Ave.

ALASKA

Anchorage—
Yukon Radio Supply, 3222 Commercial Drive
Fairbanks—Yukon Radio Supply, 1112 Cushman

ARIZONA

Phoenix—Dalis Electr. Supply, 917 N. 7th St.
Tucson—Inland Electronic, 715 E. Broadway

ARKANSAS

Blytheville—
Bluff City Dist. Co., 113 S. Division
Fort Smith—Carlton-Bates Co., 302 No. 6th St.
Jonesboro—Bluff City Dist., 324 W. Huntington
Little Rock—Carlton-Bates Co., 1210 E. 6th St.
Southern Electronics, 1419 Main St.
Pine Bluff—Carlton-Bates Co., 1510 State St.

CALIFORNIA

Fresno—Jack C. Arbuckle Co., 2349 Kern St.
Hayward—Dunlap Electronics, 25354 Cypress
Hollywood—
Yale Radio Electric Co., 6616 Sunset Blvd.
Los Angeles—Calif. Electrs, 1911 Armacost Ave.
Radio Products Sales, 1501 So. Hill St.
Mt. View—Brill Electrs., 1065 Terra Bella Ave.
Dunlap Electrs., 2025 Old Middlefield Way
Oakland—Brill Electronics, 610 E. 10th St.
Sacramento—Dunlap Electronics, 1800 18th St.
Sacramento Electronic Supply, 1219 S. St.
San Diego—Shanks & Wright, 2045 Kettner Blvd.
Western Radio, 1415 India St.
San Francisco—Zack Electronics, 1444 Market St.
San Jose—Quement Electrs., 1000 S. Bascom
Sunnyvale—Sunnyvale Electrs., 548 S. Murphy

CANADA

Calgary, Alberta—Canadian Electronics Ltd., 457-42nd Ave. S.E.
Quebec City, Quebec—Crobel, Ltd., 225 Rue Lee
Sept-Iles, Quebec—
Eastern Electronics Inc., 765 Laure Blvd.
Sherbrooke, Quebec—Sherbrooke Electronic Supply Inc., 522 Galt St. W.
Toronto, Ont.—
Electro Sonic Supply Co. Ltd., 543 Yonge St.
Vancouver, B.C.—
L.A. Varah, Ltd., 1250 W. 6th Ave.

COLORADO

Colorado Springs—
D & M Electronics Supply, 715 No. Weber
Walker Electronics Inc., 9 E. Vermijo
Denver—Burstein-Applebee Co., 800 Lincoln St.
Newark-Denver Electr. Supply, 2170 S. Grape
Walker Electronics Inc., 300 Bryant St.
Durango—
Walker Electronics Inc., 1129 Main Ave.
Grand Junction—
Walker Electronics Inc., 537 N. First
Greeley—Walker Electronics Inc., 1525 8th Ave.
Pueblo—Walker Electronics Inc., 100 N. Victoria

CONNECTICUT

Bridgeport—Hatry Electronics, 2465 Main St.
Westconn. Electrs., 195 Colorado Ave.
Darien—Springdale Electronic Corp., 110 Post Rd.
East Hartford—Eastco, 95 Leggett St.
Fairfield—"U"-Tronics Inc., 273 Linwood Ave.
Hamden—
Connecticut Electro Sales, 1601 Dixwell Ave.
Hartford—Hatry Electronics, 500 Ledyard St.
Sceli Electronics, 78 Maple Ave.
New Britain—United Electronics Supply Corp., 49 E. Main St.
New Haven—Hatry Electronics, 610 Boulevard
New London—
Jabbour Electronics Inc., 227 Jefferson Ave.
Norwalk—Arrow Electronics Inc., 18 Isaac St.
Stamford—
Westchester Electrs., 181 Stillwater Ave.
Waterbury—
Hatry Electronics, 480 Watertown Ave.

DELAWARE

Wilmington—Radio Electric Service Co. of Pa., 3601 N. Market St.

DISTRICT OF COLUMBIA

Collins Bros. Electrs., 4946 Marlboro Pike

FLORIDA

Ft. Walton Beach—
Grice Electronics, Inc., 280 N. Eglin Pkwy.
Miami—Electro-Standards Labs, Inc., 3560 N.W. 34th St.
Electronic Equipment Co., Inc., 2701 N.W. 42nd Ave.
Walder Electronic Dists., 1801 N.E. 2nd Ave.
Orlando—
Hammond Electrcs., 911 W. Central Ave.
Pensacola—
Grice Electronics, Inc., 320 E. Gregory St.
St. Petersburg—
Mountain Electronics Inc., 2875 46th Ave. No.
Tampa—Leader Electr. Distributors, Inc., 3411 South Dale Mabry Hwy.
Lykes Electronics Corp., Thurow Division, 121 S. Ashley Dr.
W. Palm Beach—Mountain Electronics Inc., 1000 N. Dixie Highway

GEORGIA

Albany—Southeastern Radio, 206 S. Monroe St.
Athens—
Southeastern Radio Parts Co., 393 Finley
Atlanta—Ack Radio Supply Co. of Ga., 554 Deering Rd. N.W.
Jackson Electronics Co., 1135 Chattahoochee Ave., N.W.
Southeastern Radio Parts Co., 430 W. Peachtree St. N.W.
Specialty Distributing, 763 Juniper St., N.E.
Augusta—
Dixie Radio Supply, 1234 Gordon Park Rd.
Gainesville—
Southeastern Radio Parts Co., 412 Oak St.

GEORGIA (cont'd.)

Hapeville—Southeastern Radio Parts Co., 565 N. Central Ave.
La Grange—
Southeastern Radio Parts Co., 206 Ridley Ave.
Macon—Southeastern Radio Parts Co., 866 2nd
Rome—
Southeastern Radio Parts Co., 248 N. 5th Ave.
Savannah—
Southeastern Radio Parts Co., 545 E. York

HAWAII

Honolulu—
Honolulu Electronics, 819 Keeaumoku St.
Industrial Electronic, Inc., 646 Queen St.
Precision Radio, Ltd., 1160 S. King St.
Service Appliance & Electrs., Div/Servo Pacific Inc., 556 Pohukaina

IDAHO

Boise—Kimball Electrs., 418 N. Orchard

ILLINOIS

Chicago—
Electronic Distrib., 4900 N. Elston Ave.
Newark Electrs., 500 No. Pulaski Rd.
Rinoldi Sales, 6319 No. Central
Danville—Bud Electr. Supply, 22 N. Jackson St.
Decatur—
Klaus Radio & Electric, 370 E. Cerro Gordo
Jacksonville—Baptist Electronic Supply Co., 419 S. Mauvaisterre St.
La Salle—Klaus Radio & Electric, 1055 First
Palatine—Ohmtronics, Inc., 649 Vermont Ave.
Peoria—Klaus Radio & Electric Co., 8400 Pioneer Industrial Park
Quincy—Klaus Radio & Electric, 1101 S. B'dway

INDIANA

Anderson—Electronic Supply of Anderson, 23rd and Columbus
Seybert's Radio Supply Inc., 1331 Main St.
Evansville—
Ohio Valley Sound Inc., 20 E. Sycamore St.
Ft. Wayne—Ft. Wayne Electrs., 3606 E. Maumee
Indianapolis—Graham Electrs., Supply, Inc., 133 S. Pennsylvania St.
Graham Electronics, 6101 N. Keystone
Ra-Dis-Co., Inc., 814 N. Senate Ave.
Kokomo—
Servi-Tronics, Inc., 320 W. Superior St.
Lafayette—
Lafayette Radio Electrs., 408 North St.
Michigan City—Tri-State Electrical Supply Inc., 3320 S. Wabash St.
Muncie—Muncie Electronics, 222 No. Madison
Vincennes—Ohio Valley Sound, Ninth & Main

IOWA

Burlington—Union Supply Co., Inc., 231 S. 3rd
Cedar Rapids—Deeco, Inc., 2500 16th Ave. S.W.
Iowa Radio Supply Co., Inc. 719 Center Point Rd., N.E.
Davenport—Klaus Radio & Electric, 322 E. 4th
T.C.R. Distributors, 1205 E. River Dr.
Radio Trade Supply Co., 1017 High St.
Mason City—Waters Elect. Sy., 516 So. Delaware

KANSAS

Coffeyville—Norman Electr. Supply, 121 W. 7th
Great Bend—Radio Supply Co., 1910 Tenth
Salina—Radio Supply Co., Inc., 1809 S. B'dway
Topeka—Interstate Electronic, 2500 S. Kansas
Wichita—Interstate Electronic Supply, 230 Ida
Radio Supply Co., Inc., 115 Laura Ave.

Contact Your Local Distributor For The 1971 Radio-Electronic MASTER

KENTUCKY

Lexington—Radio-Electronic Equipment Co., Inc., 480 Skain Ave.
Louisville—P.I. Burks Co., 842 S. Seventh St.
Peerless Electr. Equipt., 1815 S. Seventh St.
Owensboro—Ohio Valley Sound, 600 W. 3rd St.

LOUISIANA

Alexandria—Ralph's, 601 N. 3rd St.
Baton Rouge—
Davis Wholesale Electronic Supply Co., 3575 Choctaw Dr.
Ralph's 1732 Plank Rd.
Southern Radio Supply Co., 2610 Scenic Hwy.
Gretna—EPCOR, 723 Franklin St.
Lafayette—Ralph's, 3004 Cameron St.
Lake Charles—Ralph's, 911 4th Ave.
Metairie—
Sterling Electronics, 5029 Veterans Hwy.
Morgan City—Ralph's, 715 Brashear St.
New Iberia—Ralph's, 1903 E. Main St.
New Orleans—Columbia Radio & Sup., 3940 3rd
EPCOR, 3308 Orleans Ave.
Radio Parts, Inc., 1331 Prytania St.
Southern Radio Supply, 1909 Tulane Ave.
Shreveport—
B & S Electronics Inc., 2618 Southern Ave.
Interstate Electric Co., Inc., 1419 Culpepper St.
Koelemay Electronics, 2530 Linwood Ave.
Wholesale Electronic Supply, 2423 Southern Ave.

MAINE

Portland—Commercial Distributors, Parts Dept., 8 Somerset St.

MARYLAND

Aberdeen—Harco Electrs., Carsins Run, Rte. 22
Baltimore—ASI Electronics, Div. of Astrex, Inc., 1728 Whitehead Rd.
Henry O. Berman Co., Inc., 12 E. Lombard St.
General Radio Electronics Inc., 2207 E. Joppa Rd.
Radio Electric Service Co. of Pa., 1728-30 Whitehead Rd.
Bethesda—Empire Electr. Sup., 4907 Rugby Ave.
Hagerstown—
Stoddard Supply Co., 354 S. Cannon Ave.
Hyattsville—
Milgray/Washington, 5405 Lafayette Pl.
Rockville—Capitol Radio Wholesalers, Inc., 12270 Wilkins Ave.

MASSACHUSETTS

Boston—
Sager Electrical Supply Co., 172 High St.
Burlington—
Milgray/New England, 79 Terrace Hall Ave.
Cambridge—Electrical Supply Corp., 205 Alewife Brook Parkway
Fitchburg—
Radio Maintenance Supply Co., 1334 Water St.
Lexington—Harvey/R&D, 44 Hartwell Ave.
Lynn—Land Electronics Supply Co., Inc., 9R Franklin St.
No. Wilbraham—Industrial Components Corp., 2551 Boston Road
Springfield—Del Padre Supply of Springfield, 999 Worthington St.
Soundco Electronics Corp., 2095 Roosevelt Ave.
Westwood—Eastco, 26 Dartmouth St.
Worcester—
Radio Maintenance Supply Co., 80 Thomas St.

MICHIGAN

Flint—
Shand Electronics, Inc., 2401 S. Dort Hwy.
Marquette—
NWR Electrs. Corp., 1010 W. Washington
Romulus—Harvey/Detroit, 36312 Ecorse Road

MINNESOTA

Duluth—Northwest Radio, 123 E. 1st St.
Edina—Lew Bonn Co., 7275 Bush Lake Rd.
Minneapolis—Electronic Center, 107 3rd Ave. N.
St. Paul—
Electronic Center, 312 W. University Ave.

MISSISSIPPI

Columbus—Bluff City Dist. Co., 116 So. 22nd
Greenville—Bluff City Dist., 349 Hwy. #1 So.
Hattiesburg—Swan Electrs., 506 Bouie St.
Jackson—Ellington Electronic Supply, 824 South Gallatin St.
Risher Radio Supply Co. Inc., 837 Bailey Ave.
Swan Electronics, 342 N. Gallatin St.
McComb—Risher Radio Supply Co., Inc. 401 S. Broadway
Meridian—
Risher Radio Supply Co., Inc., 3510 8th St.
Pascagoula—
May Electronics Supply, 1412 E. Ingalls Ave.
Ralph's, 2102 Ingalls Ave.
Tupelo—Bluff City Dist., 707 Robert E. Lee Dr.

MISSOURI

Joplin—Norman Electronic Supply, 402 Wall
Kansas City—
Burstein-Applebee Co., 3199 Mercier
Burstein Applebee Co., 1012 McGee St.
Burstein-Applebee Co., 301-305 E. 55 St.
McGee Radio Co., 1901 McGee St.
Norman Electr. Supply Co., 3814 Main
Radiolab, Inc., 3814 Main
Walters Radio Supply Inc., 3627 Main St.
St. Louis—Radonics-Electrs., 4445 Gustine Ave.
Van Sickle Radio-Electronics, Inc., 1915 Washington Ave.
Springfield—Burstein-Applebee Co., c/o Plaza Shopping Center, 1904 So. Glenstone At Sunshine
Norman Electr. Supply, 952 E. Trafficway

NEBRASKA

Lincoln—Leuck Radio Supply, 1024 "L" St.
Scott Electr. Supply, 4040 Adams St.
North Platte—Scott Electr. Sup., 516 N. Poplar
Omaha—J-B Distributing Co., 1616 Cass St.
Radio Equipment Co., 625 N. 18th St.

NEVADA

Las Vegas—Electronic Supply Co., 1112 South Casino Center Blvd.
Industrial Electronics, 300 W. Utah

NEW HAMPSHIRE

Manchester—RSL Distrs., 670 Chestnut St.

NEW JERSEY

Camden—General Radio Supply, 600 Penn St.
Lectronic Distributtors, Inc., 1423 Ferry Ave.
Radio Electric Service Co. of Pa., 211 Market St.
Cherry Hill—
Milgray/Delaware Valley, 1165 Marlkress Rd.
RESCO Electronics, Cherry Hill Mall Dr., Rt. 38
Clifton—Eastern Radio Corp., 312 Clifton Ave.
Harvey/New Jersey, 375 Allwood Road
Irvington—
Kevtron Electronics Corp., 702 So. 21st St.
Pennsauken—Radio Electric Serv. Co. of Pa., Airport and Central Highways
Airport Industrial Park
Totowa—Arrow Electronics Inc., 225 Route 46

NEW MEXICO

Albuquerque—
Walker Radio Co., 102 Granite Ave. N.W.

NEW YORK

Batavia—Radio Equipment Corp., 5 Center St.
Bayside—
Arrow Electronics Inc., 207-02 Northern Blvd.
Binghamton—
Harvey/Federal, Vestal Parkway East
Stack Indl. Electrs. Inc., 45 Washington St.
Brooklyn—Laco Indus. Electrs., 4924 4th Ave.
Buffalo—Radio Equipment Corp., 196 Vulcan St.
Radio Equipment Corp., 3240 Sheridan Drive
Summit Distributors Inc., 916 Main St.
Cheektowaga—
Harvey/Buffalo, 1517 Cleveland Drive
Radio Equipment, 1532 Walden Ave.
Elmsford—
Melville Radio Corp., 1 Nepperhan Ave.
Farmingdale—
Arrow Electronics, Inc., 900 Route 110
Harrison Electronics Corp., 20 Smith St.
Flushing—Allen Electronics, Inc., 41-42 Main
Arrow Electronics, Inc., 207-02 Northern Blvd.
Freeport—Milgray/New York, 191 Hanse Ave.
Glens Falls—Ray Supply Inc., Upper Glen St.
Hempstead—
Davis Electronics Corp., 204 Main St.
Electronic Equipment Co., Inc., 741 Peninsula Blvd.
Jamaica—Harrison Radio Co., 139-20 Hillside Ave.
Lafayette Radio Electrs., 165-08 Liberty Ave.
Norman Radio Distrs., 94-29 Merrick Blvd.
Long Island City—
Dalis Industrial Electronics, 35-35 24th St.
Lynbrook—Peerless Radio Corp., 19 Wilbur St.
Mineola—
Arrow Electronics Inc., 525 Jericho Turnpike
Nanuet—Arrow Electronics Inc., 195 W. Route 59
New York—
Arrow Electronics Inc., 97 Chambers St.
Center Industr. Electrs., 15-17 E. 16th St.
Harrison Radio Co., 8 Barclay St.
Harvey/Pro Audio/Visual, 2 West 45th St.
Midway Industrial Electronics, Inc., 38 E. 29th St.
Midway Radio & Television, 58 W. 45th St.
Newburgh—Chief Electronics, 248 Washington
Niagara Falls—
Radio Equipt. Corp., 1720 Pierce Ave.
Olean—Radio Equipt. Corp., 1615 West State
Poughkeepsie—Chief Electrs., 14 N. Bridge St.
Richmond Hill—
Anchor Electronic Dist., 116-01 101st Ave.
Rochester—
Masline Electrs., 511 Clinton Ave., South
Rochester Radio Supply, 140 W. Main St.
Syracuse—Morris Electronics of Syracuse, Inc., 1153 W. Fayette St.
White Plains—Westchester Electronics, Inc., 610 Mamaroneck Ave.
Woodbury—
Harvey/New York, 60 Crossways Park West

NORTH CAROLINA

Asheville—Freck Radio & Supply Co., Inc., 38-40 Biltmore Ave.
Freck Radio & Supply Co., 1074 Patton Ave.
Charlotte—Dixie Radio Supply, 2220 So. Tryon
Durham—Womack Electr. Supply Co., Inc., Box 1808, 511 Ramseur St.
Gastonia—
Dixie Radio Supply, 507 W. Airline Ave.
Greensboro—
Carolina Radio Supply Co., 838 Huffman St.
Hickory—
Freck Radio & Supply Co., 1012 Hgwy. 64-70
Raleigh—Southeastern Radio Supply, 414 Hillsborough St.
Shelby—Freck Radio & Sup., 402 W. Dixon Blvd.

OHIO

Akron—Sun Radio Co., 110 E. Market St.
Ashtabula—Sim's Electronic Supply Co., Inc., 4933 West Ave.
Cincinnati—Mytronic Co., 1843 N. Reading Rd.
United Radio, Summit Rd. & Reinhold Dr.
Cleveland—
Arrow Electronics, Inc., 23945 Mercantile Rd.
Milgray/Cleveland, 1821 E. 40th St.
Winteradio Electr. Sup., 1468 W. 25th St.

(Continued on next page)

Contact Your Local Distributor For The 1971 Radio-Electronic MASTER

OHIO (cont'd.)

Columbus—Thompson Electronic Supplies, Inc., 182 E. Long St.
Dayton—
Arrow Electronics Inc., 3100 Plainfield Rd.
Stotts-Friedman Co., 108 N. Jefferson St.
Lima—Lima Radio Parts Co., 600 N. Main St.
Parma—Winteradio Electr. Sup., 5373 Ridge Rd.
So. Euclid—
Winteradio Elect. Supply, 4432 Mayfield Rd.
Warren—REM Electrs., Sup., 264 W. Market St.

OKLAHOMA

Ada—Trice Wholesale Electrs., 231 N. Francis
Ardmore—Trice Wholesale Electrs., 709 Grand
Enid—Trice Wholesale Electrs., 223 E. Randolph
Lawton—Trice Wholesale Electrs., 30 "E" St.
McAlester—
Trice Wholesale Electronics, 529 No. Main
Muskogee—
Trice Wholesale Electronics, 211 Callahan
Oklahoma City—Radio, Inc., 903 North Hudson
Trice Wholesale Electrs., 4701 N. Stiles Ave.
Trice Wholesale Electronics, 800 No. Hudson
Wholesale Electronic Supply, 26th & Lincoln
Okmulgee—
Trice Wholesale Electronics, 120 N. Oklahoma
Ponca City—
Trice Wholesale Electronics, 607 No. First St.
Tulsa—Burstein-Applebee Co.,
c/o Crossroads Shopping Center,
6353 E. 41st St.
Oil Capitol Electronics Corp., 708 So. Sheridan
Radio, Inc., 1000 South Main St.
Trice Wholesale Electronics, 730 So. Utica

OREGON

Klamath Falls—RF Supply Co., 509 Commercial
Medford—Verl G. Walker Co., 205 W. Jackson St.
Portland—Almac/Stroum Electronics,
8888 S. W. Canyon Road
JW Electronics, Inc., 2030 S. E. 7th Ave.

PENNSYLVANIA

Allentown—A. A. Peters, Inc., 404 Union Blvd.
Radio Electric Service Co., 425 Hanover Ave.
Braddock—
M. Leff Radio Parts, 225 Braddock Ave.
Carlisle—Cumberland Electrs., 810 No. Hanover
Drexel Hill—Kass Electronics Distributors,
2502 Township Line Rd.
Easton—Radio Elec. Serv. Co., 1700 Northampton
Erie—J. V. Duncombe Electr., 721 Parade St.
Folcroft—Arrow Electronics, Inc.,
700 Carpenter's Crossing
Harrisburg—Cumberland Electrs., 1345 So. 12th
Lancaster—
Barbey Electronics, 622 Columbia Ave.
Lebanon—
Barbey Electronics, 821 Quentin Rd.
Norristown—
Phila. Electronics Inc., 624 W. Airy St.
Philadelphia—
A. C. Radio Supply Co., 1539 W. Passyunk Ave.
Phila. Electronics, Inc., 1225 Vine St.
Radio Electric Service Co. of Pa.,
5930 Market St.
Radio Electric Service Co. of Pa.,
6587 Roosevelt Blvd.
Simco Electrs., Inc., 3907-11 N. Broad St.
Eugene G. Wile, 218 South 11th St.
Pittsburgh—Cameradio Co., 2801 Liberty Ave.
Pottstown—Barbey Electronics, 157 N. York St.
Pottsville—Moyer Electronic Supply Co., Inc.,
330 E. Norwegian St.
Reading—Barbey Electronics, 333 N. 4th St.
Electronic & TV Distrs., Inc., 201 So. 4th St.
Upper Darby—Radio Electric Service Co. of Pa.,
7911 W. Chester Pike
Willow Grove—Radio Electric Service Co. of Pa.,
29 York Rd.

RHODE ISLAND

Cranston—
Jabbour Electronics Inc., 840 Dyer Ave.
Pawtucket—
Jabbour Electronics Inc., 20 Woodbine St.
Providence—
William Dandreta & Co., 28 Wolcott St.
Warwick—
W. H. Edwards, Inc., 55 Electronic Drive

SOUTH CAROLINA

Anderson—
Dixie Radio Supply, 1206 S. Murray Ave.
Charleston—Radio Laboratories, 475 E. Bay St.
Wholesale Radio Supply Inc., 515 E. Bay St.
Columbia—Dixie Radio Supply, 1900 Barnwell
Southeastern Radio Parts Co., 1606 Gregg
Florence—Dixie Radio Supply, 531 Palmetto
Greenville—Dixie Radio Supply, 500 Pendleton
Greenwood—Dixie Radio Supply, 116 Circular St.
Spartanburg—Dixie Radio Sup., 208 E. St. John
Sumter—Dixie Radio Supply, 25 Guignard Dr.

TENNESSEE

Bristol—Clark Radio Supply, 1130 W. State
Johnson City—
Freck Radio & Supply, 1611 W. Market St.
L & S Electronics, 501 So. Roan St.
Kingsport—Radio Elec. Sup., 961 E. Sullivan
Knoxville—Bondurant Bros. Co., 906 Sevier Ave.
Industrial Electronics, Inc.,
Gov. John Sevier Hwy.
Mountain Electronics Inc.,
2211 Dutch Valley Rd.
Roden Electrical Supply Co.,
205 Oklahoma, N.W.
Memphis—Bluff City Distributing, 234 East St.
Nashville—Braid Electric Co., 1101 McGavock St.
Electra Distrib. Co., 1914 West End Ave.
Union City—Bluff City Dist. Co., 306 S. Second

TEXAS

Amarillo—Nunn Electric Supply, 119 Polk St.
Trice Wholesale Electronics, 1014 W. Sixth
Austin—Electrotex, 914 W. 12th St.
Hargis-Austin, Inc., 410 Baylor St.
Beaumont—Electrotex, 1275 E. 11th St.
Ralph's, 1293 Broadway
Bellaire—Tele-Radio, Inc., 5202 Bissonnet
Borger—Trice Wholesale Electrs., 500 W. 3rd
Corpus Christi—Alltec Electronics Corp.,
3854 S. Padre Island Dr.
Electrotex, 1800 Ayers
Wicks Radio Equipment Co.,
513-515 S. Staples St.
Dallas—Crabtree's Electronics, 2608 Ross Ave.
Crabtree's Electronics,
254 W. Carpenter Freeway
Crabtree's Electronics,
11430 N. Central Expressway
Crabtree's Electronics,
3510 Marvin D. Love Freeway
Crabtree's Electronics, 4428 Lemmon Ave.
Electronic Center, Inc., 2929 N. Haskell
Trice Wholesale Electronics, 2914 Commerce
Wholesale Electronic Supply, 2809 Ross Ave.
El Paso—Midland Specialty, 2235 Wyoming Ave.
Nunn Electric Supply, 2137 Mills Ave.
Fort Worth—
Crabtree's Electronics, 2939 W. 7th St.
Swieco, Inc., 1518 E. Lancaster
Trice Wholesale Electronics, 104 South Main
Wholesale Electronic Supply, 520 So. Freeway
Houston—Electrotex Corp., 2300 Richmond
Electrotex, 512 Crosstimbers
Geophysical Supply Co., 1500 Crawford St.
Lenert Co., 1420 Hutchins
Sterling Electrs., 4201 Southwest Freeway
Universal Electronics Supply Inc., 5723 Savoy
Killeen—Trice Wholesale Electrs., 709 N. 8th
La Marque—Electrotex, 216 Byrd St.
Laredo—Guarantee Radio Sup., 1314 Iturbide

TEXAS (cont'd.)

Longview—
Wholesale Electronic Supply, 203 So. High
Lubbock—
Nunn Electric Supply Corp., 1801 4th St.
R & R Electronic Supply, 1607 Ave. G
Trice Wholesale Electronics, 1812 Ave. "Q"
Lufkin—Electrotex, 407 Atkinson Drive
Midland—
Trice Wholesale Electrs., 1907 W. Industrial
Odessa—
Midland Specialty Co., 2101 Andrews Hwy.
Pampa—Trice Wholesale Electrs., 400 S. Russell
Port Arthur—
Texas Electronics Co., 1236 Seventh St.
San Antonio—Electrotex Corp., 910 W. Laurel
Sherman Electronics Supply, Inc.,
722 San Pedro Ave.
Sterling Electronics, 4600 San Pedro Ave.
Sherman—
Trice Wholesale Electronics, 306 S. Crockett
Temple—Trice Wholesale Electrs., 217 No. Main
Texarkana—
McCulloch Electr. Sup., 1222 Main St.
Tyler—East Texas Electronics, Inc.,
119-121 So. Glenwood Blvd.
Victoria—Electrotex, 1007 N. Williams
Waco—
Wholesale Electronic Supply, 1400 Washington
Wichita Falls—
Trice Wholesale Electrs., 1502 11th St.
Wholesale Electronic Supply, 1006 Holiday

UTAH

Salt Lake City—
Kimball Electrs., 350 Pierpont Ave.
Standard Supply Co., 225 E. 6th South St.

VIRGINIA

Alexandria—Certified Electrs., 1313 Powhatan
Norfolk—Avec Electronics, 711 Granby St.
Cain Electronics Co., 1530 Ingleside Rd.
Priest Electronics, Inc., 6431 Tidewater Dr.
Portsmouth—Distributors, Inc., 710 County St.
Richmond—Avec Electrs., 2002 Staples Mill Rd.
Roanoke—Avec Electronics, 2009 Williamson Rd.
H. C. Baker Sales Co., 19 Franklin Rd. S.W.
Staunton—
Southern Electric Corp., 818 Greenville Ave.
Virginia Beach—
World Electronics, 206 Jersey Ave.
Winchester—
Stinson Elects. Inc., 2149 Valley Ave.

WASHINGTON

Bellingham—Advanced Electronics, 804 Dupont
Olympia—J. W. Electronics, 2921 Pacific Ave.
Seattle—Pacific Electrs. Sales, 1209 First Ave.
Almac/Stroum Electronics, 5811 6th Ave. So.
Amateur Radio Supply Co.,
d/b/a/ Radio Supply Co., 6213 13th Ave. So.
Western Electrs., Co., 717 Dexter Ave. N.
Spokane—Columbia Electric, E. 3420 Ferry Ave.
Tacoma—C & G Electrs., Co., 2502 Jefferson Ave.

WEST VIRGINIA

Charleston—Mountain Electrs., 1605 4th Ave.

WISCONSIN

Fond du Lac—
Wisconsin Electr. Sup. 223 N. Seymour St.
Green Bay—Northern Radio & Telev., 1585 Main
Milwaukee—
Marsh Radio Supply, 6047 W. Beloit Rd.
Radio Parts Co., Inc., 1314 N. 7th St.

This is the last page of Volume 3, Catalog Section

Next page starts Manufacturers and Sales Offices Directory

MANUFACTURERS AND SALES OFFICE DIRECTORY

This is an alphabetical listing of more than 6,000 manufacturers supplying electronic equipment, instrumentation, components, materials and fabrication services. Included for each company are address, telephone number and name of the key sales executive.

Bold Face listings indicate those manufacturers who have information in the catalog sections (white pages) of the three volumes of **eem.** Their page numbers are included, as well as listings of their local sales offices. Sales offices are listed by state and city. Look for the sales office nearest you. Be sure to ask the sales office if there is a distributor of electronic parts nearby who handles the line in which you are interested.

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1971-72

note:
This same directory appears in all three volumes of eem.

A & D ELECTRICAL INSTRS., 73-07 88th St., Glendale, N.Y., 11227, Tel: 212-275-6516; Sls. Mgr: D.B. Schettini

A & M INSTRUMENT, INC., Community Dr., Great Neck, N.Y., 11022, Tel: 516-487-0330, TWX: 510-223-0888; Sls. Mgr: P. Stitzer

AAI CORP., P.O. Box 6767, Baltimore, Md., 21204, Tel: 301-666-1400, TWX: 710-232-1800; Sls. Mgr: K.E. Daub

AARON-DAVIS CO., 1150 S.Beverly Dr., Los Angeles,, Cal., 90035, Tel: 213-553-8121; Sls. Mgr: R. Alan Pg. 616

AAVID ENGRG., INC., 30 Cook Ct., Laconia, N.H., 03246, Tel: 603-524-4443; Sls. Mgr: P.A. Johnson

AB RIFA, See LM Ericsson

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A. J. ABRAMS CO., Box 571, Westport, Conn., 06880, Tel: 226-3010; Sls. Mgr: A.J. Abrams

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NY Cortland, RJC Assocs., 26 Morningside 697-753-3909
NY Great Neck, EAC Assocs., 55 Northern 516-466-9798
Pa Kimberton, W. Dugger Co., Box 482 215-933-7756

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Ariz Scottsdale, O.E.M. Spec., 6625 E. MacDonald 602-946-4617
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Fla Maitland, Beacon Elctrn., 540 S. Maitland 305-647-3498
Ga Atlanta, Beacon Elctrn., 2285 Peachtree Rd. 404-351-3654

See Page 957 for TRADE NAME DIRECTORY

Ill Chicago, Data Elctrns., 5505 N. Menard 312-774-1452
Kans Leawood, Poly-Onics, 4434 W. 90th Terr. 913-648-4173
Md Silver Spring, Sel-Tronics, 721 Ellsworth 301-589-3391
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Ohio Dayton, R. G. Sidnell, 3300 S. Dixie Dr. 513-293-1194
Ohio Mentor, R. G. Sidnell, 7191 Dogwood La. 216-942-3304
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Utah Salt Lake City, PLS Assocs., 5219 Major St. 801-262-2866
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NY Rochester, L-Tron Corp., 47 Devonshire Ct. 716-436-4410
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Mich Southfield, Sterling-Lowell, 21251 Civic Center 313-352-8881
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NIPPERT CO., 825 Pittsburgh Dr., Delaware, Ohio, 43015, Tel: 614-363-1981; V.P: J.E. Nippert

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Cal Los Angeles, Moxon Elctrns., 2311 Pontius Ave. 213-272-9311
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NL INDS., See National Lead Co.

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Wash Seattle, Reeve Mktg. Assocs., 4000 Aurora Ave. N. 206-632-4290

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V1	80-260	150min	3MHz	290
V2	250-520	150min	spfy	190
U7	490-1000	150min	spfy	190
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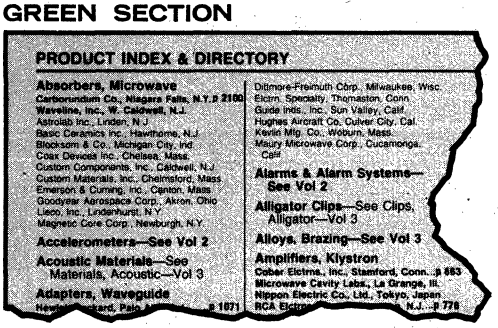
See Page 957 for TRADE NAME DIRECTORY

How to use eem

to find manufacturers of a specific product

GREEN SECTION


PRODUCT INDEX & DIRECTORY

Absorbers, Microwave
Carborundum Co., Niagara Falls, N.Y.p 2100
Waveline, Inc., W. Caldwell, N.J.
Astrolab Inc., Linden, N.J.
Basic Ceramics Inc., Hawthorne, N.J.
Blocksom & Co., Michigan City, Ind.
Cree Devices Inc., Chelsea, Mass.
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Goodyear Aerospace Corp., Akron, Ohio
Lieco, Inc., Lindenhurst, N.Y.
Magnetic Core Corp., Newburgh, N.Y.

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Acoustic Materials—See Materials, Acoustic—Vol 3

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Electr. Specialty, Thomaston, Conn.
Gurde Instr., Inc., Sun Valley, Calif.
Hughes Aircraft Co, Culver City, Cal.
Kevlin Mfg. Co., Woburn, Mass.
Maury Microwave Corp., Cucamonga, Calif.

Alarms & Alarm Systems—See Vol 2

Alligator Clips—See Clips, Alligator—Vol 3

Alloys, Brazing—See Vol 3

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Nippon Electric Co, Ltd., Tokyo, Japan
RCA Electron... N.J. ...p 776

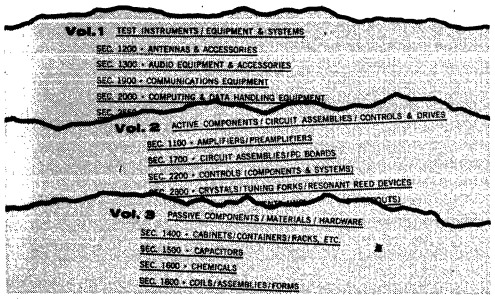
Each of the three volumes of **eem** contains a Product Index and Directory, the Green Section. This Index is a complete alphabetical listing of products. If the product you are looking for appears in the particular volume you are consulting, the green pages will provide a complete list of manufacturers who make that product. If the product is included in another volume of **eem**, the Index will provide a cross reference, directing you to the correct volume.

Boldface listings under product headings indicate that the listed manufacturer has products cataloged in **eem. Boldface** listings with page numbers indicate that this manufacturer's catalog pages include detailed data on the product indicated in the product heading.

Similar products are grouped together. For example, the many kinds of meters are listed in this manner: "Meters, Ampere," "Meters, Capacitance," "Meters, Flux" etc. To help you locate the prime product heading, there are hundreds of cross references, e.g. "Voltmeters — See Meters, Volt."

to find manufacturers' catalog information

WHITE SECTION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SEC. 1200 - ANTENNAS & ACCESSORIES
SEC. 1300 - AUDIO EQUIPMENT & ACCESSORIES
SEC. 1900 - COMMUNICATIONS EQUIPMENT
SEC. 2000 - COMPUTING & DATA HANDLING EQUIPMENT

Vol. 2 ACTIVE COMPONENTS / CIRCUIT ASSEMBLIES / CONTROLS & DRIVES
SEC. 1100 - AMPLIFIERS/PREAMPLIFIERS
SEC. 1700 - CIRCUIT ASSEMBLIES/PC BOARDS
SEC. 2200 - CONTROLS (COMPONENTS & SYSTEMS)
SEC. 2400 - CRYSTALS/TUNING FORKS/RESONANT REED DEVICES

Vol. 3 PASSIVE COMPONENTS / MATERIALS / HARDWARE
SEC. 1400 - CABINETS/CONTAINERS/RACKS, ETC.
SEC. 1500 - CAPACITORS
SEC. 1600 - CHEMICALS
SEC. 1800 - COILS/ASSEMBLIES/FORMS

Catalog pages in **eem** are divided into three volumes based on very broad product groupings. These are:

Volume 1 — Test Instruments / Equipment and Systems

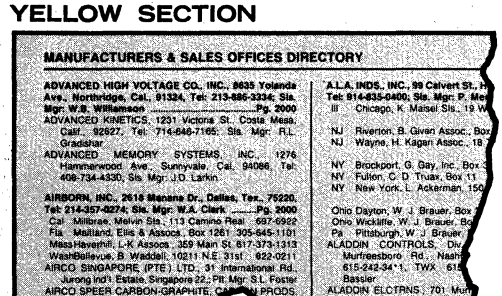
Volume 2 — Active Components / Circuit Assemblies / Controls and Drives

Volume 3 — Passive Components / Materials / Hardware

These volumes are further divided into 55 **eem** Product Sections which are assigned individually to the most appropriate volume. Within each of the 55 product sections manufacturers are arranged alphabetically, wherever possible. A complete index of all manufacturers' catalog pages is included in every volume. To locate the catalog pages of a specific manufacturer, refer to this index at the beginning of the white section in any of the three volumes. This index will provide the page numbers you require. In Volume 1, the index begins on page 302, in Volume 2 on page 1274 and in Volume 3, page 2310.

to find manufacturers' addresses, phones and sales offices

YELLOW SECTION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NJ - Wayne, H. Kagan Assoc., 18...
NY - Brockport, G. Gay, Inc., Box...
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Pa - Pittsburgh, W. J. Brauer,...
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ALADDIN ELCTRNS, 701 Mur... Tenn., 37210, Tel: 615-24...

More than 6,000 manufacturers of electronic components, materials, instruments, assemblies, systems and key services are listed in the Yellow Section. An identical Yellow Section appears in each of the three volumes of **eem,** listing addresses, phone numbers and sales managers' names. TWX numbers are also included where available. **Boldface** listings indicate that detailed information on the manufacturers' products is cataloged in the White Section of **eem. Boldface** listings also indicate that local sales offices or representatives are listed for that manufacturer.

to find trade name sources

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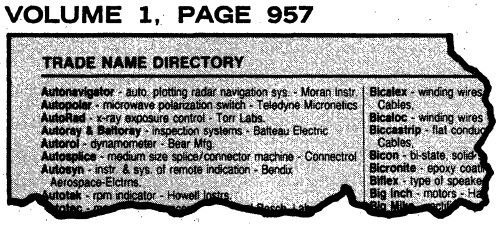
TRADE NAME DIRECTORY

Autonevigator - auto. plotting radar navigation sys. - Moran Instr.
Autopolar - microwave polarization switch - Teledyne Microneitics
AutoRad - x-ray exposure control - Torr Labs.
Autoray & Battoray - inspection systems - Balteau Electric
Autorol - dynamometer - Bear Mfg.
Autosplice - medium size splice/connector machine - Connectrol
Autosyn - instr. & sys. of remote indication - Bendix Aerospace-Elctrns.
Autotek - rpm indicator - Howell Instrs.

Bicalex - winding wires... Cables.
Bicaloc - winding wires...
Biccastrip - flat conduc... Cables.
Bicon - bi-state, solid-...
Bicronite - epoxy coati...
Biflex - type of speake...
Big inch - motors - He...

If you know only the trade name, brand name or trade mark of a product, you can locate it in **eem** by using the **Trade Name Directory.** This appears only in Volume 1, beginning on page 957 of the White Section. These pages can be identified by a vertical black band along the outside edge.

if you require additional assistance

contact the Editorial Department, United Technical Publications, Inc., 645 Stewart Ave., Garden City, N.Y. 11530, or phone (516) 248-9700.

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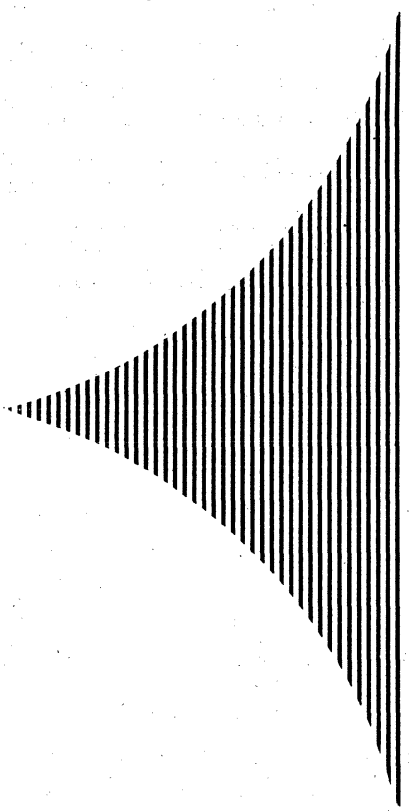


If you want to know

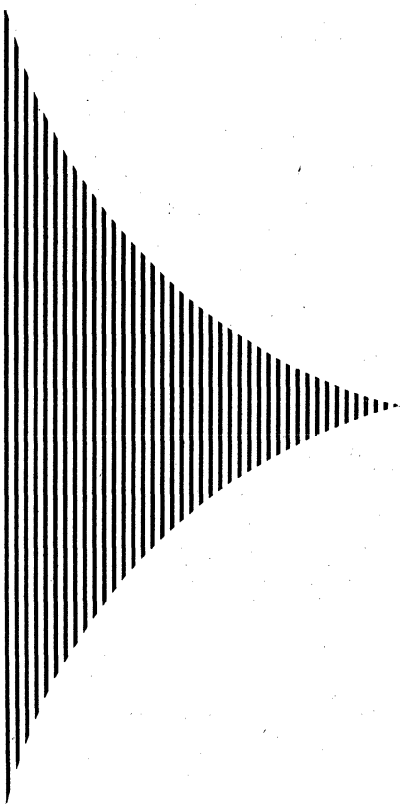
what manufacturers make what products, the **eem** green pages will solve your problem.

Product data is found

in the **eem** white pages they contain just about all the information you need to make a purchase decision.

If you're interested

in finding the address of a specific manufacturer, the **eem** yellow pages is the place to look.



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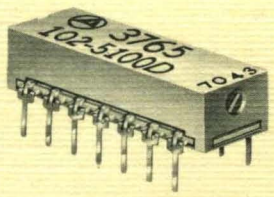
TRN



Amphenol's "New Concept" Trimming Resistive Networks (TRN) are a combination of a variable resistor and up to 5 fixed resistors in a single package.

CONTROLS DIVISION

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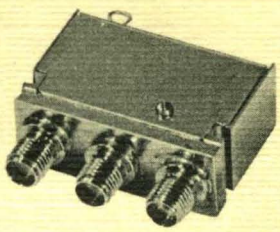

The unusually high power handling capability of these tiny, inexpensive units make them ideal for microwave signalling, communications and EDP matrix switching.

RF DIVISION

For more information and fast sales service, contact your nearest Amphenol Sales Representative or Amphenol Industrial Distributor.

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Economical, versatile, rectangular 14 contact relay socket with solder eyelet, PC tail contacts for computers, data processing equipment, business machines and communication equipment.

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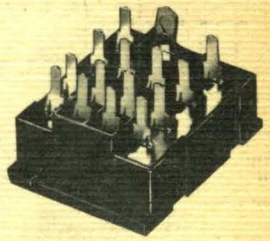
RELAY SOCKET



Save 15¢ a hole with this high density environmental connector. MIL-C-81511.

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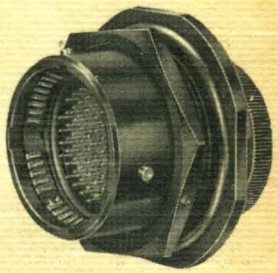

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